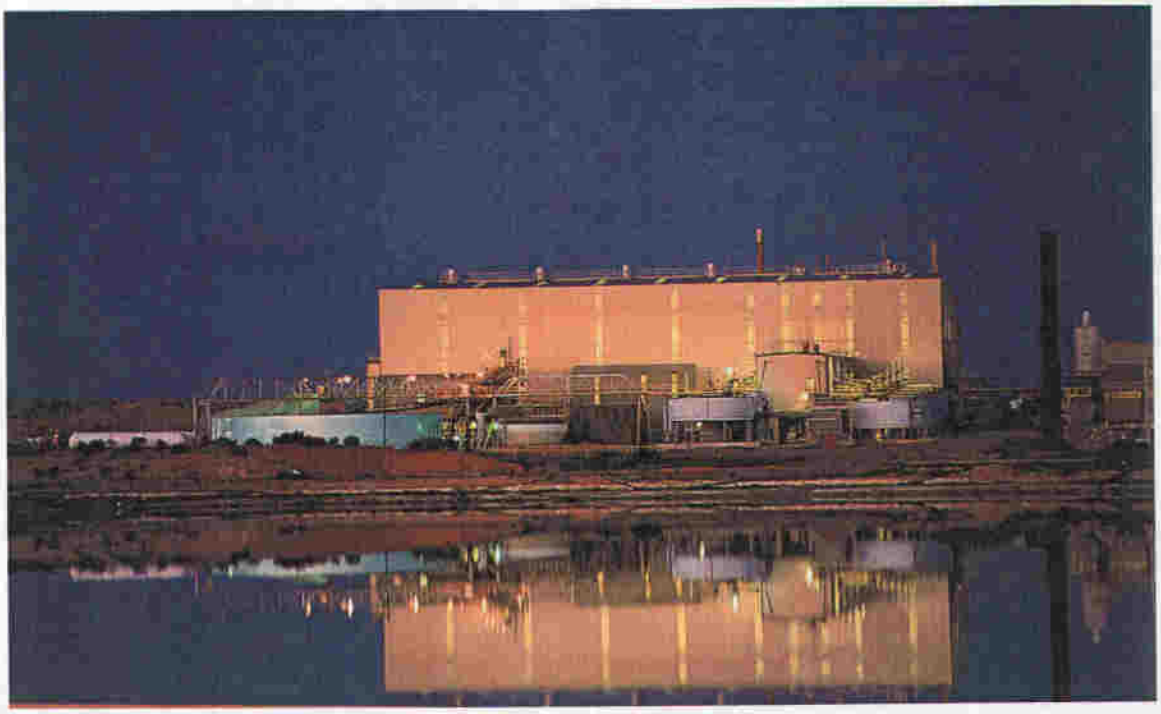

WHITE MESA URANIUM MILL

LICENSE RENEWAL APPLICATION

STATE OF UTAH RADIOACTIVE MATERIALS LICENSE No. UT1900479

February 28, 2007

Prepared By:
Denison Mines (USA) Corp.
1050 17th Street, Suite 950
Denver, CO 80265

Volume 1 of 5
(License Renewal Application)

DENISONMINES

February 28, 2007

VIA HAND DELIVERY

Dane L. Finerfrock, Executive Secretary
Utah Radiation Control Board
Utah Department of Environmental Quality
168 North 1950 West
P.O. Box 144810
Salt Lake City, UT 84114-4810

Re: Application to Renew State of Utah Radioactive Materials License No. UT 1900479 for the White Mesa Uranium Mill

Dear Mr. Finerfrock:

Denison Mines (USA) Corp. ("Denison") is pleased to deliver to you its application to renew State of Utah Radioactive Materials License No. UT 1900479 (the "License") for the White Mesa Uranium Mill (the "Mill").

Please accept this as Denison's formal application to renew the License under Utah Administrative Code R313-22-37. Enclosed with this letter and included as part of this application are the following:

1. Form DRC-01 with attached Addendum.

2. Five-volume set of supporting documents, including Volume 1, *License Renewal Application, State of Utah Radioactive Materials License No. UT1900479*, dated February 28, 2007, and Volume 4, *Environmental Report in Support of License Renewal Application, White Mesa Uranium Mill*, dated February 28, 2007, and Appendices thereto in Volumes 2, 3 and 5; and

3. The following documents delivered to you at this time under cover of and described in a separate letter dated today's date:

   a) Previous Environmental Analyses

Denison Mines (USA) Corp.
www.denisonmines.com
1050 17th Street, Suite 950
Denver, CO, USA 80265
Tel : 303 628-7798
Fax : 303 389-4125

DENISONMINES

February 28, 2007

VIA HAND DELIVERY

Dane L. Finerfrock, Executive Secretary
Utah Radiation Control Board
Utah Department of Environmental Quality
168 North 1950 West
P.O. Box 144810
Salt Lake City, UT 84114-4810

Re: Application to Renew State of Utah Radioactive Materials License No. UT 1900479 for the White Mesa Uranium Mill

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   a) Previous Environmental Analyses

Denison Mines (USA) Corp.
www.denisonmines.com
1050 17th Street, Suite 950
Denver, CO, USA 80265
Tel : 303 628-7798
Fax : 303 389-4125

(i) 1978 Environmental Report, prepared by Dames & Moore;

(ii) 1979 Final Environmental Statement, prepared by the United States Nuclear Regulatory Commission ("NRC"); and

(iii)1997 Environmental Assessment, prepared by NRC

b) Monitoring Reports

(i) Semi-Annual Effluent Monitoring Reports since January 1997;

(ii) Annual National Emission Standards for Hazardous Air Pollutants (NESHAP) Reports since January 1997;

(iii)Particulate matter compliance test results for the North Yellowcake Scrubber Dryer Baghouse and Superior Boiler conducted under the Mill's State of Utah Air Approval Order; and

(iv)Radionuclide Emission Tests for the Mill's yellowcake scrubber since the last License renewal in March 1997;

c) Groundwater Monitoring

(i) State of Utah Groundwater Discharge Permit No. UGW370004, as amended, and accompanying Statement of Basis;

(ii) Quarterly Groundwater and DMT Performance Standard Monitoring Reports since the issuance of the groundwater discharge permit in March 2005;

d) Chloroform Investigation

(i) Quarterly Chloroform Monitoring Reports, commencing with the 2nd quarter of 2005.

If you have any questions, or we can provide any further information, please contact me at your

convenience.

Yours truly,

Denison Mines (USA) Corp.

By:

David C. Frydenlund
Vice President and General Counsel

cc: Ron F. Hochstein
Harold R. Roberts
Steven D. Landau
David E. Turk

DRC-01
09/06

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF RADIATION CONTROL
APPLICATION FOR RADIOACTIVE MATERIAL LICENSE

INSTRUCTIONS: Complete all items whether this is an initial application or an application for renewal of a license. Use supplemental sheets where necessary. Mail to: **Utah Department of Environmental Quality, Division of Radiation Control, P.O. Box 144850, Salt Lake City, Utah 84114-4850.** Upon approval of this application, the applicant will receive a Radioactive Material License, issued in accordance with the requirements contained in the current Radiation Control Rules as adopted by the Utah Radiation Control Board.

1. THIS IS AN APPLICATION FOR: ☐ A New License ☐ Amendment to License Number UT _____ ☒ Renewal of License Number UT 1900479	**2. NAME, MAILING ADDRESS, & ZIP CODE** Denison Mines (USA) Corp. 1050 17th Street, Suite 950 Denver, CO 80265
3. LOCATION OF USE White Mesa Uranium Mill 6425 S. Highway 191 P.O.Box 809 Blanding, UT 84511	**4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION** David C. Frydenlund **Telephone No. ( )** (303) 389-4130

SUBMIT ITEMS 5 THROUGH 11 ON 8 1/2" X 11" PAPER. **KEY ALL RESPONSES TO THE RESPECTIVE ITEM AND/OR SUB ITEM OF THE LICENSING GUIDE.** STAPLE THIS FORM TO THE PAPERS.

5. RADIOACTIVE MATERIAL TO BE POSSESSED	**6. PURPOSE FOR WHICH LICENSED MATERIAL WILL BE USED**
7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE	**8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS**
9. FACILITIES AND EQUIPMENT	**10. RADIATION SAFETY PROGRAM**
11. WASTE MANAGEMENT	**12. LICENSE FEES:** Fee Category NA Amount Enclosed $ NA

13. CERTIFICATION: The applicant, or official executing this certification on behalf of the applicant named in Item 2, certifies that this application is prepared in conformity with current Radiation Control Rules adopted by the Utah Radiation Control Board and that all information contained herein, including any supplements attached hereto, are true and correct to the best of his/her knowledge and belief.

Signature- Certifying Official	DAVID C. FRYDENLUND Typed/Printed Name	VICE PRESIDENT AND GENERAL COUNSEL Title	2/28/2007 Date

ADDENDUM
APPLICATION FOR RENEWAL OF STATE OF UTAH RADIOACTIVE MATERIALS LICENSE NO. UT 1900479
WHITE MESA URANIUM MILL

This is an Addendum to the Form DRC-01 application (the "Application") to renew State of Utah Radioactive Materials License No. UT1900479 (the "License") for the White Mesa Uranium Mill (the "Mill").

Reference is made to the five-volume *License Renewal Application, State of Utah Radioactive Materials License No. UT1900479*, dated February 28, 2007, (the "Application Documents"), prepared by Denison Mines (USA) Corp. ("Denison"), including as Volume 4 thereto the document entitled *Environmental Report in Support of License Renewal Application, White Mesa Uranium Mill*, dated February 28, 2007 (the "Environmental Report"), and all documents incorporated by reference in the Application Documents.

The Application Documents and all of their respective Appendices and documents incorporated by reference therein, are hereby incorporated by reference in this Application.

The applicant, Denison, hereby responds to Items 5 through 11 of Form DRC-01, as follows:

5. RADIOACTIVE MATERIAL TO BE POSSESSED

The following radioactive material will be possessed by Denison under the License:

- An unlimited quantity of natural uranium in any chemical and/or physical form; and
- Byproduct material, as defined in Utah Code Section 19-3-102, in the form of uranium waste tailings and other uranium byproduct waste generated by Denison's milling operations authorized by the License.

6. PURPOSE FOR WHICH LICENSED MATERIAL WILL BE USED

Denison proposes to continue to operate the Mill and use the licensed material as described in Volume 1, Section 2 and elsewhere in the Application Documents.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE

The Radiation Safety Officer at the Mill, Mr. David E. Turk is the individual responsible for the radiation safety program at the Mill. Mr. Turk has the following training and experience:

a) Positions Held

- March 2006 to Present, Radiation Safety Officer at the Mill
- August 1997 to May 2000 and May 2001 to March 2006, Radiation Safety Technician and Environmental Technician at the Mill
- May, 2003 to January 2006 Safety Coordinator at the Mill
- 1995 to 1997, Receiving Technician, Inteplast Corp.
- 1994 to 1995, Materials Manager, Navtech Industries

b) Work Experience

- Approximately 9 years of experience in all aspects of environmental, radiation safety, industrial hygiene and occupational safety programs at the Mill
- Experience in all aspects of the radiation safety program at the Mill, including all aspects of training, monitoring, dose calculation, issuing radiation work permits and safe work permits, working with radiation detection and measurement equipment including radiation surveys, scanning and calibration, bioassay procedures, the chemical and analytical procedures used for radiological sampling and monitoring, personnel exposure calculation, reporting, and development and implementation of standard operating procedures
- Experience in all environmental monitoring and protection programs at the Mill
- Experience in all industrial hygiene and occupational health and safety programs at the Mill
- Experience in and an understanding of the uranium recovery process and the equipment used at the Mill and how the hazards are generated and controlled during the uranium recovery process
- Responsibility for all training programs at the Mill since 2002
- Mill liaison with regulatory agencies.

c) Formal Education

Southern Utah University - Bachelor of Science in Criminal Justice, with minor works in Biology,

d) Professional Training Courses Taken

- Radiation Safety Officer Course, March 27-31, 2006
- Radiation Safety Officer Refresher Course, October 23-24, 2003
- Radiation Instrument Calibration, February 1998

- Radiation Instrument Repair, February 2000
- Radiation Instrument Repair and Calibration Refresher, July 2003
- Underground Storage Tank Groundwater and Soil Sampler, February 19, 2002
- EPA Method 9 Visible Emissions Course, November 2, 2006
- Basic Medical Technician (Utah)

e) Certifications

- Utah Water System Operator (D1) Unrestricted , March, 2006
- First Aid, CPR and AED Instructor, January 2006
- OSHA HAZWOPER, since May 2002
- MSHA Surface Instructor
- MSHA Surface and Underground Certificates, March 2006
- Basic Chemical Operator, State of Texas, January 1997
- Basic Peace Officer, December 1994

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

The Mill's training program is described in Volume 1, Section 6.3.3, and elsewhere in the Application Documents.

9. FACILITIES AND EQUIPMENT

The Mill's facilities and equipment are described in detail in Volume 1, Section 4, and elsewhere in the Application Documents.

10. RADIATION SAFETY PROGRAM

The Mill's Radiation Safety Program is described in detail in Volume 1, Section 6.4, and elsewhere in the Application Documents.

11. WASTE MANAGEMENT

The Mill's waste management facilities, equipment and programs are described in detail in Volume 1, Section 5, and elsewhere in the Application Documents.

DENISONMINES

February 28, 2007

HAND DELIVER

Mr. Dane L. Finerfrock
Executive Secretary
Utah Radiation Control Board
State of Utah
Department of Environmental Quality
168 North 1950 West
P.O Box 144850
Salt Lake City, UT 84114-4850

Re: Supporting Documents for the White Mesa Uranium Mill License Renewal Application, February 28, 2007

Dear Mr. Finerfrock:

Enclosed please find supporting documents for the White Mesa Uranium Mill License Renewal Application, dated February 28, 2007. The documents included are listed on the attached key.

If you have any questions please feel free to contact me at 303 389-4130.

Very truly yours,

DENISON MINES (USA) CORP

David C. Frydenlund
Vice President, Regulatory Affairs and Counsel

cc: Ron F. Hochstein
Harold R. Roberts
Steven D. Landau
David Turk

Denison Mines (USA) Corp.
www.denisonmines.com
1050 17th Street, Suite 950
Denver, CO, USA 80265
Tel : 303 628-7798
Fax : 303 389-4125

White Mesa Uranium Mill License Renewal Application, February 28, 2007
Supporting Documents Key

Environmental Report: January 1978
1 document: ENV-1978-1

Final Environmental Statement: May, 1979
1 document: ENR-1979-1

Environmental Assessment: February 1997
1 document: ENA-1997-1

Semi Annual Effluent Report: 1997-June 2006
19 documents: EFF-1997-1 through EFF-2006-1

Chloroform Monitoring Report: March 2005-December 2006
7 documents: CHL-2005-2 through CHL-2006-4

Meteorological Monitoring Report: 2004-2006
6 documents: MET-2004-1 through MET-2006-2

Groundwater & DMT Performance Standard Monitoring Report: 2005-September 2006
7 documents: GRN-2005-1 through GRN-2006-3

NESHAPS Report: 1997-2005
9 documents: NES-1997-1 through NES-2005-1

Radionuclide Emissions Test Report: 2006
4 documents: STA-2006-1 through STA-2006-4

Air Approval Order Performance Test Report: 2006
1 document: NOX-2006-1

Ground Water Discharge Permit and Statement of Basis: 2005
1 document: GWD-2006-1

Total 57 documents

WHITE MESA URANIUM MILL

LICENSE RENEWAL APPLICATION

STATE OF UTAH RADIOACTIVE MATERIALS LICENSE No. UT1900479

February 28, 2007

Denison Mines (USA) Corp.
1050 17th Street, Suite 950
Denver, CO 80265

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 Applicable Standards for Review and Approval of this Application 1

1.2 Components of this Application 3

1.2.1 Application Document 3

1.2.2 Environmental Report 4

1.2.3 Monitoring Reports 6

1.2.4 Groundwater Monitoring 6

1.2.5 Inspection Reports 7

1.2.6 Listing and Description of Violations, Incident Investigations, Excursions, Regulatory Exceedances and License Amendments 7

1.2.7 Chloroform Investigation 7

1.2.8 THF Study 9

2. PROPOSED ACTIVITIES 10

2.1 Activity Summary 10

3. SITE CHARACTERISTICS 12

4. MILL PROCESS AND EQUIPMENT 13

4.1 Conventionally Mined Ores 13

4.1.1 Mill Process Summary 13

4.1.2 Receiving and Stockpiling Delivered Ore 16

4.1.3 Grinding and Wet Ore Storage 16

4.1.4 Leaching 16

4.1.5 Counter-Current Decantation (CCD) Washing Circuit 17

4.1.6 Solvent Extraction 18

4.1.7 Precipitation and Dewatering 18

4.1.8 Drying 19

4.1.9 Mill Process Laboratory 19

4.1.10 By-Product Vanadium Recovery 20

4.1.11 Chemical and Reagent Use 20

4.1.12 Process/Chemical Tankage 22

4.1.13 Fire Protection System 23

4.1.14 Instrumentation 24

4.2 Alternate Feed Processing 25

4.2.1 The Mill's Alternate Feed Program 25

4.2.2 Processing Alternate Feeds 26

4.2.3 Alternate Feed Materials Licensed to Date for Processing at the Mill 27

4.3 Direct Disposal of 11e.(2) Byproduct Material From In Situ Recovery Facilities 29

5. WASTE MANAGEMENT SYSTEM 30
5.1 Gaseous - Mill 30
5.1.1 Airborne Dust and Fume Control - Mill 30
5.1.2 Airborne Dust Control - Mill Stockpile 34
5.1.3 Airborne Dust and Fume Control - Process Laboratory 34
5.2 Liquids and Solids 34
5.2.1 Tailings Retention Area 34
5.2.1 Sanitary and Other Mill Solid Wastes 40
5.2.2 Liquid Discharges 40
5.2.3 Contaminated Equipment 40
6. ADMINISTRATION 41
6.1 Corporate Organization 41
6.1.1 Management 41
6.1.2 Committees 44
6.2 Qualifications 45
6.3 Administrative Procedures 45
6.3.1 Management Controls 45
6.3.2 ALARA Program 45
6.3.3 Training 46
6.3.4 Security 47
6.4 Radiation Protection Program 48
6.4.1 Mill External Radiation Monitoring 48
6.4.1 Mill Airborne Radionuclide Monitoring 50
6.4.3 Radioactive Material Intake - CEDE 53
6.4.4 Total Effective Dose Equivalent 54
6.4.5 Bioassay Program 54
6.4.6 Contamination Control Program 55
6.4.7 Respiratory Protection Program 55
6.4.8 Summary of Effectiveness of Mill Controls and Radiation Protection Program.. 55
6.5 Environmental Monitoring Program 55
6.5.1 Ambient Air Monitoring 55
6.5.2 External Radiation 58
6.5.3 Soil and Vegetation 58
6.5.3 Meteorological 59
6.5.4 Point Emission 59
6.5.5 Water 60
6.5.6 Seeps and Springs Monitoring 62
6.5.7 Solid Waste 63

6.5.8 MILDOS AREA Modeling 65
6.5.9 Summary of Effectiveness of Environmental Controls and Monitoring 65
7. MILL ACCIDENTS 66
7.1 Process Accidents 68
7.1.1 Unloading/Storage of Ammonia or Propane 68
7.1.2 Leach Tank Failure 68
7.1.3 Ammonia Explosion in a Building 68
7.1.4 SX Fire 69
7.2 Acts of God 69
7.2.1 Tornado 69
7.2.2 Flood Water Breaching of Retention System 70
7.2.3 Seismic Damage 70
7.3 Tailings Accidents 70
7.3.1 Structural Failure of Tailings Dikes 70
7.4 Transportation Accidents 70
7.4.1 Concentrate Shipments 70
7.4.2 Ore Shipments 71
7.4.3 Reagent Shipments 71
7.5 On Site Spill Countermeasures 71
7.6 Emergency Procedures 72
7.6.1 GWDP Contingency Plan 73
8 RECLAMATION PLAN 74
9. LISTING AND DESCRIPTION OF VIOLATIONS, INCIDENT INVESTIGATIONS, EXCURSIONS AND REGULATORY EXCEEDANCES AND LICENSE AMENDMENTS 75
9.1 Regulatory Authorities 75
9.2 License Violations Identified During NRC or State of Utah Site Inspections Since March 31, 1997. 75
9.2.1 Environmental Control and Radiation Safety Notices of Violation 75
9.2.2 Air Quality Notices of Violation 77
9.2.3 Water Quality Notices of Violation 77
9.3 Occupational Safety and Health Citations 78
9.4 Excursions, Incident Investigations or Root Cause Analyses, and Resultant Cleanup Histories or Status since March 31, 1997. 79
9.5 Exceedances of Regulatory Standards or License Conditions Pertaining to Radiation Exposure, Contamination, or Release Limits Since March 31, 1997 80
9.6 License Amendments Since March 1997 80
10. CONCLUSIONS 84

INDEX TO FIGURES

Figure No.	Description	Page
2.0-1	White Mesa Mill Location Map	17
4.1-1	Mill Block Flow Diagram	
4.1-2	General Layout of the Mill Site	21
5.1-1	Flow Diagram – Airborne Dust and Fume Control	38
6.1.1	Mill Management Organization Chart	
6.4-1	Airborne Radiation Sample Locations in Mill	59
6.5-1	Locations of High Volume Environmental Air Particulate Monitoring Stations	63

INDEX TO TABLES

Table No.	Description	Page
4.2-1	General Features of Alternate Feed Materials Licensed to Date for Processing at the Mill	27
4.2-2	Uranium Content of Alternate Feed Materials	29
4.2-3	Metal and Inorganic Content of Alternate Feed Materials	30-31
4.2-4	Semi-Volatile Organic Compounds in Alternate Feed Materials	32
4.2-5	Volatile Organic Compounds in Alternate Feed Materials	33
4.2-6	Transportation of Alternate Feed Materials to the Mill	34
5.1-1	Gas-Mist-Dust Emissions Equipment Inventory	37
5.1-2	Stack Heights and Emission Data	39-40
5.2-1	Tailings Solution Characterization Data	41-43
6.4-1	Beta-Gamma Survey Locations	55
6.4-2	Airborne Radiation Sample Locations	56-57
6.5-1	Operational Phase Surface Water Monitoring Program	66
7.0-1	Spectrum of Potential Mill Accidents	73

INDEX TO APPENDICES

Appendix	Description
A	Environmental Protection Manual
B	Release and Shipping of Vanadium Blackflake, Standard Operating Procedure
C	Stormwater Best Management Practices Plan
D	Emergency Response Plan
E	Radiation Protection Manual
F	Ore Receiving, Feed and Grind Standard Operating Procedure
G	Uranium Precipitation, Drying and Packaging Standard Operating Procedure
H	SERP Standard Operating Procedure
I	ALARA Program
J	Training Program
K	Security Program
L	Respiratory Protection Program
M	GWDP Quality Assurance Plan
N	Transportation Accidents Plan
O	Inspection Reports and Notices of Violation

1. INTRODUCTION

Denison Mines (USA) Corp. ("Denison")[1] operates the White Mesa Uranium Mill (the "Mill"), located approximately six miles south of Blanding, Utah, under State of Utah Radioactive Materials License No. UT 1900479 (the "License"). The License was last renewed by the United States Nuclear Regulatory Commission ("NRC") on March 31, 1997, for 10 years, and is up for timely renewal on March 31, 2007 in accordance with Utah Administrative Code ("UAC") R313-22-36.[2]

In accordance with R313-22-36, this is an application to the Executive Secretary of the Utah Radiation Control Board ("the Executive Secretary") for renewal of the License under R313-22-37. This License Renewal Application (the "Application") is appended to and incorporated by reference in Form DRC-01, 02/94, which is the form prescribed by the Executive Secretary under R313-22-37 for the renewal of a State of Utah Radioactive Materials License for a uranium mill.

The Mill is also subject to State of Utah Groundwater Discharge Permit No. UGW370004 (the "GWDP"), which was issued on March 8, 2005 and is not up for renewal until March 8, 2010, and State of Utah Air Quality Approval Order DAQE-AN1205005-06 (the "Air Approval Order") which was re-issued on July 20, 2006 and is not up for renewal at this time. While the GWDP and Air Approval Order are referred to in this Application from time to time in order to allow the Executive Secretary to better understand Mill operations and compliance with applicable regulatory requirements, this is not an application for renewal of either of those permits.

1.1 Applicable Standards for Review and Approval of this Application

R313-22-39 (Executive Secretary Action on Applications to Renew or Amend) provides that in considering an application by a licensee to renew or amend a license, the Executive Secretary will use the criteria set forth in Sections R313-22-33 (General Requirements for the Issuance of Specific Licenses) and R313-24 (Uranium Mills and Source Material Mill Tailings Disposal Facility Requirements) as applicable.[3]

In addition, Form DRC-01, 02/94 requires that the application include responses to the "respective item and/or sub item of the licensing guide," which Denison understands to be the

[1] Prior to December 16, 2006, Denison was named "International Uranium (USA) Corporation."

[2] The License was originally issued by the NRC as a source material license under 10 CFR Part 40 on March 31, 1980. It was renewed by NRC in 1987 and again in 1997. After the State of Utah became an Agreement State for uranium mills in August 2004, the License was re-issued by the Executive Secretary as a State of Utah Radioactive Materials License on February 16, 2005, but the remaining term of the License did not change.

[3] R313-22-39 also requires the Executive Secretary to use the applicable criteria in R313-22-50 (Special Requirements for Specific Licenses of Broad Scope), and R313-22-75 (Special Requirements for a Specific License to Manufacture, Assemble, Repair, or Distribute Commodities, Products, or Devices Which Contain Radioactive Material) and in Rules, R313-25 (License Requirements for Land Disposal of Radioactive Waste-General Provisions), R313-32 (Medical Use of Radioactive Material), R313-34 (Requirements for Irradiators), R313-36 (Special Requirements for Industrial Radiographic Operations), or R313-38 (Licenses and Radiation Safety Requirements for Well Logging). However, none of these criteria are applicable to uranium mills.

applicable NRC Standard Review Plan for the type of activity being licensed. For the renewal of uranium mill licenses, Denison has been advised by NRC that the applicable Standard Review Plan is the *Standard Review Plan for In Situ Leach Uranium Extraction License Applications*, NUREG-1569, June 2003 ("NUREG-1569").[4]

Accordingly, this Application must demonstrate that the following criteria enumerated in R313-22-33 are satisfied:

a) The applicant and all personnel who will be handling the radioactive material are qualified by reason of training and experience to use the material in question for the purpose requested in accordance with the applicable rules in a manner as to minimize danger to public health and safety or the environment;

b) The applicant's proposed equipment, facilities, and procedures are adequate to minimize danger to public health and safety or the environment;

c) The applicant's facilities are permanently located in Utah;

d) The issuance of the license will not be inimical to the health and safety of the public;

e) The applicant satisfies applicable special requirements in sections R313-22-50 and R313-22-75, and Rules R313-24, R313-25, R313-32, R313-34, R313-36, or R313-38; and

f) To the extent the original siting of the mill has resulted in any environmental costs, the Executive Secretary will be able to conclude, after weighing the environmental, economic, technical and other benefits against such environmental costs and considering available alternatives that the action called for is the issuance of the proposed license renewal.

R313-22-33 provides that a license application shall be approved by the Executive Secretary if the Executive Secretary determines that the forgoing criteria are satisfied.

Similarly, this Application must also demonstrate that the Mill continues to comply with the applicable provisions of 10 CFR Part 40 Appendix A, as required by R313-24-3 and must contain an environmental report describing the proposed action, a statement of its purposes, and the environment affected as required by R313-24-3 and NUREG-1569.

It is important to note that since this is an application for renewal of an existing licensed facility, this Application will focus on any changes to currently licensed activities and on demonstrating how existing licensed facilities continue to meet applicable regulatory criteria. As stated in the introduction to NUREG-1569:

---

[4] NRC staff advised that they did not prepare a similar Standard Review Plan for uranium mills at that time because they did not anticipate any new uranium mills being constructed, and they concluded that, because both uranium mills and ISL uranium recovery facilities are subject to 10 CFR Part 40, NUREG-1569 could be applied universally to both types of facilities.

> For renewals, the licensee need only submit information containing changes from the currently accepted license. . . . The licensee need not resubmit a complete application covering all aspects of facility operation. Reviewers should analyze the inspection history and operation of the site to see if any major problems have been identified over the course of the license term and should review changes to operations from those currently found acceptable (see Appendix A). If the changes are found to be acceptable, then the license is acceptable for renewal.
>
> For license amendments and renewals, the operating history of the facility is often a valuable source of information concerning the adequacy of site characterization, the acceptability of radiation protection and monitoring programs, the success of and adherence to operating procedures and training programs, and other data that may influence the staff's determination of compliance. Appendix A to the standard review plan provides guidance for review of these historical aspects of facility performance.[5]

As indicated in the excerpts quoted above and elsewhere in NUREG-1569, Appendix A to NUREG-1569 lists the documentation required and the criteria to be applied in connection with license renewal applications for uranium mills. Appendix A provides that for license renewals, the historical record of site operations, including air and groundwater quality monitoring, provides valuable information for evaluating the licensing actions. The Appendix then lists a number of specific areas where a compliance history or record of site operations and changes should be provided in the application for review. The Appendix then provides that if, after a review of these historical aspects of site operations, the staff concludes that the site has been operated so as to protect health and safety and the environment and that no un-reviewed safety-related concerns have been identified, then only those changes proposed by the license renewal application should be reviewed using the appropriate sections of NUREG-1569. The Appendix concludes by specifically stating that aspects of the facility and its operations that have not changed since the last license renewal should not be re-examined.

1.2 Components of this Application

In order to satisfy the requirements of R313-22-39, and applicable criteria set out in R313-22-33, R313-24-3 in accordance with the provisions of NUREG-1569, this Application is comprised of the following:

1.2.1 Application Document

This Application document describes the Mill's process and equipment; waste systems; administration, including qualifications of personnel, management controls, inspection and audit programs, training program, radiation protection program, and environmental surveillance program; a review and analysis of potential accidents and the Mill's emergency response programs; the Mill's reclamation plan; and a listing and description of violations, incident

[5] NUREG-1569, page xvii.

investigations, excursions and regulatory exceedances. Attached to or incorporated by reference in this Application are the Mill procedures and programs that are relevant to those matters.

While NUREG-1569 provides that aspects of the facility and its operations that have not changed since the last license renewal should not be re-examined, it is intended that this Application and the documents appended hereto and incorporated by reference herein, together with the accompanying Environmental Report, will

a) demonstrate that Denison and all Mill personnel are qualified by reason of training and experience to perform their respective functions in accordance with applicable rules in a manner as to minimize danger to public health and safety or the environment;

b) describe the Mill's existing equipment, facilities, and procedures and demonstrate that they continue to be adequate to minimize danger to public health, safety or the environment; and

c) confirm that the Mill facilities are located in Utah,

as required under R313-22-33, and that the Mill continues to satisfy the applicable special requirements of R313-24.

No changes to the Mill's existing equipment, facilities, and procedures are requested as part of this License renewal process. Some changes to the Mill's equipment, facilities and procedures have been made with the approval of the NRC or in accordance with existing License conditions since the last License renewal in March 1997. These changes are reflected in the descriptions set out in this Application and in the documents incorporated by reference herein. However, since the changes are comprised in the existing License, Executive Secretary approval of these changes is neither sought nor requested.

1.2.2 Environmental Report

An Environmental Report accompanies and is incorporated by reference into this Application. The Environmental Report incorporates by reference, updates or supplements the information previously submitted in previous environmental analyses performed at the Mill to reflect any significant environmental changes, including any significant environmental change resulting from operational experience or a change in operations or proposed decommissioning activities since the last License renewal on March 31, 1997.[6]

[6] Page xvi of NUREG-1569 provides that an applicant for a new operating license, or for the renewal or amendment of an existing license, is required to provide detailed information on the facilities, equipment, and procedures to be used and to submit an environmental report that discusses the effect of proposed operations on public health and safety and the impact on the environment as required by 10 CFR 51.45, 51.60, and 51.66. 10 CFR 51.60 provides that in the case of an application to renew a license issued under 10 CFR Part 40 for which the applicant has previously submitted an environmental report, the applicant may submit a supplement to the applicant's previous environmental report, which may be limited to incorporating by reference, updating or supplementing the information previously submitted to reflect any significant environmental change, including any significant environmental change resulting from operational experience or a change in operations or proposed decommissioning activities. Although the regulations in 10 CFR 51.45, 51.60 and 51.66, which implement Section 102(2) of the National Environmental Policy Act, do not apply to State licensing activities, the State of Utah has its own requirements to prepare an

The Environmental Report includes the following matters as contemplated by Appendix A to NUREG-1569:

a) Updates and changes to any site characterization information important to the evaluation of exposure pathways and doses including site location and layout; uses of adjacent lands and waters; population distributions; meteorology; the geologic or hydrologic setting; ecology; background radiological or non-radiological characteristics; and other environmental features;

b) Environmental effects of site operations including data on radiological and non-radiological effects, accidents, and the economic and social effects of operations;

c) Updates and changes to factors that may cause reconsideration of alternatives to the proposed action;

d) Updates and changes to the economic costs and benefits for the facility since the last application; and

e) The results and effectiveness of any mitigation proposed and implemented in the original license.

With respect to the assessment of any impact on groundwater resulting from the activities conducted pursuant to the License, the Environmental Report will incorporate by reference certain reports, or portions thereof, filed with the Co-Executive Secretary of the Utah Water Quality Board pursuant to the Mill's GWDP.

Included with this Application are the following previous environmental analyses:

- 1978 Environmental Report, prepared by Dames & Moore
- 1978 Final Environmental Statement, prepared by NRC
- 1997 Environmental Assessment, prepared by NRC

The result of the foregoing is that, as required by R313-24-3, the Environmental Report, together with the previous environmental analyses and reports incorporated by reference therein, describes the proposed action, a statement of its purposes, and the environment affected, and presents a discussion of the following:

- An assessment of the radiological and non-radiological impacts to the public health from the continuation of the activities to be conducted pursuant to the License;

Environmental Report in R313-24-3. It should also be noted that R313-22-32 states that this Application may incorporate by reference information contained in previous applications. By including changes since the last application and incorporating by reference those aspects of previous applications that have not changed, the Executive Secretary will be able to focus his review on those aspects of licensed operations that have changed since the license issuance or subsequent renewals.

- An assessment of any impact on waterways and groundwater resulting from the continuation of the activities conducted pursuant to the License;

- Consideration of alternatives, including alternative sites and engineering methods, to the continuation of the activities to be conducted pursuant to the License; and

- Consideration of the long-term impacts including decommissioning, decontamination, and reclamation impacts, associated with the continuation of the activities to be conducted pursuant to the License.

1.2.3 Monitoring Reports

Copies of the following monitoring reports are included with this Application:

a) Semi-Annual Effluent Monitoring Reports;

b) Annual National Emission Standards for Hazardous Air Pollutants (NESHAP) Reports;

c) Particulate matter compliance test results for the North Yellowcake Scrubber Dryer Baghouse and Superior Boiler conducted under the Air Approval Order; and

d) Radionuclide Emission Tests for the Yellowcake Scrubber since the last License renewal in March 1997. It should be noted that due to abeyant operations for most of the time since 1997, particulate matter compliance tests were only performed in June 2006, and Radionuclide Emission Tests for the Yellowcake Scrubber were only performed in the second, third, and fourth quarters of 2006.

Also included are the semi-annual meteorological reports for the last three years.

1.2.4 Groundwater Monitoring

While the Mill currently has a State of Utah GWDP that is not up for renewal until March 2010, certain reports filed with the Co-Executive Secretary of the Utah Water Quality Board under the GWDP are relevant to an evaluation of any potential impacts the Mill could have on the environment. Accordingly, the following documents are included with this Application:

a) GWDP No. UGW370004, as amended, and accompanying Statement of Basis;

b) Quarterly Groundwater and DMT Performance Standard Monitoring Reports since the issuance of the groundwater discharge permit in March 2005;

c) Notice of Violations under the GWDP dated July 17, 2006 and August 24, 2006 (See Appendix O);

d) Letter dated October 20, 2006 from the Executive Secretary relating to the resolution of the July 17, 2006 Notice of Violation (See Appendix O);

e) Final Consent Agreement dated October 23, 2006 relating to the resolution of the August 24, 2006 Notice of Violation (See Appendix O); and

f) *Background Groundwater Quality Report: Existing Wells for Denison Mines (USA) Corp.'s White Mesa Mill Site, San Juan County Utah, dated December 2006*, prepared by Intera, Inc. (See Appendix B to the Environmental Report)

The groundwater status at the site is addressed in detail in the Environmental Report.

1.2.5 Inspection Reports

Included with this Application (See Appendix O) are copies of all NRC and State of Utah Division of Radiation Control ("DRC") inspection reports and license performance reports, as contemplated by Appendix A to NUREG-1569, since the last License renewal on March 31, 1997.

1.2.6 Listing and Description of Violations, Incident Investigations, Excursions, Regulatory Exceedances and License Amendments.

As contemplated by Appendix A to NUREG-1569, included in Section 9 of this Application is a listing and description of:

a) License violations identified during NRC or State of Utah site inspections;

b) Excursions, incident investigations or root cause analyses, and resultant cleanup histories or status;

c) Exceedances of any regulatory standard or License condition pertaining to radiation exposure, contamination, or release limits; and

d) License amendments.

since the last license renewal on March 31, 1997.

1.2.7 Chloroform Investigation

In May 1999, excess chloroform concentrations were discovered in monitoring well MW-4, found in the shallow perched aquifer along the eastern margin of the Mill site. Because these concentrations were above the State Ground Water Quality Standard ("GWQS") for chloroform, the Executive Secretary of the Utah Water Quality Board initiated enforcement action against the Mill on August 23, 1999 through the issuance of a Groundwater Corrective Action Order, which required completion of: 1) a contaminant investigation report to define and bound the contaminant plume, and 2) a groundwater corrective action plan to clean it up. Repeated

groundwater sampling by both the Mill and DRC have confirmed the presence of chloroform in concentrations that exceed the State GWQS along the eastern margin of the site in wells that are upgradient or cross gradient from the tailings cells. Other VOC contaminants have also been detected in these samples. After installation of 23 new monitoring wells at the site, groundwater studies appear to have defined the eastern and southern boundaries of the chloroform plume. The Mill is currently in the process of installing additional wells in order to define the western and northern bounds of the plume.

Based on the location of the plume and characterization studies completed to date, the contamination resulted from the operation of laboratory facilities that were located at the site prior to and during construction of the Mill facility, and septic drainfields that were used for laboratory and sanitary wastes prior to construction of the Mill's tailings cells. Interim measures have been instituted in order to contain the contamination and to pump contaminated groundwater into the Mill's tailings cells. A final corrective action plan has not yet been developed.

In the Statement of Basis for the GWDP, the DRC noted that[7], while the contaminant investigation and groundwater remediation plan are not yet complete, the DRC believes that additional time is available to resolve these requirements based on the following factors: 1) the hydraulic isolation found between the shallow perched aquifer in which the contamination has been detected and the deep confined aquifers which are a source of drinking water in the area, 2) the large horizontal distance and the long groundwater travel times between the existing groundwater contamination on site and the seeps and springs where the shallow aquifer discharges at the edge of White Mesa, and 3) the lack of human exposure to these shallow aquifer contaminants along this travel path.

Denison and DRC have agreed on a schedule for drilling of the additional wells necessary to define the boundaries of this plume and for completion of the contaminant investigation report and preparation of a groundwater corrective action plan.

Enclosed with this application are the following:

a) Groundwater Corrective Action Order dated August 23, 1999 (See Appendix O); and

b) Quarterly Chloroform Monitoring Reports commencing with the 2nd quarter of 2005.

These documents are included as representative of the characterization and interim corrective actions taken to date. The Executive Secretary should also refer to the DRC files, which contain copies of all correspondence and reports to date relating to this matter.

[7] See page 3 of the Statement of Basis, dated December 1, 2004.

1.2.8 THF Study

Detectable concentrations of tetrahydrofuran ("THF") have been found in four wells at the Mill, including upgradient well MW-1, and far downgradient well MW-3, as well as wells MW-2 and MW-12 which are close to the Mill's tailings cells. Two of these wells, upgradient well MW-1 and far downgradient well MW-3, have THF concentrations that exceed the State GWQS. The two other wells, MW-2 and MW-12 that are closest to the tailings cells exhibited detectable THF concentrations that did not exceed the GWQS. Denison believes that the THF was most likely derived from PVC glues and solvents used during construction of the PVC well casings found in several monitoring wells at the facility, including each of the four wells described above. This position is consistent with the occurrence of THF in both up and far downgradient wells at the site. However, the Executive Secretary has determined that further evaluation is required to determine why three other wells installed at the same time do not exhibit detectable THF concentrations. As a result, Part I.H.19 of the GWDP requires that Denison submit a work plan to examine this matter further. Such work plan was submitted to the Executive Secretary and further evaluations are ongoing at this time.

1.2.9 Summary

Denison has attempted to make this Application as complete as possible so that, together with the information within DRC files, the Executive Secretary will have all information necessary to determine whether or not:

a) Denison and all personnel at the Mill are qualified by reason of training or experience to perform their functions in a manner as to minimize danger to public health and safety or the environment;

b) the existing equipment, facilities, and procedures at the Mill are adequate to minimize danger to public health and safety or the environment;

c) the renewal of the Mill's license will not be inimical to the health and safety of the public;

d) the applicable requirements of R313-24 and all other applicable regulations have been satisfied; and

e) after weighing the environmental, economic, technical and other benefits against any environmental costs and considering available alternatives, the action called for is the issuance of the proposed license renewal.

However, if the Executive Secretary requires any further information or has any questions in order to fully evaluate this Application, Denison would be pleased to supplement this Application as necessary. All such supplements should be considered to be incorporated by reference into this Application.

2. PROPOSED ACTIVITIES

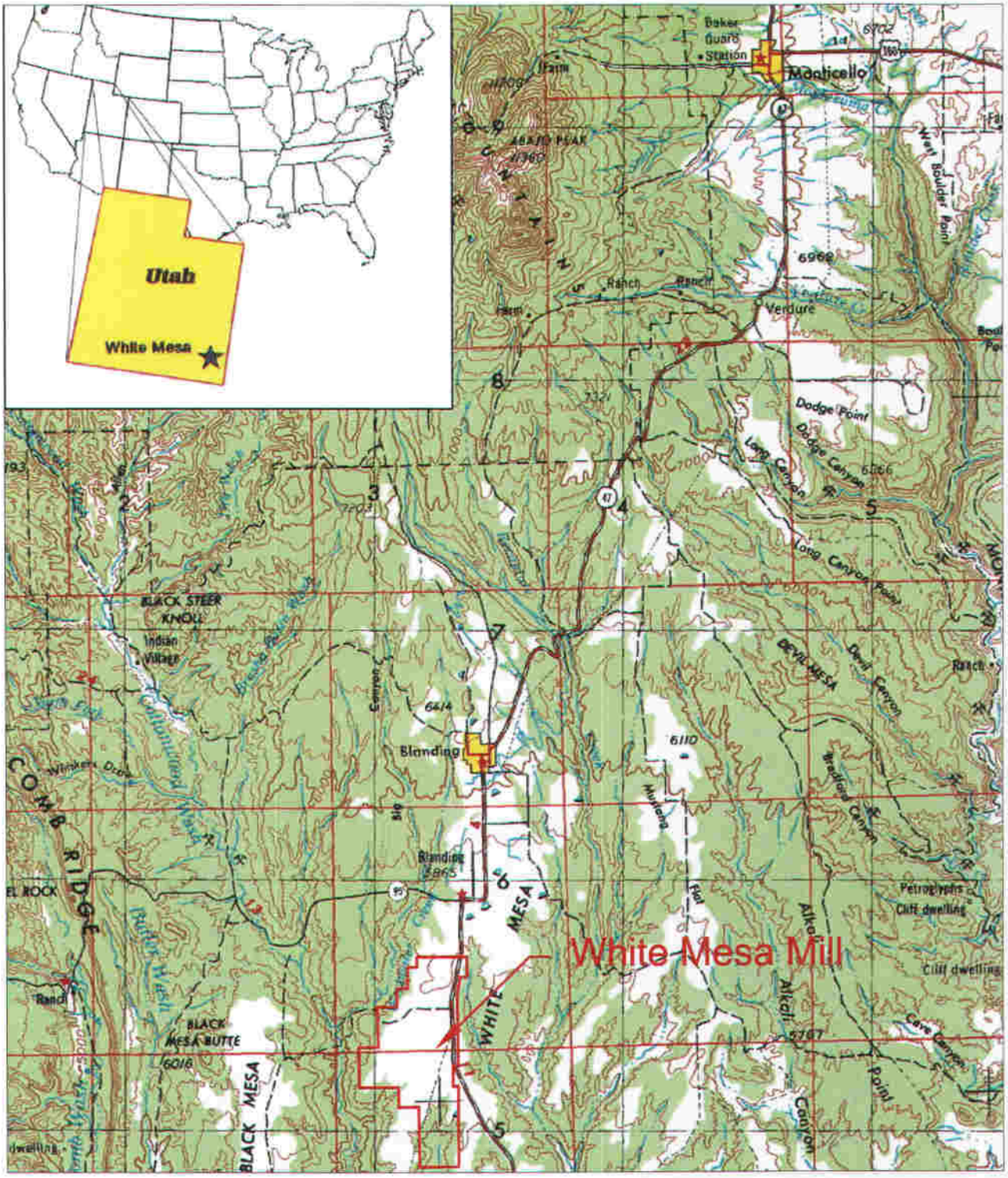
Denison proposes to continue to operate the Mill, producing a calendar year limit of 4,380 tons U_3O_8. The Mill is owned by Denison White Mesa LLC, a Colorado limited liability company and an affiliate of Denison. See Figure 2.0-1, Location Map, for regional information and site location.

2.1 Activity Summary

Feed for the Mill will be provided through: 1) mining operations of Denison and its affiliates, including joint ventures to which Denison or its affiliates are party, and 2) other uranium/vanadium mining operations; and 3) alternate feed materials (alone or in combination with 1) and/or 2) above) containing uranium alone or together with vanadium and/or other recoverable metals. Nominal uranium content from uranium ores referred to in 1) and 2) above is expected to range from approximately 0.04% or lower to approximately 4%, with an expected annual average concentration of approximately 0.64% U_3O_8 or less. Alternate feed materials may contain uranium in lower concentrations than this, as well as uranium in disequilibrium in excess of these concentrations, as well as natural thorium and its decay products and other radionuclides and metals. Mill feed rate will be a function of ore hardness, uranium/vanadium content, acid consumption and leach retention time and will vary between 1,500 and 2,500 tons per day (TPD), with annual average throughout of approximately 2,000 TPD.

Mill tailings will be deposited within the existing authorized tailings cells at the Mill. Additional cells may be constructed and operated in accordance with applicable regulations. Refer to the Mill's Environmental Protection Manual, included as Appendix A to this Application, for additional information regarding the tailings retention system.

Liquid wastes are retained in lined cells as described in the tailings management plan, or as approved through the License Amendment process.



Denison Mines (USA) Corp.			
Project	WHITE MESA MILL		
REVISIONS	County:	State: UT	
Date / By	Location:		
	Figure 2.0-1 White Mesa Mill Location Map		
	Scale: as shown	Date: Feb. 2007	figure 2.0-1.dwg
	Author: bm	Drafted By: B. Munkhbaatar	

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3. SITE CHARACTERISTICS

A full description of the Mill site characteristics is contained in the accompanying Environmental Report dated February 28, 2007.

4. MILL PROCESS AND EQUIPMENT

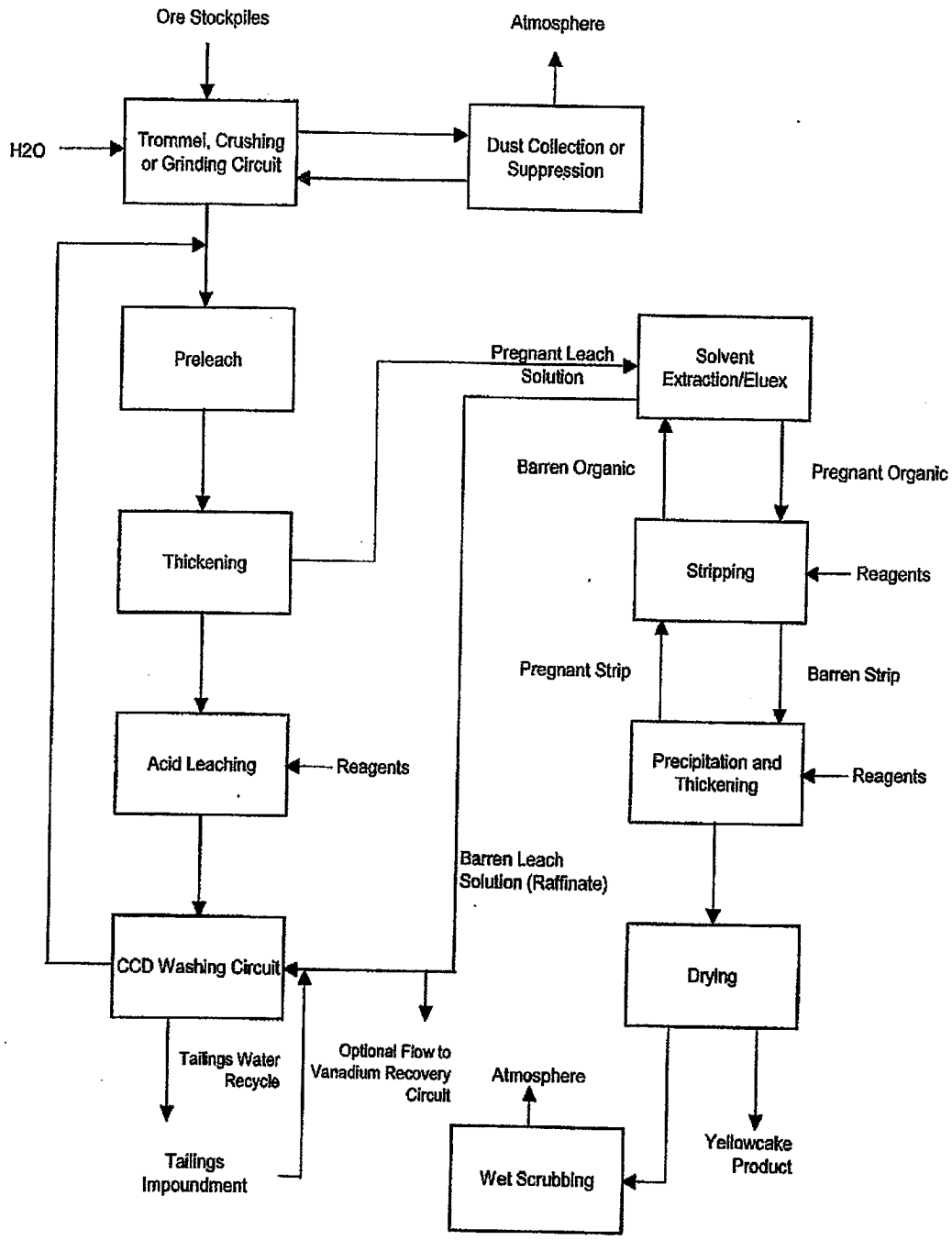
4.1 Conventionally Mined Ores

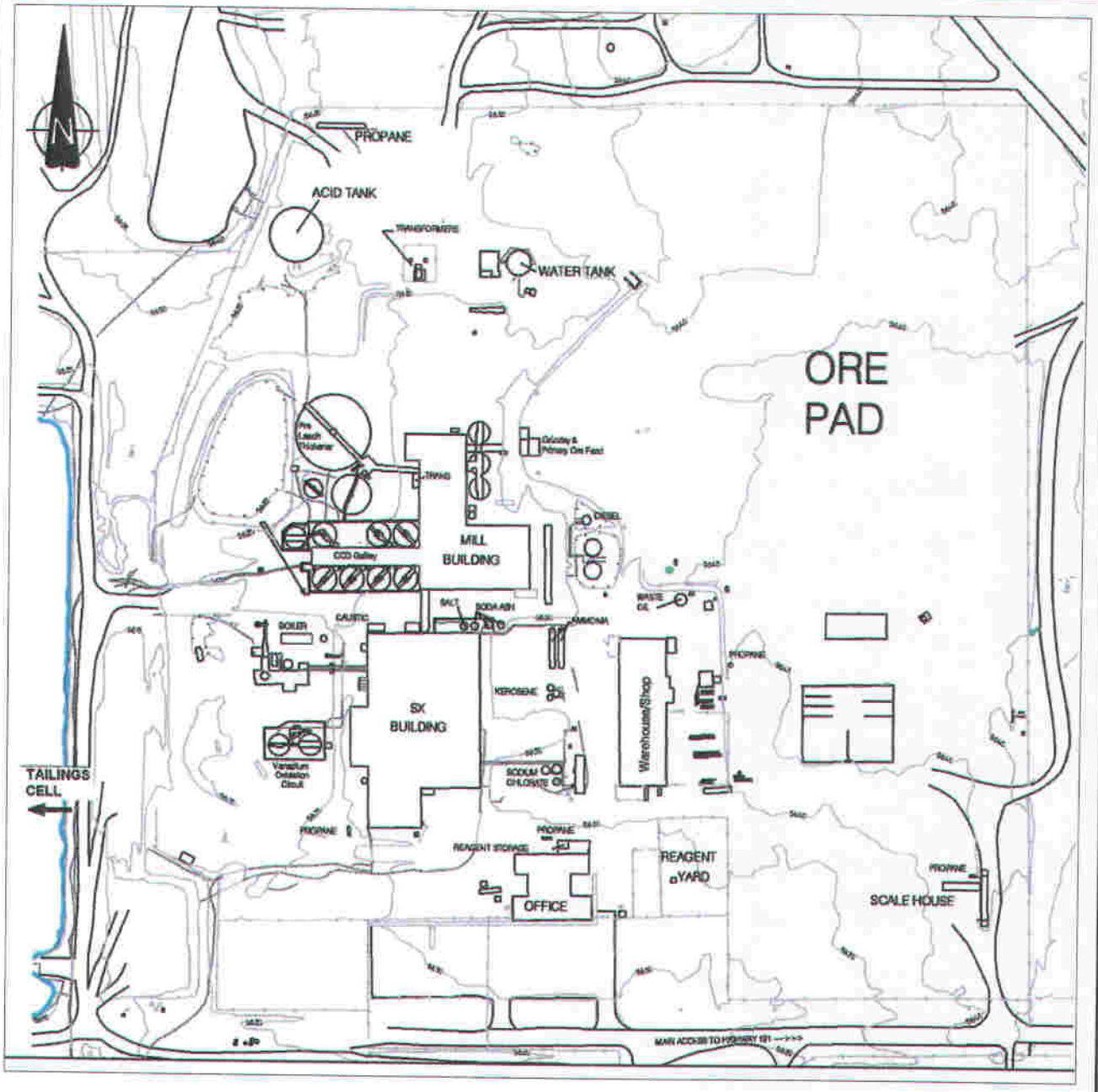
4.1.1 Mill Process Summary

Operations at the Mill begin with the weighing, receiving, sampling and stockpiling of conventional ore and other feed materials from various sources. Mine run ore as well as stockpiled crushed ore is fed at the rate of 1,500 to 2,500 (TPD) to the semi-autogenous grinding (SAG) Mill, depending on the ore type. The ground feed material, stored as a wet slurry in one of two agitated tanks, is then fed to the first stage of leach. The two-stage acid leach is followed by the recovery of uranium-bearing pregnant solution in a counter-current decantation (CCD) system. Once the pregnant solution is clarified, it is pumped to the solvent extraction (SX) circuit. Vanadium, when recovered, is stripped from the barren uranium raffinate, also using a solvent extraction circuit. Both uranium and vanadium are precipitated in their respective circuits, followed by drying and packaging.

The following sections describe the Mill flowsheet including unit operations and major equipment groups. A block flow diagram of the Mill's uranium recovery circuit is shown on Figure 4.1-1. Figure 4.1-2 shows the general layout of the Mill site.

Figure 4.1-1
Generalized Flow Diagram of the Uranium Milling Process for the White Mesa Mill





100 0 100 200 300 feet

SCALE 1"=250'

Denison Mines (USA) Corp.			
Project	WHITE MESA MILL		
REVISIONS	County:	State: UT	
Date / By	Location:		
	Figure 4.1 - 2 General Layout of the Mill Site		
	Scale: as shown	Date: Feb. 2007	figure 4.1-2.dwg
	Author: bm	Drafted By: B. Munkhbaatar	

Z:\White Mesa Mill\2007 License Renewal Application\Figures\Figure 4.1-2.dwg, Figure 4.1 - 2, 02/24/2007 2:41:09 PM, Adobe PDF.pc3, Letter

4.1.2 Receiving and Stockpiling Delivered Ore

Conventional ores are delivered by truck to the Mill. Each truck is weighed on a 60-ton truck scale and unloaded in a specified area on the Mill ore storage pad. The empty truck is reweighed to determine the net wet tons of ore delivered.

After the empty truck has been weighed, it is washed at the decontamination pad and then proceeds to the Mill gate. The vehicle is radiologically scanned by qualified personnel to ensure the vehicle meets the release criteria prior to leaving the Mill site.

The ore is placed in stockpiles based on source of ore prior to processing.

4.1.3 Grinding and Wet Ore Storage

Ore is trammed to the ore grizzly from the storage stockpiles by loaders and trucks. The ore from the grizzly is fed at a controlled rate to the semi-autogenous ("SAG") mill circuit.

The SAG mill circuit consists of an 18 foot x 6 foot grinding mill. The Overflow from the sizing returns to the SAG mill in a closed circuit. The underflow from the screens (opening size varies in response to ore type) is pumped to the three 35 foot diameter mechanically agitated wet slurry storage tanks.

Minor spills from the slurry tanks are contained within concrete barriers. This area is periodically cleaned, with the cleanup returned to the circuit or taken to a tailings cell. The slurry from a catastrophic tank failure would flow to the lined catchment basin (Roberts Pond) west of the Mill.

In order to minimize the risk of a tank overflow, operators visually check tank levels approximately once per hour when grinding.

4.1.4 Leaching

Leaching at the Mill is designed for vanadium, as well as uranium extraction. A two-stage acid leach having a nominal retention time of 24 hours is employed to maximize recoveries.

The two-stage leach process starts with separating the strong acid leach liquor from the leached residue in the No. 1 counter-current decantation thickener and mixing it with fresh ore in the first stage leach tankage. The slurry from the first stage leach is pumped to a cyclone (or alternately to the pre-leach thickener). The cyclone overflow reports to the pre-leach thickener, while the underflow continues through the leach circuit. Acid and oxidants are added through the second stage leach. The function of the first stage leach is to utilize the residual acidity from the second stage leach by reacting it with the alkaline constituents of the freshly ground ore, thereby reducing the amount of chemicals added in the second stage and lowering the acid content of the tailings effluent.

The overflow from the pre-leach thickener reports to a conventional thickener called the clarifier.

The underflow from the clarifier is pumped periodically and the slurry is returned to the pre-leach thickener. The overflow from the clarifier is pumped to the claricone, a device that removes suspended solids through centrifugal action. The overflow from the claricone (pregnant liquor) is pumped to the solvent extraction circuit.

Concrete curbs are constructed around the leach area to contain spillage from the leach circuit. This catchment area holds sufficient volume to contain the entire contents of any one of the leach tanks. The concrete floors are sloped toward floor sumps where spills can easily be washed and recycled back into the circuit.

In the event of an overflow, each leach tank is constructed with an overflow pipeline down the side of the tank and directed toward the floor.

The thickened underflow from the pre-leaching thickener is combined with the cyclone underflow as feed to the second stage leach circuit. Two rubber-lined, steel tanks are used in the first leach stage and seven rubber-lined, steel tanks all equipped with rubber-covered turbine type agitators are used in the second stage. Sulfuric acid (H_2SO_4) and an oxidant are added to the leach tanks in the second stage to dissolve the uranium and vanadium.

Approximately 250 to 1,000 pounds of H_2SO_4 per ton of ore is typically used, resulting in a free acid concentration typically of 75 to 180 grams/liter. Oxidant requirements also vary with ore type, and can run from approximately 3 pounds to 20 pounds of sodium chlorate per ton of ore. The temperature of the secondary leach circuit is elevated to approximately 60 to 90° C by the injection of steam.

4.1.5 Counter-Current Decantation (CCD) Washing Circuit

Separation of the strong acid liquor and washing of the leached residue is accomplished in a multi-stage counter-current thickener arrangement using 40 foot diameter high-capacity type thickeners. The barren raffinate or tailings solution recycle is added to the final thickener for washing, drastically reducing fresh water requirements. This internal recycle is equivalent to approximately 2.5 tons of solution for each ton of ore processed, or conservation of 833 gallons per minute of fresh water.

During each CCD thickening stage, solid particles settle to the bottom leaving a clarified uranium bearing solution at the top of the thickener tank. The underflow slurry is pumped to the next thickener mix tank ("down" the circuit), while the overflow solution is pumped to the next mix tank ("up" the circuit). Polymeric flocculants are utilized to increase the settling rates of the solid in each stage of thickening. The under flow slurry, from the last thickener, is sampled and pumped to the tailings retention area.

As mentioned above, the solution from the No. 1 CCD thickener is utilized in the first stage leach circuit before reporting to the pre-leach thickener. Overflow from the pre-leach thickener is transferred to clarification prior to solvent extraction.

The CCD thickener tanks are situated on a concrete slab with a curb around the perimeter. Any

overflow or spillage from this area is contained within the perimeter unless several thickener tanks would fail or collapse at once. In this event, the contents would flow into the lined catchment basin west of the Mill area (Roberts Pond), as shown in Figure 4.1-2.

The thickeners and claricone have overflow pipelines, flowing to overflow sumps. The overflow floor sump pump starts automatically when the sump becomes full and diverts the material to the appropriate circuit. In the event the pre-leach thickener, clarifier, or claricone would collapse, the contents would flow into the lined catchment basin where it would be contained and pumped back (Roberts Pond) into the Mill circuit.

4.1.6 Solvent Extraction

Solvent extraction is used to concentrate and purify the uranium contained in the overflow solution. The solvent extraction process is carried out in a series of mixing and settling vessels using an amine-type compound carried in kerosene modified by addition of an alcohol (collectively called organic). The organic selectively adsorbs the dissolved uranyl ions from the aqueous leach solution. The organic and aqueous solutions are agitated by mechanical means and then allowed to separate into organic and aqueous phases in the settling tanks. Each settler has an area of about 1,400 square feet.

This procedure is performed in four stages using a counterflow principle, where the organic flow is advanced to the preceding stage and the aqueous flow (drawn from the bottom) is advanced to the following stage. After four stages, the organic phase will typically contain about 5-8 grams of U_3O_8 per liter and the depleted aqueous phase (raffinate) less than 5 milligrams per liter. The raffinate is discharged to the tailings area (or alternately recycled to the counter-current decantation step previously described), or further processed for the recovery of vanadium.

The strip circuit begins when the organic phase is washed with acidified water and then stripped of uranium by contact with an acidified sodium chloride solution in mixer-settler vessels (strippers). The barren organic solution is cleaned as necessary in the regeneration circuit and returned to the solvent extraction circuit. The enriched strip solution, typically containing about 40-60 grams of U_3O_8 per liter, is stored in the Pregnant Solution tank before being pumped to precipitation.

All solvent extraction settling tanks (inside the solvent extraction building) are constructed with an overflow at the discharge end. In the event of a tank overflow or collapse, the content flows into the concrete sump on the west edge of the solvent extraction building. The sump will contain the contents of two mixer-settlers. A sump pump is installed in the sumps to transfer the collected material to the appropriate tank.

4.1.7 Precipitation and Dewatering

The pregnant solution pumped from solvent extraction is neutralized with ammonia to precipitate ammonium diuranate ("yellowcake"). The yellowcake is settled in two 20-foot diameter thickeners in series, and the overflow solution from the first is used as brine makeup solution or combined with the overflow No.1 CCD.

A pump withdraws the yellowcake from the thickener and transfers the yellowcake to a centrifuge. The centrifuge further thickens the yellowcake in addition to providing another washing stage.

A concrete curb is constructed around the yellowcake holding and thickening tanks. Spillage from any of these tanks is contained by this curb. Sumps are situated inside the curbs and floors slope to these sumps so yellowcake spills can easily be cleaned up.

4.1.8 Drying

The thickened, dewatered yellowcake slurry is then conveyed to a totally enclosed 6 foot diameter propane fired multiple-hearth dryer (calciner) operating at approximately 650° C (1200° F). The dried uranium concentrate (about 94% U_3O_8) is passed through a lump breaker to produce a product of less than 1/4 inch size. The dried concentrate, which is the final production of the plant, is then packaged in the packaging enclosure into 55-gallon drums for shipment.

The uranium concentrate drying, crushing and packaging operations are conducted in an isolated, enclosed building with a negative ventilation pressure to contain and collect (by wet scrubbing) all airborne particles. A description of the scrubber is given in Section 5.1.1.

Radiation, monitoring equipment is all portable, and the monitoring locations are described under items 6.4.1 and 6.4.2.

4.1.9 Mill Process Laboratory

The Mill office building contains a laboratory. The laboratory performs analytical functions in the following areas:

a) Quality Control/Quality Assurance (QC/QA) for the Mill process. Examples include uranium determinations of feed, process, and tailings streams to minimize uranium release to the tailings area, and analysis of concentrates prior to shipment to the converters.

b) Health, Safety and Environmental samples. Examples are bioassays for urinary uranium and airborne uranium content from air filters. The Mill also has the capability to analyze for uranium content of surface and groundwaters, although for compliance samples required under the License or the GWDP, such analyses are performed by an independent analytical laboratory.

c) Metallurgical samples. Examples include amenability testing of proposed feed to the Mill, determination of the causes of circuit nonperformance, and exploring potential circuit improvements.

4.1.10 By-Product Vanadium Recovery

Vanadium is present in some of the ores and is solubilized along with the uranium during leaching. The solubilized vanadium reports with the uranium raffinate from the SX circuit, with vanadium recovery commencing in the Vanadium solvent extraction circuit.

The vanadium recovery process consists of a separate solvent extraction circuit to treat the uranium raffinate and precipitate the vanadium from the strip solution. The uranium raffinate is pumped to the oxidation and clarification circuit. In this circuit both pH and emf are adjusted with ammonia and sodium chlorate (alternately hydrogen peroxide), respectively. The vanadium solvent extraction section is essentially of the same design as utilized for the uranium. An amine type compound carried in kerosene (the same as used for uranium) adsorbs the vanadium ions from the uranium raffinate solution. The organic is then stripped of vanadium, with a soda ash solution. The barren organic solution is returned to the solvent extraction circuit, and vanadium is precipitated from the enriched strip solution in the vanadium precipitation circuit.

The vanadium oxidation circuit is exterior to the solvent extraction building, and is constructed on a concrete-curbed slab. Spillage flows to a sump where the solutions can be pumped back to the circuit. A major tank rupture/failure would flow to tailings for containment.

The precipitated ammonium metavanadate (AMV) is filtered, dried, and can be packaged as a final product. The AMV can also have the ammonia driven off prior to a fusion step (which occurs at approximately 800° C) to produce V_2O_5 (black flake). Packaging is in 55-gallon steel drums. Drying and packaging dusts are collected by wet scrubbing to control employee exposure. The vanadium product must meet release standards for any trace concentrations of contained radionuclides (see the Mill's Release and Shipping of Vanadium Blackflake standard operating procedure, included as Appendix B to this Application).

4.1.11 Chemical and Reagent Use

The Mill uses a number of chemicals and reagents in the milling process. The main chemicals and reagents are described below.

i Uranium Circuit

The following are the main chemicals and reagents used in the uranium circuit:

- SAG Mill
  - Water
- Pre-Leach
  - Water or solutions from the CCD circuit
- Pre-leach Thickener
  - Flocculant

- Leach
  - Acid (typically sulfuric acid)
  - Oxidant (Sodium Chlorate, air, hydrogen peroxide or some other type of oxidant)
  - Steam
- CCD
  - Water or barren solutions
  - Flocculant
- Solvent Extraction
  - Kerosene
  - Amine
  - Isodecanol
- SX Stripping
  - Acidified brine (sulfuric acid and salt)
- Precipitation and drying
  - Ammonia
  - Air
  - Propane
  - Steam

ii Vanadium Circuit

The following are the main chemicals and reagents used in the vanadium circuit:

- EMF adjustment tanks
  - Ammonia
  - Sodium chlorate
- Solvent extraction
  - Kerosene
  - Amine
  - Isodecanol
- SX stripping
  - Soda ash solution

iii Laboratory

The following are the chemicals currently used in the Mill's laboratory in some of the major procedures performed by the laboratory:

- Extraction procedure for Organic samples
  - Sodium carbonate
- Acidmetric Determination of Amines
  - Perchloric acid
  - 1,4 dioxane
  - THAM (thris hydoxymethy – amino methane)
  - Methanol
  - Thymol Blue

- Ethanol
- Sodium carbonate

- Determination of Uranium in Ore Samples (Colormetric)
  - Perchloric acid
  - Nitric acid
  - Hydrochloric acid
  - Hydrofluoric acid
  - Sodium sulfate
  - Ammonium hydroxide
  - Acetic acid
  - Aluminum nitrate
  - Meta cresol purple
  - Tributyl phosphate
  - Iso-octane
  - 1,3 diphenyl
  - 1,3 propanedione
  - ethanol

Part I.H.10 of the GWDP required that Denison complete a historical review, and conduct an inventory of all chemical compounds or reagents stored, used, or currently in use at the Mill including:

- The identification of all chemicals used in the milling and milling related processes at the Mill; and

- A determination of the total volumes currently in use and historically used, as data is available.

Such inventory was prepared by Denison and submitted to and approved by the Co-Executive Secretary. Part I.D.7 of the GWDP requires that at the time of GWDP renewal, Denison must submit a report to update this chemical inventory.

Part I.E.7 of the GWDP requires that Denison monitor and maintain a current inventory of all chemicals used at the Mill at rates equal to or greater than 100 kg/yr. Such inventory must be maintained on-site, and shall include, but is not limited to:

- Identification of chemicals used in the milling process and the on-site laboratory; and

- Determination of volume and mass of each raw chemical currently held in storage at the Mill.

4.1.12 Process/Chemical Tankage

Tanks are used to store slurries, process solutions, and chemicals throughout the Mill. Different systems are used to control spillage, either routine or catastrophic, from each tank, depending on location and construction details. A rupture of any chemical holding tank would: 1) be contained

by dikes or curbs, 2) flow to the lined catchment basin west of the pre-leach thickener, or 3) flow to Cell 1.

The sulfuric acid tank is equipped with an overflow near the top of the tank in addition to an automatic audible signal which will sound before the tank overflows.

In case of a large spill in the Mill, CCD or pre-leach thickener area, such as several tanks collapsing, a lined catchment basin (Roberts Pond) is utilized to contain the spills. This catchment basin holds approximately 1.5 million gallons, which will hold all of the contents from the pre-leach thickener or the contents of several of the CCD thickener tanks.

Part I.D.8 of the GWDP requires that Denison manage all contact and non-contact stormwater and control contaminant spills at the Mill in accordance with an approved Stormwater Best Management Practices Plan. The Mill's Stormwater Best Management Practices Plan is included as Appendix C to this Application. That Plan includes provisions to adequately:

a) Protect groundwater quality or other waters of the state by design, construction, and/or active operational measures that meet the requirements of the Groundwater Quality Protection Regulations found in UAC R317-6-6.3(G) and R317-6-6.4(c);

b) Prevent, control and contain spills of stored reagents or other chemicals at the Mill site;

c) Cleanup spills of stored reagents or other chemicals at the Mill site immediately upon discovery; and

d) Report reagent spills or other releases at the Mill site to the Executive Secretary in accordance with UAC 19-5-114.

Part I.D.3.e) of the GWDP provides that for all chemical reagents stored at existing storage facilities and held for use in the milling process, the Mill must provide secondary containment to capture and contain all volumes of reagent(s) that might be released at any individual storage area. Response to spills, cleanup thereof, and required reporting must also comply with the provisions of the Mill's Emergency Response Plan, a copy of which is enclosed as Appendix D to this Application. For any new construction of reagent storage facilities, the secondary containment and control is intended to prevent any contact of the spilled or otherwise released reagent or product with the ground surface.

4.1.13 Fire Protection System

The solvent extraction, warehouse, and office buildings are equipped with sensor operated fire control systems. In addition, there are hose stations located in the Mill yard. The solvent extraction building has a foam dispersion sprinkler system. The main water supply tank has a 250,000 gallon reserve, for fire protection use, which feeds an automatic starting diesel-fired pump rated at 2,000 gallons per minute at one hundred pounds pressure per square inch. The fire protection system receives documented monthly inspections. Refer to the Mill's Emergency Response Plan, included as Appendix D to this Application.

4.1.14 Instrumentation

Automatic or semi-automatic instruments are utilized where applicable in the Mill circuit for safety, quality control, and process efficiency. The following describes the current instrumentation controls. The Mill is currently undergoing a review of its instrumentation and controls.

i. Grinding Circuit and Wet Ore Storage

The rate the ore is fed to the grinding circuit will be determined by belt scales. The ore feed rate is controlled by the operator. Feed to the grinding circuit is shut down by electric circuit interlocks in the event of equipment failure.

ii. Leach Circuit

Sulfuric acid and an oxidant, such as sodium chlorate, are added to the leach slurry to dissolve the uranium. The acid content is measured manually by titration and/or pH. Control is by manual adjustment of acid addition as indicated by an in-line flowmeter. Oxidation potential is determined in the leach slurry from individual samples. Oxidant is added as a slurry or solution and controlled manually through an in-line flowmeter.

Steam is injected into the leach slurry to elevate the temperature to approximately 80-90 ° C. The slurry temperature is monitored by tank thermometers and controlled by manual adjustment of steam addition.

iii. Counter-Current Washing of Leach Solids

The leached solids are washed in the CCD thickener circuit.

Determination of the density of the individual thickener underflow slurries is measured manually as well as flocculant additions and pumping rates are by manual operation.

iv. Solvent Extraction

The flow rate of the pregnant liquor feed to the solvent extraction circuit is determined by a mass flow (magnetic) meter and the flow is controlled automatically. Flow rates are recorded continuously.

The organic flow rate is controlled similar to the pregnant liquor, except a differential pressure flowmeter is utilized in place of the magnetic flowmeter. Flow rate of the pregnant strip solution is controlled and recorded in the same manner as the pregnant liquor feed.

v. Precipitation

The pregnant liquor from solvent extraction strip circuit is neutralized by the addition of anhydrous ammonia. The addition of the ammonia is automatically controlled by pH measurement.

vi. Drying and Packaging

The partially dewatered yellowcake slurry is dried and calcined in a multi--hearth dryer at about 650° C. The temperature of the dryer is controlled by automatic thermal controllers. An audible signal indicates excess temperature in the dryer. In addition, the yellowcake feed pump to the dryer is interlocked with the scrubber fan and water circulating pump. This feed pump, as well as the discharge scrubber fan, will shut down if the scrubber water supply fails. A flow meter is installed on the scrubber water supply line and checked twice per shift.

Manometer readings of the yellowcake dryer off gases are checked twice each shift and recorded.

vii. Radiation Safety and Monitoring Instrumentation

Equipment used in monitoring for the radiation safety program is detailed within the Radiation Protection Manual included as Appendix E to this Application.

4.2 Alternate Feed Processing

4.2.1 The Mill's Alternate Feed Program

In addition to processing conventionally mined ores for the recovery of uranium and vanadium for many years, the Mill License gives the Mill the right to process other uranium-bearing materials known as "alternate feed materials," pursuant to the Alternate Feed Guidance[8]. Alternate feed materials are uranium-bearing materials, other than conventionally mined uranium ores, such as residues from other processing facilities, which usually are classified as waste products to the generators of the materials. Each different alternate feed material requires an amendment to the Mill License. The Mill can process these uranium-bearing materials and recover uranium, alone or together with other valuable metals such as niobium, tantalum and zirconium. License condition 9.11 also requires that, prior to the placement of alternate feed material, Denison must determine using a SERP-approved procedure, that adequate tailings cell space is available for that additional material.

As of February 28, 2007, the Mill has received fourteen license amendments, authorizing the Mill to process seventeen different alternate feed materials. As of February 28, 2007, the Mill has processed over 360,000 tons of alternate feed materials, recovering over 1.6 million pounds of U_3O_8 from these materials.

[8] See NRC Regulatory Issues Summary 00-023, *Recent Changes to Uranium Recovery Policy*, (November 30, 2000).

4.2.2 Processing Alternate Feeds

i. General

The Mill circuit that is applicable to processing alternate feed materials generally follows the description given in Section 4.1 for conventionally mined ores, but usually with some minor variations, depending on the type of feed.

Alternate feed materials that are received in bulk and require grinding are typically introduced into the Mill circuit in the same fashion as conventional ores. Alternate feed materials that are received in bulk but that do not require grinding are typically introduced into the Mill circuit by way of a trommel. Alternate feed materials that are received in drums can be introduced into the Mill circuit by way of a remote barrel dumping station.

Certain alternate feed materials require modifications to the process steps described in Section 4.1, including the use of ion exchange alone or in combination with solvent extraction. Generally, the changes to the process involves utilizing some, but not all of the steps, or changing the order of the steps, or in some cases modifying the reagents, used for processing conventional ores.

ii. Introducing Alternate Feed Materials Into the Mill Circuit via Trommel

To feed the Mill from its stockpiles of bulk alternate feed ores, the ore is dumped, by front-end loader, through a stationary grizzly and into an ore-receiving hopper. The ore is then transferred to the trommel screen via a conveyor belt. Water is added with the ore into the trommel where the washing of the material, break-up of the larger material, and removal of debris is accomplished. The finer particles, now in slurry form, are pumped to the pulp (wet) storage tanks. The debris that is removed is hauled to the tailings cells where it is placed in lifts prior to placement of random fill cover material.

iii. Introducing Alternate Feed Materials Into the Mill Circuit via the Remote Drum Dumping Station

The Mill also has specific equipment for remotely emptying drums of alternate feed materials. This equipment is used for drummed material that has a high specific activity and that can not be introduced into the Mill circuit manually.

iv. Uranium Extraction

For some alternate feed materials, ion exchange or a combination of ion exchange and solvent extraction is used rather than solvent extraction alone.

The ion exchange circuit is utilized to extract dissolved uranium from clarified pregnant liquor. The ion exchange process selectively removes uranium from an acid water solution, leaving unwanted metals in solution. The uranium-acid solution from the clarifiers, or the aqueous feed, is pumped to the first ion exchange column. Ion exchange resin, in the form of small beads, acts

the same as the organic in the solvent extraction circuit in that it picks up uranium in the extraction phase and releases uranium in an acid stripping solution. After uranium bearing solution flows through the columns, the resin is "loaded" and the aqueous is barren of uranium. The barren aqueous solution or "raffinate", now free of uranium, leaves the extraction stage and is pumped to the CCD thickener circuit as a washing solution or is disposed of in a tailings cell. From the extraction stage, the uranium bearing resin is pumped to the stripping stage, where uranium is stripped from the resin by an acid brine. The brine leaves the circuit typically containing approximately 40 times the concentration of uranium as compared to the acid water solution or aqueous that was introduced into the ion exchange circuit. The resin leaving the strip stage of the circuit is free of uranium and ready for re-use in the extraction stage. The loaded high-grade strip solution is then pumped to a solvent extraction circuit for further purification. The raffinate from the solvent extraction circuit is pumped to the tailings cells. The loaded high-grade strip solution from the solvent extraction circuit is then pumped to the precipitation circuit.

4.2.3 Alternate Feed Materials Licensed to Date for Processing at the Mill

Table 4.2-1 sets out the sources of alternate feed materials and their source material content that have been licensed to date for processing at the Mill.

Table 4.2-1
Alternate Feed Materials Licensed to Date for Processing at the Mill

Alternate Feed	Description	Volume	Average Uranium Content (Wt % U)
Linde[1]	Soils contaminated with uranium and other radionuclides	100,000 tons	0.07%
Ashland [1]	Soils contaminated with uranium and other radionuclides.	172,600 tons	0.06%
Ashland[1]	Soils contaminated with uranium and other radionuclides.	43,980 tons	0.009%
St. Louis [1,2]	Soils contaminated with uranium and other radionuclides.	1,029,000 CY	0.09%
Maywood[1,3]	Soils contaminated with Th-232, uranium and other radionuclides.	250,000 Tons	0.01%
Nevada Test Site Cotter Concentrate[4]	Drummed slurry	363 tons	10.0%
Honeywell[5]	Calcium Fluoride waste stream – licensed source material	5,443 tons	2.0%
Cabot[6]	Ore residues from tantalum production Licensed source material	16,830 tons	0.343%
Allied Signal[5]	Aqueous potassium hydroxide (KOH) slurry and solids Licensed source material	1,595 tons	17.0%
Rhone-Poulenc[5]	Uranyl nitrate hexahydrate liquid concentrate	17 tons	50.0%
Cameco[5]	Potassium fluoride product	1,966 tons	4.6%
Cameco[5]	Uranium tetrafluoride with filter ash Powdered solid	10 tons	65%
Cameco[5]	Calcined raffinate	2,197 tons	5.5%
Cameco[5]	Mono- and dibutyl phosphate regeneration product	557 tons	8.0%
W.R. Grace[2, 7]	Monazite sands and soils	203,000 tons	.0.74%
Heritage[8]	Monazite sands	2,910 tons	0.05%
Molycorp[6]	Lead sulfide pond solids. Licensable source material	11,500 tons	0.15%
FMRI[8]	Ore residues from tantalum production Licensed source material	32,000 tons	0.15%

Source: Denison

[1] These FUSRAP materials are derived from uranium mill tailings. Therefore, they contain the U-238 series in disequilibrium
[2] Material that the Mill is licensed to process, but which the Mill has not received to date.
[3] Contains U-238 series in equilibrium and Th-232 series in disequilibrium.
[4] Contains U-238, low levels of Ra-226 and high levels of Th-230
[5] Contains U-238 series in disequilibrium
[6] Contains U-238 series in equilibrium as well as Th-232 series in equilibrium.
[7] Contains U-238 series in equilibrium with high levels of Th-232 and Th-228.
[8] Contains U-238 series in equilibrium, as well as elevated levels of Th-232 series in equilibrium.

4.3 Direct Disposal of 11e.(2) Byproduct Material From In Situ Recovery Facilities

License condition 10.5 authorizes the Mill to dispose of 11e.(2) byproduct material generated at licensed in situ recovery facilities, subject to the following:

- Disposal of waste is limited to 5,000 cubic yards from a single source;
- All contaminated equipment must be dismantled, crushed, or sectioned to minimize void spaces. Barrels containing waste other than soil or sludges must be emptied into the disposal area and the barrels crushed. Barrels containing soil or sludges must be verified to be full prior to disposal. Barrels not completely full must be filled with tailings or soil;
- All waste must be buried in Tailings Cell No. 3 unless prior written approval is obtained from the Executive Secretary for alternate burial locations; and
- All disposal activities must be documented. The documentation must include descriptions of the waste and the disposal locations, as well as all actions required by license condition 10.5.

An annual summary of the amounts of waste disposed of from off-site generators is sent to the Executive Secretary.

5. WASTE MANAGEMENT SYSTEM

The methods used for control of gaseous emissions and liquid/solid effluents are discussed below.

5.1 Gaseous - Mill

Table 5.1-1 summarizes the ventilation, confinement, filtration, and dust collection system relating to emission sources at the Mill. Tab 1.4, Stack Emissions, in the Environmental Protection Manual included as Appendix A to this Application, details measurement procedures for gaseous effluents.

5.1.1 Airborne Dust and Fume Control - Mill

Dust generated in the ore hopper area is collected in a reverse jet bag house dust collecting system. Bag house negative pressure checks are made and logged every two hours. In addition, a dust suppression spray system is installed in the SAG mill feeding system and used when exceedingly *dry* ores are being fed to the SAG mill. Water added for these purposes remains with the ore and goes to process. See the Mill's *Ore Receiving, Feed and Grind* Standard Operating Procedure included as Appendix F to this Application for specific operational parameters and procedures.

The Mill operates two yellowcake dryers feeding into a single packaging area. Yellowcake particles carried in flue gases and fumes from each of the uranium dryers pass through two different scrubbing trains that are joined in a common discharge stack. Both trains consist of a Ducon UW-4 wet scrubber, or equivalent, followed by Ducon packed tower mist eliminator, or equivalent. The wet fan scrubbers are intended to remove particulates, while the packed tower is intended to remove gases and mists that may contain dissolved solids. Air from the packaging area enclosure is cleaned through a baghouse with a separate discharge stack. Figure 5.1-1 is a flow diagram that sets out the airbourne dust and fume control systems for both the uranium and vanadium circuits at the Mill, as taken from the Mill's Air Approval Order. See the Mill's *Uranium Precipitation, Drying and Packaging* Standard Operating Procedure included as Appendix G to this Application for specific operational parameters and procedures. Specifications for the fan-type scrubbers show efficiencies to be greater than 99 percent. Figure 5.1-1 is a flow diagram that sets out the airbourne dust and fume control systems for both the uranium and vanadium circuits at the Mill, as taken from the Mill's Air Approval Order. See the Mill's *Uranium Precipitation, Drying and Packaging* Standard Operating Procedure included as Appendix G to this Application for specific operational parameters and procedures.

The solution and particulates collected from the scrubbers are recycled to the No. 1 yellowcake thickener.

Denison Mines (USA) Corp. - Uranium and Vanadium Flow Diagram

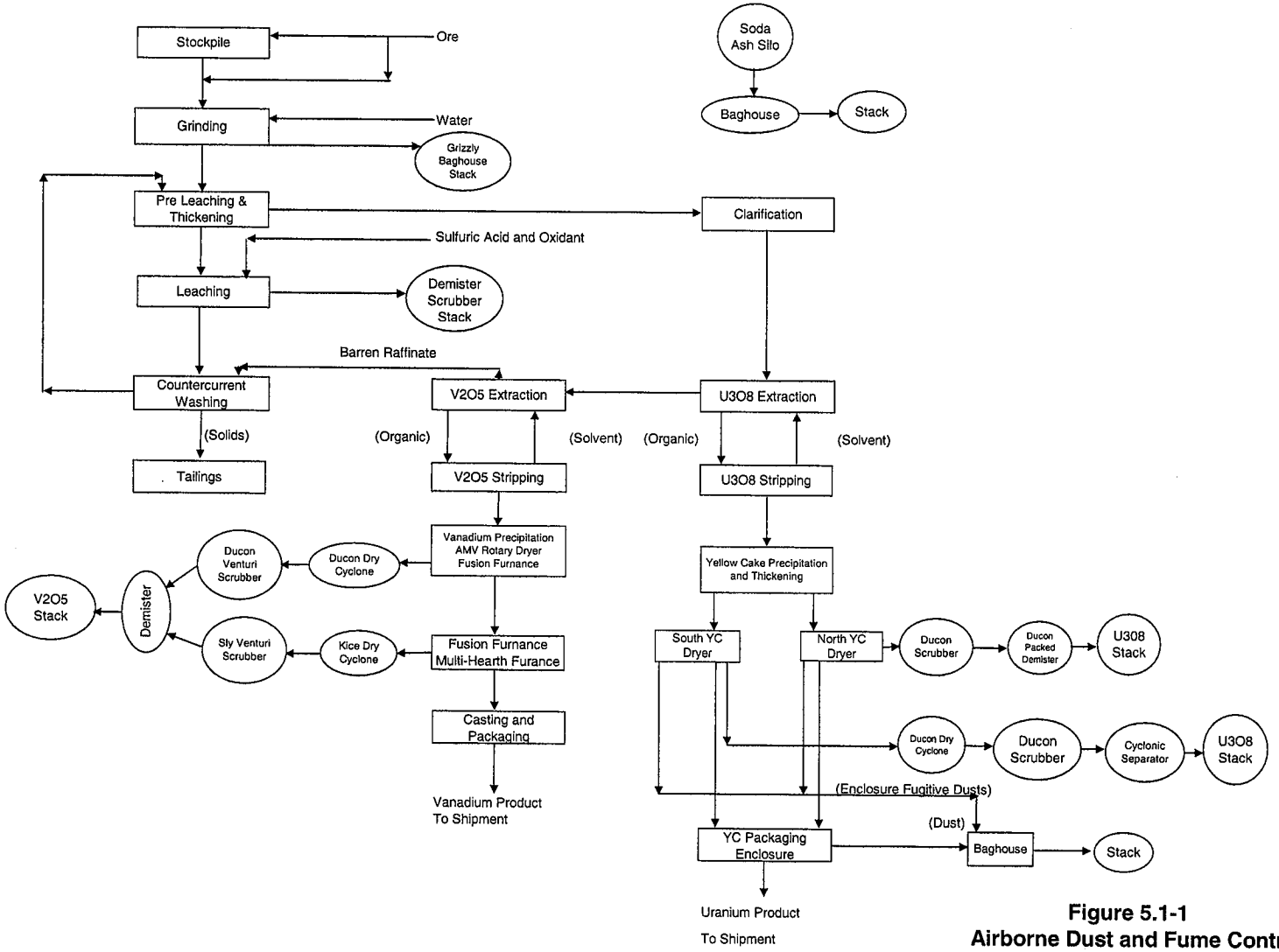


Figure 5.1-1
Airborne Dust and Fume Control

The monitored emission rate from the yellowcake dryer emission stack during operation is approximately 4,000 scfm containing 0.050 pounds per hour U_3O_8, with a total emission rate of approximately 2 pounds per hour. The stack is approximately eighteen inches in diameter, extending approximately eighty feet above roof level and consists of discharges from both scrubbers.

Two wet dust collectors also are installed to collect and recycle dust generated from the vanadium drying operation. An isolated portion of the building is utilized for precipitation, drying, and packaging of the vanadium. Since uranium is removed prior to vanadium recovery, virtually no release of radioactivity is expected in the vanadium drying and fusion step.

Processing buildings and equipment are provided with ventilation fans, hoods and ducting to control the concentration of gaseous effluents. Table 5.1-1 describes the Gas-Mist-Dust Emission Equipment inventory at the Mill.

Table 5.1-1
Gas-Mist-Dust Emissions Equipment Inventory

Source	Emission Type	Control Method	Control Equipment	Design Efficiency %
Ore from Stockpile to SAG Mill	Dust	Baghouse Dust Collectors (3,060 Sq. Feet)	Torit Model T-d 3,060 Ft^2 – Air to Cloth Ratio 1.6:1	99.9
Pre-Leach Agitators and Final Leach Agitators	Mist	Covered Tanks, and Demister Exhaust Fans to Atmosphere	Heil Model 716 14,000 CFM	
Boiler, Gas Fired	Flue Gas	NA	NA	
Boiler, Oil Fired	Flue Gas	NA	NA	
Uranium and Vanadium Extraction	Vapor	Forced Air Building Ventilation	Vent Fans, up to 6-Changes per Hour	
Yellowcake Drying and Packaging	Vapor-Dust	Wet Fan Scrubbers	Ducon Packed Towers and Mist Eliminator	99.5
Vanadium Drying-Fusion	Dust	Wet Venturi Scrubber	Sly Wet Venturi Scrubber 12,000 CFM	99.5
Vanadium Fugitive Dust	Dust	Wet Venturi Scrubber	Sly Venturi Scrubber 6,980 CFM	99.5

A forced air ventilation system designed for the entire solvent extraction and stripping buildings removes kerosene vapors. The ventilation fans are checked visually for proper operation on a daily basis. In addition, the fans are equipped with a "running light" so that a malfunction is readily apparent.

Table 5.1-2 summarizes information regarding the Mill discharge stacks and effluents.

Table 5.1-2
Stack Heights and Emission Data

Mill Facility	Release Height Feet	Exit Diameter Inches	Exit Temperature Degree F	Radionuclide	Observed Emissions µCi/ml
Ore Hopper 4,300 CFM	35	18	Ambient	Unat Ra-226 Th-230 Pb-210	3E-11 2E-11 6E-12 1E-11
Leach Exhaust 13,700 CFM	101	36	130	Unat Ra-226 Th-230 Pb-210	3E-11 5E-13 7E-13 3E-13
Yellowcake Drying and Packaging 4,000 CFM	83	18	200	Unat Ra-226 Th-230 Pb-210	1E-9 5E-14 5E-13 2E-12
Yellowcake Dryer (Shaft Cooling)	70	12		NA	NA
Vanadium Dryer	83	38	200	NA	NA
Vanadium Dryer (Shaft Cooling)	70	12			
Boiler, Propane	20	26	188	NA	NA
Boiler, Propane	20	26	188	NA	NA
Laboratory Fume Hood	35	10	60	NA	NA
Boiler, Propane (SX)	43	10	NA	NA	NA

5.1.2 Airborne Dust Control - Mill Stockpile

A daily inspection of the ore stockpile area for dusty conditions will dictate if dust suppression measures are necessary. The inspection is documented by the radiation staff and filed with the radiation department. If dusty conditions are present, the roadways and/or stockpiles will be sprayed with water or stabilized to minimize dusting. A log sheet of water applications is maintained by the radiation staff. See Section 3 of Tab 3-3, Tailings Dust Minimization, in Appendix A for the products used to control airborne dust on the ore pad.

5.1.3 Airborne Dust and Fume Control - Process Laboratory

The Mill facility is complemented with an analytical laboratory which routinely assays ore, process streams and final products to ensure adequate quality control and plant operating efficiency. The laboratory fume hoods collect air and mixed chemical fumes for venting to the atmosphere. These gases contain non-radioactive chemicals, including acids and organics. The volume of gaseous fumes emitted from the laboratory operations is small and free of dust as samples processed in the analytical laboratory are wet.

Dust is controlled in the sample preparation room (bucking room) utilizing dust collector systems over the pulverizer and crusher. Two ISSCO .003 dust collectors with 100 square foot filter bags, or the equivalent, are used to control dust. (Model PB-l2 with 825 cfm, or the equivalent).

5.2 Liquids and Solids

The design of the Mill is such that any leaks or spills are collected and recycled to the appropriate part of the process, thus eliminating any product loss, hazard to personnel, or contamination of the surrounding area. These collection systems are described in detail in Section 4.1 under the specific equipment headings.

Most process liquids are recycled in the Mill; however, about one ton of liquid (water) for every one ton of tailings solids is discharged to the impoundment area. The water is required to transport the solid tailings. In addition, the elimination of some process water in this manner avoids a buildup in chemical ions that could affect the Milling process.

5.2.1 Tailings Retention Area

The tailings (both slurry and solution) from the Milling operation are discharged by pipelines to an impoundment system southwest of the Mill.

i. Available Characterization Data For Tailings Solutions

Some limited historic wastewater quality sampling and analysis has been done at the Mill's tailings cells. Some of this work included pre-construction laboratory bench top testing by the previous Mill operator to estimate the possible contaminants that might be discharged to the tailings wastewater. Several historical samples of the tailings effluent have been collected and

analyzed by both the NRC and the Mill to determine the chemical properties of the tailings wastewater for a limited number of parameters.

Part I.E.8 of the GWDP requires that, on an annual basis, the Mill collect wastewater quality samples from each wastewater source at each tailings cell at the Mill, including, but not limited to: surface impounded wastewaters, and slimes drain wastewaters. Part I.E.8 of the GWDP also requires that all such sampling shall be conducted in August of each calendar year in compliance with an approved Tailings Cell Wastewater Quality Sampling Plan required by Part I.H.5 of the GWDP. Denison submitted a draft Tailings Cell Wastewater Quality Sampling Plan to the Executive Secretary for approval on August 4, 2005. The draft Plan is currently under review by the Executive Secretary. Once the Plan is approved by the Executive Secretary, Denison will commence annual sampling in accordance with that Plan.

Table 5.2-1 sets out the available data as of February 28, 2007 characterizing the tailings solutions, as taken from the GWDP Statement of Basis.

From this information it is evident that the pre-construction laboratory testing, which analyzed effluents to be discharged to the tailings system, under-estimated the actual concentration of several contaminants that would accumulate over time in the tailings wastewater. Other pre-construction estimates over-predicted the average measured concentrations, including: silica, barium, calcium, manganese, and gross alpha. These concentration differences are indicative of either variability of the feedstocks input to the Mill, the variability of the milling process itself, and/or increasing concentrations in the solutions in the tailings cells over time due to evaporation.

Table 5.2-1
Tailings Solution Characterization Data

Contaminant	1979 Benchtop Estimate[1] (mg/L)	September, 1980 – March, 2003 Mill / NRC Tailings Wastewater Samples[2] Reported Concentrations Min. (mg/L)	Max. (mg/L)	Average (mg/L)	Std. Dev. (mg/L)	Sample Count
PH (std units)	1.8 – 2.0	0.7	2.33	1.83	0.52	16
Nutrients (mg/l)						
Ammonia (N)	65	3.0	13,900	3,130.65	3,318.40	17
Nitrite (N)		< 100	< 100	< 100		2
Nitrate (N)		24	24	24		1
Nitrite+Nitate (N)		17.0	49.2	30.91	12.53	12
Phosphorus-total		88.1	620	273.03	171.23	17
TKN (N)		4,900	5,300	5,100	282.84	2
Inorganics (mg/l)						
Bicarbonate (HCO3)		< 5	< 5	< 5		2
Bromide		< 500	< 500	< 500		1
Carbonate (CO3)		< 1	< 5	< 1.3		13
Chloride	3,050	2,110	8,000	4,608.44	2,372.39	16
Cyanide – total		0.022	0.022	0.02		1
Fluoride	1.4	0.02	4,440	1,694.7	1,449.21	13
Phosphate		< 500	< 500	< 500		2
Silica	300	110	400	210.0	164.62	3
Sulfate	82,200	29,800	190,000	64,913.9	48,361.6	17
Sulfide		< 5	< 5	< 5		2
TDS	n/a	43,100	189,000	85,960	40,645.55	17
TOC		76.0	81	78.50	3.54	2
TSS		31.0	115	73.00	59.40	2
Metals (mg/l)						
Aluminum	4,260	330.0	2530	1,826.9	591.63	16
Antimony		< 20	< 20	< 20		3
Arsenic	52	0.3	440	149.1	148.18	22
Barium	0.3	0.021	0.10	0.048	0.02	13
Beryllium		0.347	0.78	0.502	0.13	15
Boron		3.5	11.3	6.9	2.83	16
Cadmium	1.7	1.64	6.6	3.4	1.58	17
Calcium	480	90.0	630	367.7	124.70	18
Chromium	6	1.0	13	6.2	3.38	17
Cobalt	N/a	14.0	120	60.7	54.12	3
Copper	1,620	72.2	740	234.4	206.02	17
Iron	n/a	1080.0	3400	2,211.9	887.56	16
Gallium		< 30	< 30	< 30		3
Lead	1	0.21	6.0	3.0	1.26	14

Contaminant	1979 Benchtop Estimate[1] (mg/L)	September, 1980 – March, 2003 Mill / NRC Tailings Wastewater Samples[2] Reported Concentrations Min. (mg/L)	Max. (mg/L)	Average (mg/L)	Std. Dev. (mg/L)	Sample Count
Lithium		< 10	< 20	< 17.5	< 5.0	4
Magnesium	4,060	1,800	7,900	4,773.7	1,871.03	19
Manganese	4,580	74.0	222	145.8	34.76	18
Mercury	0.001	0.0008	17.6	3.5	7.87	5
Molybdenum	7	0.44	240	52.8	71.17	18
Nickel	N/a	7.2	370	82.6	115.40	17
Potassium		219.0	828	433.1	215.70	14
Selenium	0.56	0.18	2.4	1.4	0.67	18
Silver	0.06	0.005	0.14	0.1	0.10	2
Sodium	4,900	1,400	10,000	5,808.7	3,072.10	19
Strontium		3.6	14	7.0	4.74	4
Thallium		0.7	45	16.0	20.54	8
Tin		< 5	< 5	< 5		3
Titanium		6.5	33.3	19.1	11.70	12
Uranium	2.5	5.0	154	93.6	41.20	17
Vanadium	240	136	510	263.1	111.91	17
Zinc	90	50	1300	640.6	598.48	5
Zirconium		2.3	38.5	12.2	12.00	14
Radiologics (pCi/l)						
Gross Alpha	250,000	14,000	189,000	120,493	50,345.1	15
Gross Beta		74	116,000	68,942	35,918.8	15
Lead-210		680	20,700	3,385	4,660.1	17
Thorium-230		3,650	76,640	21,748	15,394.8	18
Thorium-232		49	121	87	27.9	12
Polonium-210		1,410	1,410	1,410		1
Radium-226		40	1,690	1,027	497.2	15
Radium-228		1.9	1.9	1.9		1
Total Radium		42	1,700	942	553.2	19
Selected VOCs (ug/l)						
Acetone		28	514	192	278.4	3
Benzene		< 5	< 5	< 5		2
2-butanone (MEK)		11	15.13	13.38	2.13	3
Carbon Disulfide		16	16	16		1
Carbon tetrachloride		< 5	< 5	< 5		2
Chloroform		6	16.84	10.28	5.77	3
1,1-Dichloroethane		< 5	< 5	< 5		2
1,2-Dichloroethane		< 5	< 5	< 5		2
Dichloromethane		10	11	10.5	0.71	2
Tetrahydrofuran		n-a	n-a	n-a	n-a	n-a
Toluene		< 5	6.25	< 5.62		2
Vinyl chloride		< 10	< 10	< 10		2

Contaminant	1979 Benchtop Estimate[1] (mg/L)	September, 1980 – March, 2003 Mill / NRC Tailings Wastewater Samples[2] Reported Concentrations				
		Min. (mg/L)	Max. (mg/L)	Average (mg/L)	Std. Dev. (mg/L)	Sample Count
Selected Semi-VOCs (ug/l)						
Xylene (total)		< 5	< 5	< 5		2
Benzo(a)pyrene		< 10	< 10	< 10		2
Bis(2-ethylhexyl)phthalate		1	1	1		3
Chrysene		< 10	< 10	< 10		2
Diethyl phthalate		< 10	18.1	18.1		3
Dimethylphthalate		2.7	2.7	2.7		3
Di-n-butylphthalate		1.08	1.08	1.08		3
Fluoranthene		< 10	< 10	< 10		2
2-Methylnaphthalene		< 10	< 10	< 10		2
Naphthalene		2.44	2.44	2.44		3
Phenol		< 10	38.4	38.4		3

Footnotes:

1) From May, 1979 NRC Final Environmental Statement, p. 3-11, Table 3.1. Original concentrations reported in units of gm/liter, converted here to mg/liter.
2) Based on samples collected by Denison and the NRC between September, 1980 and March, 2003. For details see Attachment 6 to the GWDP Statement of Basis.

ii. Cell Design

The tailings impoundment consist of a series of cells that are designed for phased construction and reclamation. The conceptual and permitted total capacity is for the quantity of Mill tailings produced from a 15-year operating period at a rate of 2,000 TPD, operating 365 days per year. The cells are membrane lined to provide containment of solids and liquids.

In addition to the barren ore slurry and barren solvent extraction raffinate discharged to the impoundment area, uranium source material contaminated solid wastes are disposed of in the tailings area. To prevent damage to the tailings cell liners, these contaminated solid waste materials (e.g., discarded or scrap metal, wood, etc.) are only placed on top of the tailings material deposited in that cell. This provides a barrier between the material and the liner. Materials containing voids are crushed or modified so as to eliminate air pockets which may cause future differential settling. Existing License Condition 10.4 delineates procedures for the disposal of source material contaminated material within the tailings impoundments.

The tailings and evaporation cells are designed and constructed as below grade disposal facilities. Each cell includes an engineered membrane liner, and a leak detection system. The leak detection system is designed to provide an early warning of catastrophic liner failure. Tailings cells 1, 2 and 3 were constructed and approved for use in 1979-1980 in accordance with NRC requirements and by the State of Utah State Health Department. See the Mill's GWDP and Statement of Basis for additional details on the tailings cell design and construction. As those cells were constructed in 1979 and 1980, they do not meet every current Best Available Technology ("BAT") standard applicable to the design and construction of similar cells today. However, the Statement of Basis for the Mill's GWDP concludes that tailings cells 1, 2 and 3 meet the discharge minimization technology ("DMT")/criteria set out in UAC R317-6-6.4(c) and are therefore permitted for continuous use, in accordance with the terms of the GWDP, which imposes additional DMT performance standards and monitoring requirements.

iii. Relining of Tailings Cell 4A

Tailings cell 4A was designed and constructed and placed into operation in 1990 in accordance with the requirements of 10 CFR Part 40 Appendix A and 40 CFR 192 and was approved by NRC. Unlike tailings cells 1, 2 and 3, tailings cell 4A was designed with a one-foot clay liner beneath the synthetic liner and leak detection system. However, the synthetic liner in cell 4A experienced seam degradation and damage, as it was only used for a short period of time in 1990 for the disposal of raffinates and has not been used since. In 2001, the calculated flow rate in the leak detection system for Cell 4A exceeded one gallon per minute and notice was provided to NRC procedures were followed pursuant to License condition 11.3D.

The raffinates, resulting crystals, and radioactive solids have been removed from cell 4A, and Denison is currently in the processing of re-lining the cell. Part I.D.4 of the GWDP provides that any construction, modification, or operation of new waste or wastewater disposal, treatment, or storage facilities shall require submittal of engineering design plans and specifications and prior Executive Secretary review and approval. Part I.D. 4 also provides that all engineering plans or

specifications submitted shall demonstrate compliance with all BAT requirements stipulated by the Utah Groundwater Quality Protection Regulations (UAC R317-6). Denison has submitted to the Executive Secretary for approval, under Part I.H.15 of the GWDP, engineering design plans and specifications for the re-lining of cell 4 that demonstrate compliance with BAT criteria.

5.2.1 Sanitary and Other Mill Solid Wastes

Trash, rags, wood chips, and other solid debris, including solid waste (trash) from office buildings, plant buildings, e.g., florescent light bulbs containing mercury, NiCd, batteries, etc. are collected and buried in the designated tailings dump area. Coveralls used in the yellowcake area are laundered at the Mill. Mill personnel are provided with a change room and laundering facility to allow them to leave their work clothes at the Mill. All liquid effluents from the laundry are routed to the tailings retention system.

Liquid laboratory wastes are discharged to the tailings retention system.

Sanitary wastes are disposed of in state approved leach fields.

5.2.2 Liquid Discharges

No effluents are released into waters of the United States. Therefore, no request has been made to obtain a UPDES permit under R317-8-3.

5.2.3 Contaminated Equipment

All equipment contaminated by source material in the Mill process is buried in a designated zone per 10 CFR Part 40 within the tailings impoundments or, if released, is decontaminated for unrestricted use as specified in NRC Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, NRC, May, 1987. All solid contaminated waste from Milling operations will be buried in the Mill's tailings retention system.

6. ADMINISTRATION

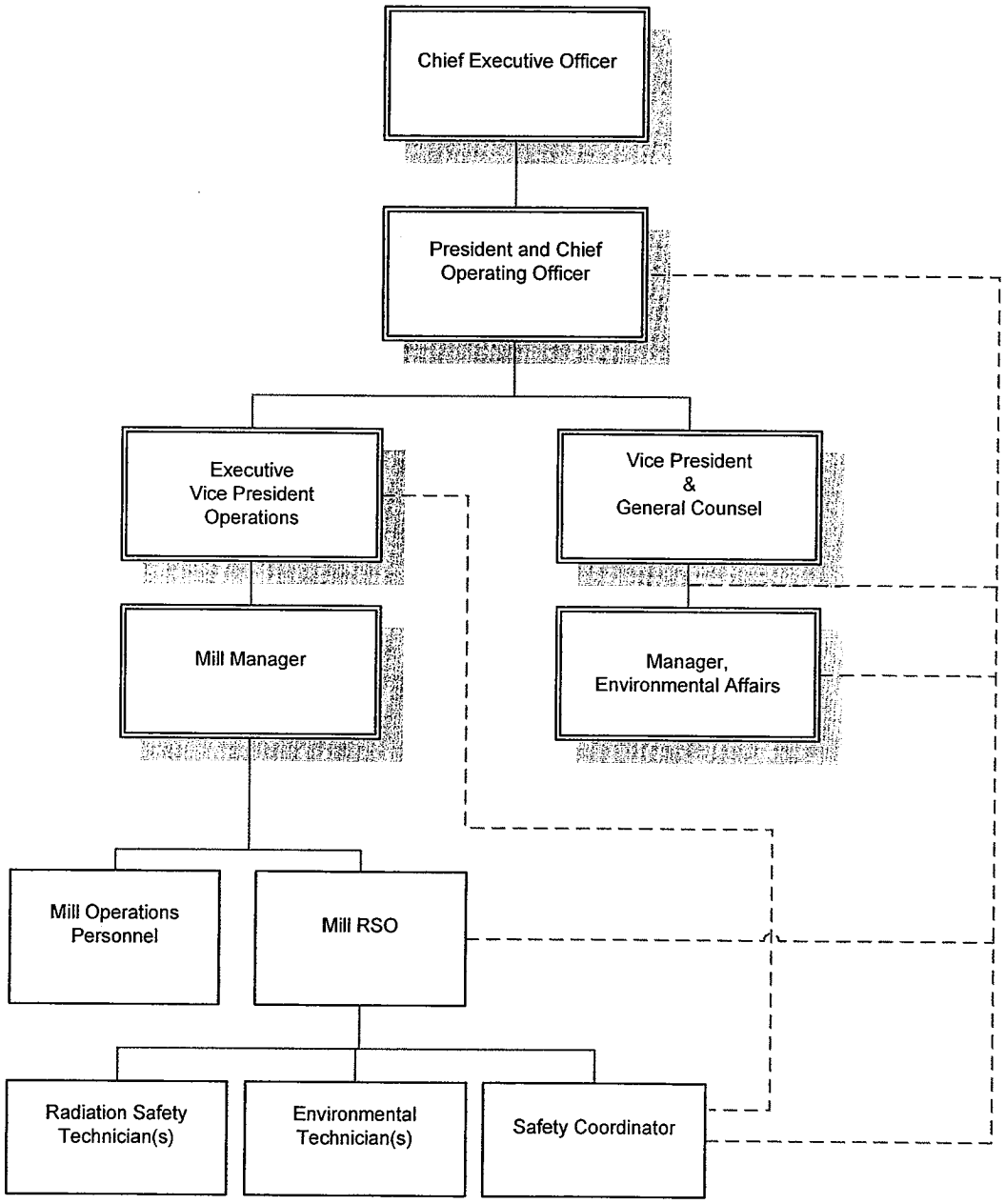
6.1 Corporate Organization

Denison is a wholly owned subsidiary of Denison Mines Holdings Corp., a Delaware corporation, which is in turn wholly owned by Denison Mines Corp., an Ontario, Canada corporation. Uranium operations are managed by Denison, primarily from offices located in Denver, Colorado.

6.1.1 Management

The management organization of Denison, relevant to Mill operations, is illustrated in Figure 6.1-1.

Figure 6.1-1
Denison Mines (USA) Corp.
Mill Management Organization Chart



The authority and responsibilities of each level of management as shown in Figure 6.1-1 is as follows:

The President and Chief Operating Officer of Denison is responsible for all of the practices and decisions made by those personnel reporting to him. He delegates the authority for the decisions in the uranium mining and milling operations to the Executive Vice President, Operations. The President and Chief Operating Officer of Denison reports to the Chief Executive Officer of Denison Mines Corp. The Chief Executive Officer of Denison Mines Corp. is also the Chief Executive Officer of Denison.

The Executive Vice President, Operations reports to the President and Chief Operating Officer of Denison and is responsible for conducting Denison's uranium mining and milling operations in a safe and efficient manner. These responsibilities include safety programs, and environmental and security practices. He also has responsibilities for reclamation operations as well as new facility development.

The Vice President and General Counsel reports to the President and Chief Operating Officer of Denison and is responsible for coordinating and reviewing environmental and safety practices to ensure regulatory and corporate standard compliance. This position performs or oversees periodic audits of the facilities to identify potential liabilities and recommend remedial actions.

The Manager, Environmental Affairs reports to the Vice President and General Counsel and is responsible for providing services and coordinating functions to the Mill's Radiation Safety Officer, Safety Coordinator and operations personnel relative to environmental, occupational health and permitting activities.

The Mill Manager reports directly to the Executive Vice President, Operations and is responsible for all of the day-to-day operations, maintenance and functions at the Mill, as well as compliance with the Mill's health, safety, and environmental practices and standards. His duties also include reviewing appropriate Mill operations with the Radiation Safety Officer, and Safety Coordinator to ensure operational compliance with corporate and regulatory standards.

The Radiation Safety Officer is directly responsible for developing, implementing, monitoring, and reporting activities that ensure that the Mill radiation safety program meets applicable standards. This responsibility involves monitoring, maintenance, and evaluation of personnel exposure and plant area surveys; determination of occupational work modifications relative to radiation protection; personnel radiation protection training; maintenance of plant radiation monitoring equipment; and report preparation for regulatory agency compliance. The Radiation Safety Officer reviews plant procedures and equipment and develops and coordinates procedure modifications for radiological protection and As Low As Reasonably Achievable ("ALARA") policy adherence.

The Radiation Safety Officer is also responsible for safety compliance at the Mill. His duties include oversight of the Mill's Safety Coordinator.

In addition to his responsibilities for radiation and occupational safety, the Radiation Safety

Officer is also responsible for providing necessary monitoring to comply with regulatory permits and licenses. These responsibilities include Mill emission sources, solid and liquid waste disposal systems, and off-site environmental concerns. In addition, the Radiation Safety Officer is responsible for the tailings reclamation technology and operating supervision of the tailings cells.

The Radiation Safety Officer reports to the Mill Manager and is authorized to escalate concerns to the Manager, Environmental Affairs, Executive Vice President, Operations, Vice President and General Counsel, or President and Chief Operating Officer of Denison as the Radiation Safety Officer deems necessary.

The Safety Coordinator is responsible for developing, implementing, monitoring, reporting and coordinating safety affairs for the Mill. His duties include general safety training of personnel; safety procedures and practices development and implementation; enforcement; industrial hygiene monitoring other than radiation protection; and first aid instruction and fire protection training. Compliance with MSHA and corporate safety standards are the responsibility of this position. The Safety Coordinator reports to the Radiation Safety Officer with lateral reporting functions to the Mill Manager.

The Radiation Safety Officer and Safety Coordinator have sufficient authority to enforce regulatory compliance and ensure employee health and safety at the Mill. They have the authority to cancel, postpone, or modify any operation or process which poses an immediate radiological, safety, or environmental hazard. The positions have the authority to escalate concerns to the Manager, Environmental Affairs, Executive Vice President, Operations, Vice President and General Counsel, or President and Chief Operating Officer of Denison, as necessary. These positions may be assigned support staff (such as Radiation Technicians and Environmental Technicians) to maintain compliance with the applicable regulations. Such staff will be assigned primarily health, safety, and environmental duties and will not be assigned duties in areas where their authority or disposition to perform health, safety and environmental protection duties is impaired.

6.1.2 Committees

Denison has established two committees that have a regulatory compliance oversite function at the Mill: the ALARA Committee and the Safety and Environmental Review Panel ("SERP").

The ALARA Committee is comprised of key Mill and Denison operational and regulatory personnel. The ALARA Committee meets quarterly and reviews all Mill public health, safety and environmental matters to ensure that the Mill is operated safely, in a manner that is within regulatory standards and that exposures to workers and the public are maintained as low as reasonably achievable. See Section 6.3.2 below for a description of the Mill's ALARA Program.

The Mill's SERP is established pursuant to License condition 9.4 and determines whether or not any proposed changes in the facility or process, changes in procedures not presented in the License application and the proposed conduct of any tests or experiments not presented in the License application meet the conditions set out in License condition 9.4B and can be made

without the need to file an application for a License amendment. The SERP membership requirements are set out in License condition 9.4B. The SERP functions in accordance with the SERP standard operating procedure included as Appendix H to this Application.

6.2 Qualifications

The minimum qualifications of radiation protection personnel associated with uranium processing at the Mill are set out in the ALARA Program, included as Appendix I to this Application.

6.3 Administrative Procedures

6.3.1 Management Controls

Activities at the Mill involving design, procurement, construction, pre-operational checkout, operations and maintenance of safety or environmentally related equipment will be authorized by written procedures approved by the Radiation Safety Officer, and/or the Safety Coordinator, respectively. These procedures will comply with Denison's standards and conditions of applicable permits, licenses and regulatory requirements. The Mill Manager is responsible to ensure compliance.

Administrative policies and procedures are documented to clearly delineate the authorities and responsibilities for each level within the facility with regard to environmental, radiation protection, and safety related activities. See the Radiation Protection Manual included as Appendix E to this Application for the current policies and procedures.

Appendices A and E delineate the current environmental monitoring and radiation protection procedures. Appendices B, C, D and H include the Vanadium Blackflake Release and Shipping, the Stormwater Best Management Practices Plan, Emergency Response Plan and SERP standard operating procedures. Written operations procedures are detailed in Appendix F and G, Ore Receiving, Feed and Grind and Uranium Precipitation, Drying and Packaging, for the radiation protection and environmental control related aspects at the grinding and yellowcake circuits. The remainder of the operations procedures are available for review at the Mill. These procedures are reviewed annually by the Mill Manager and the Radiation Safety Officer.

6.3.2 ALARA Program

The program that Denison utilizes to ensure that employee radiological exposures and effluent releases are "as low as reasonably achievable" (ALARA) and is the sum of all design barriers, operating procedures, management controls, and personnel experience and expertise incorporated in operation of the Mill facility.

The plant design, (see Sections 4.0 and 5.0), including the equipment to control and prevent effluent releases and to sample and monitor the working environment, reflects proven technology that is capable of meeting current regulatory standards. Potential releases, both in the plant and to the environment, will be held within the performance capability of the control equipment

through regular inspection and maintenance of the equipment.

The ALARA Program, included as Appendix I to this Application, sets up procedures intended to ensure that all operating procedures, management controls and personnel experience and expertise are such that the Mill is operated in a manner that ensures exposure to workers and the public are as low as reasonably achievable.

Under the ALARA Program, routine inspections are performed, minimum qualifications of key personnel are established, training requirements are mandated, periodic reviews by the ALARA committee of all matters relating to public health, safety and the environment are conducted, and the scope of the annual ALARA audit of the Mill and its activities are set out.

6.3.3 Training

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

Each person, upon reporting for employment at the Mill, will receive instruction in the following to be updated after completion of Training Program and ALARA Program:

- Employee Indoctrination
- Statutory Rights of Miners
- Regulatory Jurisdiction
- Transportation and Communication
- Emergency Procedures
- First Aid
- Hazard Recognition
- Hazard Communication
- Radiation Protection Program
- Prenatal Radiation Review
- Radiation Protection Review
- Respiratory Protection Program

The instruction will also include on-the-job demonstrations of proper safety precautions, and measures to be taken to minimize radiation exposure. These instructions and precautions are summarized in the Training Program, included as Appendix J to this Application. Each employee will also be provided a safety manual which covers radiation safety and industrial safety procedures including personal hygiene instructions for use of monitoring and safety equipment, and procedures for handling spills and maintaining clean working conditions. Each employee will be required to pass a written test on their understanding of radiation safety and hygiene.

The employee's understanding and retention of proper practices will be validated by the supervisor at the work location through use of periodic checks. If the employee does not exhibit sufficient grasp of the safety procedures, they will receive further instruction from the employee's supervisor. This procedure will be repeated until satisfactory retention is demonstrated. On-the-job training and testing will be conducted and the results recorded to ensure that each employee understands applicable safety and radiation protection practices.

In addition, a portion of monthly Mill safety meetings will be set aside for discussion of radiation protection procedures and, on an annual basis, one of the monthly meetings will be set aside for re-indoctrination of the Mill staff in radiation protection. Each employee will be tested annually by the Radiation Safety Officer or another member of the radiation safety staff on the employee's understanding of radiation protection as related to the employee's job. All supervisors will be required to periodically attend specific training courses in radiation and industrial protection, so that they will be better able to provide and evaluate specific job-related training.

Employment at the Mill is comprised of Denison employees and employees of White Mesa Inc. ("WMI"). WMI is an independent Native-American owned services company that provides workers to the Mill on a contract services basis. All WMI personnel who work at the Mill are provided the same training as Denison employees working at the Mill.

As a result of the Mill's training program and compliance with the qualification requirements for key Mill personnel set out in the Mill's ALARA Program, included as Appendix I to this Application, Denison and all personnel who will be handling radioactive materials under the License are qualified by reason of training and experience to use such materials.

6.3.4 Security

The Mill and tailings area is fenced and posted with "Restricted Area" signs in accordance with 10 CFR 20.203. As set forth in License Condition 9.9, the Mill is exempted from the requirements of R313-15-902(5) for areas within the Mill, provided that all entrances to the Mill are conspicuously posted in accordance with R313-15-902(5) and with the words, "Any area within this facility may contain radioactive material". Refer to Figure 4.1-2 showing a plot plan of the Mill and tailings area delineated with the fence around the Restricted Area.

The Mill, During operating or stand-by periods, has personnel on site seven (7) days per week, twenty-four (24) hours per day. All visitors are required to register at the office and are not permitted inside the plant Restricted Area without proper authorization and escort. Access to the Restricted Area by the public is controlled by physical barriers and operating personnel. Contractors having work assignments are given security, safety and radiation protection orientation prior to performing their duties without escort. The Mill's Security Program is included as Appendix K to this Application.

6.4 Radiation Protection Program

The Radiation Protection program at the Mill consists of several layers of controls to ensure conditions are maintained ALARA and to achieve corporate and regulatory agency compliance.

The program consists of management controls, administrative procedures, and monitoring programs. Management controls and administrative procedures are designed to ensure the existence of and adherence to a Mill program that is functional in achieving corporate and regulatory agency compliance. The controls create a review process of operations, management practices, and monitoring capabilities. The monitoring programs consist of personnel exposure documentation, Mill effluent identification and control, process system operation documentation, off-site environment exposure documentation, and quality control procedures, both analytical and managerial.

6.4.1 Mill External Radiation Monitoring

The purpose of the personnel monitoring program is to provide accurate and timely measurements of personnel exposures to direct radiation and to provide managerial controls to maintain conditions ALARA. The program identifies areas where managerial controls are indicated to maintain potential exposures ALARA.

i. Personnel External Radiation Exposure

Luxel® (OSL) badges or the equivalent, obtained from Landauer Corporation, or an equivalent competent supplier, are utilized to determine individual external radiation exposures. Badge recordings are made in compliance with UAC R313-15-1107 and 1111.

Badges are assigned to each worker working within the restricted area. Badges are issued within thirty days of employment at the facility. The cumulative occupational dose of the workers will be filed in accordance with UAC R313-15-1107 and 1111. Exposure exceeding 25 percent of the UAC R313-15-201 limits will result in a modification of worker job assignments and a review of conditions causing exposure to exceed that objective.

The badges will be analyzed on a quarterly basis. Further discussion is presented within the personnel external radiation monitoring Section 1.3 of the Radiation Protection Manual, included as Appendix E to this Application.

ii. Mill Area Extended Radiation Monitoring

Radiation area monitoring is used throughout the Mill site to protect plant personnel and to assist in detecting abnormal operating conditions.

A combination of beta and gamma radiation measurements are obtained monthly at locations in the Restricted Area as described in Table 6.4-1. A combination of fixed and removable alpha radiation measurements are obtained weekly at lunch locations in restricted and unrestricted areas.

Table 6.4-1
Beta-Gamma Survey Locations

Identification Number	Description of Possible Source of Area of Exposure	Distance From Source in Feet
WM-1	Mill Feed Hopper and Transfer chute	1
WM-2	SAG Mill Intake-Feed Chute	1
WM-3	Screens-Area Floor Between Screens	1
WM-4	Leach Operators Desk	1
WM-5	Leach Tank Vent No. 3	1
WM-6	Leach Tank No. 3 Wall	1
WM-7	Counter-Current Decantation Thickeners	1
WM-8	Pumphouse Tailings Discharge	1
WM-9	Oxidant Makeup Room - Sump Pump	1
WM-10	Shift Foreman's Office-Work Desk	1
WM-11	SX Operator's Area	1
WM-12	Precipitation Tanks No. 1 Tank, Wall	1
WM-13	Precipitation Section "Lab Bench"	1
WM-14	Precipitation Vent	1
WM-15	Yellowcake Thickener No. 1, Wall	1
WM-16	Centrifuge Discharge-Chute Wall	1
WM-17	Yellowcake Thickener No. 2, Wall	1
WM-18	Yellowcake Packaging Room	1
WM-19	Yellowcake Dryer	1
WM-20	Yellowcake Dust Collector	1
WM-21	Solvent Extraction Uranium Mixer No. 1 Extractor	1
WM-22	Solvent Extraction Uranium Mixer No. 1 Stripping	1
WM-23	Solvent Extraction Vanadium Mixer No. 1 Stripping	1
WM-24	Vanadium Dryer	1
WM-25	Mill Laboratory Fume Hood	1
WM-26	Chemical Laboratory Work Area	1
WM-27	Metallurgical Laboratory Work Area	1
WM-28	Lunchroom Eating Area	1
WM-29	Lunchroom Wash Area	1
WM-30	Maintenance Shop – Work Area	1
WM-31	Maintenance Shop – Rubber Coating Area	1
WM-32	Tailings Impoundment Discharge Area	1
WM-33	Tailings Impoundment Dike 1	1
WM-34	Tailing Impoundment Dike 2	1
WM-35	Tailings Impoundment Dike 3	1
WM-36	Scalehouse	1
WM-37	Tailings Impoundment Dike 4	1

These areas may change from time to time as considered appropriate by the Radiation Safety Officer to reflect any changes to Mill operations or facilities.

These locations may vary in number depending upon the staffing during operating and non-operating periods. For further monitoring procedure information see Sections 1.3 and 2.4 of the Radiation Protection Manual, included as Appendix E to this Application.

6.4.1 Mill Airborne Radionuclide Monitoring

i. Uranium Dust

Several forms of airborne radionuclide sampling are utilized to determine personnel exposure to dust. Area monitoring on a monthly basis during production periods, for those areas listed in Table 6.4-2 and shown in Figure 6.4-1, provides the main approach to determining personnel exposure. Areas associated with yellowcake are monitored weekly. These areas may vary in number depending on the staffing during operating and non-operating periods.

Table 6.4-2
Airborne Radiation Sample Locations

Code	Location/Description
BA-1	Ore Scalehouse
BA-2	Ore Storage
BA-6	Sample Plant
BA-7	SAG Mill Area
BA-7A	SAG Mill Control Room
BA-8	Leach Tank Area
BA-9	CCD Circuit Thickeners
BA-10	Solvent Extraction Building/Stripping Section (North Area)
BA-11	Solvent Extraction Building/Control Section (South Area)
BA-12	Yellowcake Precipitation and Wet Storage Area
BA-12A	North Yellowcake Dryer Enclosure
BA-12B	South Yellowcake Dryer Enclosure
BA-13	Yellowcake Precipitation and Wet Storage Area
BA-13A	Yellowcake Packaging Enclosure
BA-14	Packaged Yellowcake Staging Area
BA-15	Met. Lab. Sample Preparation Room
BA-16	Lunch Room Area (New Training Room)
BA-17	Change Room
BA-18	Administration Building
BA-19	Warehouse
BA-20	Maintenance Shop
BA-21	Boiler
BA-22	Vanadium Panel
BA-22A	Vanadium Dryer

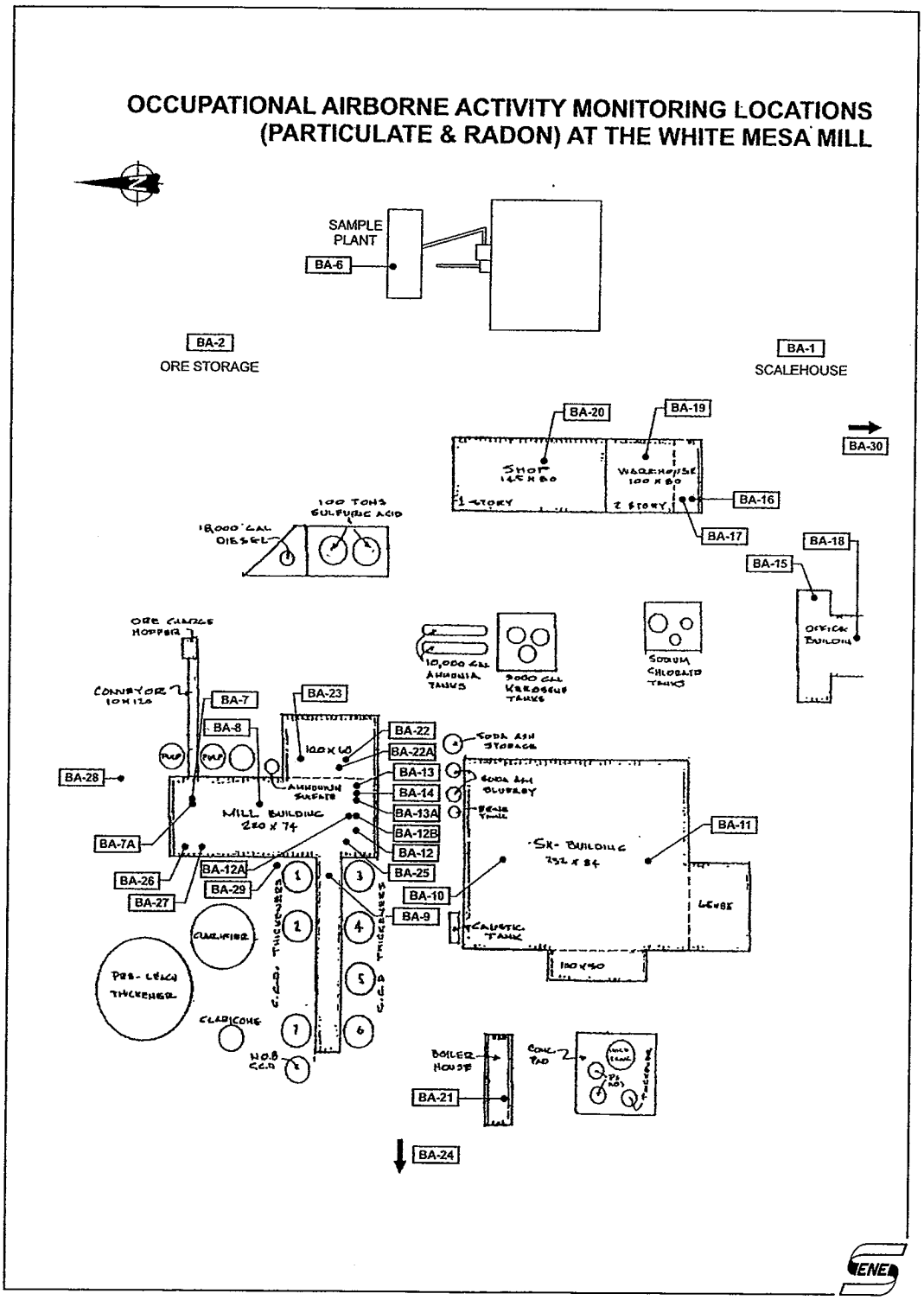
Code	Location/Description
BA-23	Filter Belt/Rotary Dryer
BA-24	Tails
BA-25	Control Room
BA-26	Shifters' Office
BA-27	Operations Lunch Room
BA-28	Dump Station
BA-29	Filter Press
BA-30	Truck Shop

These areas may change from time to time as considered appropriate by the Radiation Safety Officer to reflect any changes to Mill operations or facilities.

Area monitoring for natural uranium in dust in the air is accomplished utilizing air samplers calibrated to 40 liters per minute with a sample duration of a minimum of sixty minutes and then counted using a Ludlum Model 2200 with a Ludlum Model 43-10 probe for gross alpha, or the equivalent. Further details are presented in the appropriate section of the Radiation Protection Manual. Personnel time exposure to the monitored areas is recorded on a daily exposure time sheet by the employee. Using this information and the monitored air concentrations, an employee exposure record is developed. The Derived Air Concentrations ("DAC") to be used in the various areas of the Mill are described in Section 4 of the Radiation Protection Manual, included as Appendix E to this Application.

Sampling will be performed under conditions typical of employee exposures. A record of the state of operation of both process and effluent control equipment and ventilation conditions will be maintained along with area sampling results.

Figure 6.4-1
Airborne Radiation Sample Locations



Yellowcake drying and packaging operators are required to wear individual air samplers at least every two weeks which will then be counted for gross alpha exposure. Individual air samplers will consist of breathing zone monitors.

Mill operating and maintenance personnel working in processing areas, where the potential personnel exposure is projected to exceed 25 percent of UAC R313-15-201 limits to uranium dust, will be monitored with individual air samplers on a periodic basis during the time worked in those areas to establish typical uranium dust exposures for those individuals. Individual air samplers consist of a sampling pump and lapel filter holder capable of sampling at a rate of 4 liters per minute for eight hours.

License condition 11.4 requires that annually the Mill shall collect a set of air samples covering 8 hours of sampling, at a high collection flow rate (i.e., greater than or equal to 40 liters per minute), in routinely or frequently occupied areas of the Mill. These samples are analyzed for gross alpha. The results of this sampling are set out in the Mill's Semi-Annual Effluent Reports, which accompany this Application. In addition, License condition 11.4 requires that, with each change in Mill feed material or at least annually, the Mill shall analyze the Mill feed or final product for U-nat, Th-230, Ra-226, and Pb-210 and use the analysis results to assess the fundamental constituent composition of air sample particulates.

For further air particulate monitoring procedure information see Sections 1.1 and 2.1 of the Radiation Protection Manual, included as Appendix E to this Application.

Section 3.13.1.8(d) of the Accompanying Environmental Report shows historic results for air particulate exposure to workers at the Mill.

ii. Radon Progeny

Radon progeny is measured on a monthly basis with weekly sampling being performed at areas above 25% Maximum Permissible Exposure ("MPE") during production periods at the sample areas listed on Table 6.4-2. The locations may vary in number depending on the staffing during operating and non-operating periods. Sampling will be accomplished using a SKC AIRCHEK pump and filter unit or equivalent, with levels measured using a Ludlum Model 2200 with a Ludlum Model 43-10 probe, or equivalent. The modified Kusnetz sampling and analysis procedure will be utilized. Exposure levels for employees are calculated using resultant concentration and time records, based upon employee time card information. For further procedure information see Section 2.2 of the Radiation Protection Manual included as Appendix E to this Application.

6.4.3 Radioactive Material Intake - CEDE

When routine work is performed, assessment of an individual's exposure to airborne natural uranium and radon daughters, which together comprise the worker's Committed Effective Dose Equivalent (CEDE), is calculated using the results of the prescribed sampling in each area and the time spent in each area of exposure as determined by careful observation of the task

performed by each individual exposed. Quarterly breathing zone samples using prescribed portable samplers are taken to ensure reliability of this procedure. Individuals wearing samplers will be determined by analysis of routine samples and their likelihood of reaching the action level of 25 percent MPC.

When non-routine maintenance is performed, accurate time records are kept to calculate exposure to natural airborne uranium. Dust samples taken while work is being done are used in this exposure assessment. Periodic breathing zone samples, using prescribed portable samplers, are taken to ensure accurate assessment of exposure during non-routine work assignments.

The observed time spent in each area where routine work is performed, and where exposure beyond the 25 percent MPC action level is likely, are recorded and the accuracy of the observation reviewed quarterly, or when major changes are made in job assignments.

If a worker reaches an action level of 25 percent of MPC based on Time Weight Exposure ("TWE") over a period of one quarter, the Radiation Safety Officer will institute an investigation of their work record and exposure history to identify any problem areas. If any problem areas are noted, they are studied and necessary corrective measures taken to ensure that the exposure is ALARA.

Section 3.13.1.8(h) of the accompanying Environmental Report shows historic results for CEDE measurements for workers at the Mill. The Environmental Report concludes that all doses were well below the 5 Rem maximum exposure limit and that the average was well below the ALARA goal.

6.4.4 Total Effective Dose Equivalent

Total Effective Dose Equivalent ("TEDE") is the combination of direct radiation exposure and CEDE, and represents the total dose for the worker. R313-15-201 prescribes a maximum TEDE for adult workers of 5,000 mrem per year. The Mill has set an ALARA goal for TEDE of 25% of this prescribed limit, or 1,250 mrem per year.

Section 3.13.1.8(h) of the accompanying Environmental Report shows historic results for TEDE for workers at the Mill. The Environmental Report concludes that all doses were well below the 5 Rem maximum exposure limit and the average was well below the ALARA goal. In addition, Table 13.13.17 of the Environmental Report showed that the TEDE for workers while processing either Arizona Strip ores or Colorado Plateau ores were well below the ALARA goal.

6.4.5 Bioassay Program

The bioassay program conforms to the urinary uranium program outlined in Revision 1 Regulatory Guide 8.22. Where the word "should" appears in the Regulatory Guide, it is interpreted as meaning "shall". For further procedure information see Section 1.4 of the Radiation Protection Manual included as Appendix E to this Application.

6.4.6 Contamination Control Program

All personnel working within the Mill area are provided with change room, shower, and laundry facilities. Personnel working in the yellowcake product areas or performing maintenance on equipment from these areas are provided coveralls and are required to change and shower prior to leaving the Mill. All workers are also required to monitor themselves with an alpha survey meter prior to leaving the Mill. Alpha contamination on skin or clothes greater than 1,000 dpm/100 cm shall be cause for additional showering or decontamination and an investigation by radiation protection staff. Spot checks with a survey meter also are made at least quarterly. Coveralls and contaminated clothing are laundered on site.

6.4.7 Respiratory Protection Program

A respiratory protection program includes written procedures and personnel training in the use, care and selection of respirators as outlined in ANSI—Z88.2—1980. The Mill's Respiratory Protection Program is included as Appendix L to this Application.

6.4.8 Summary of Effectiveness of Mill Controls and Radiation Protection Program

As mentioned above, the Mill's radiation protection program consists of Mill design, Mill process control, and monitoring and other radiation protection practices. As is evident from the historic monitoring results for worker exposures at the Mill, the Mill equipment, facilities and procedures have been very successful in maintaining occupational radiation exposures within regulatory limits and within the Mill's ALARA goals and are adequate to minimize danger to workers.

6.5 Environmental Monitoring Program

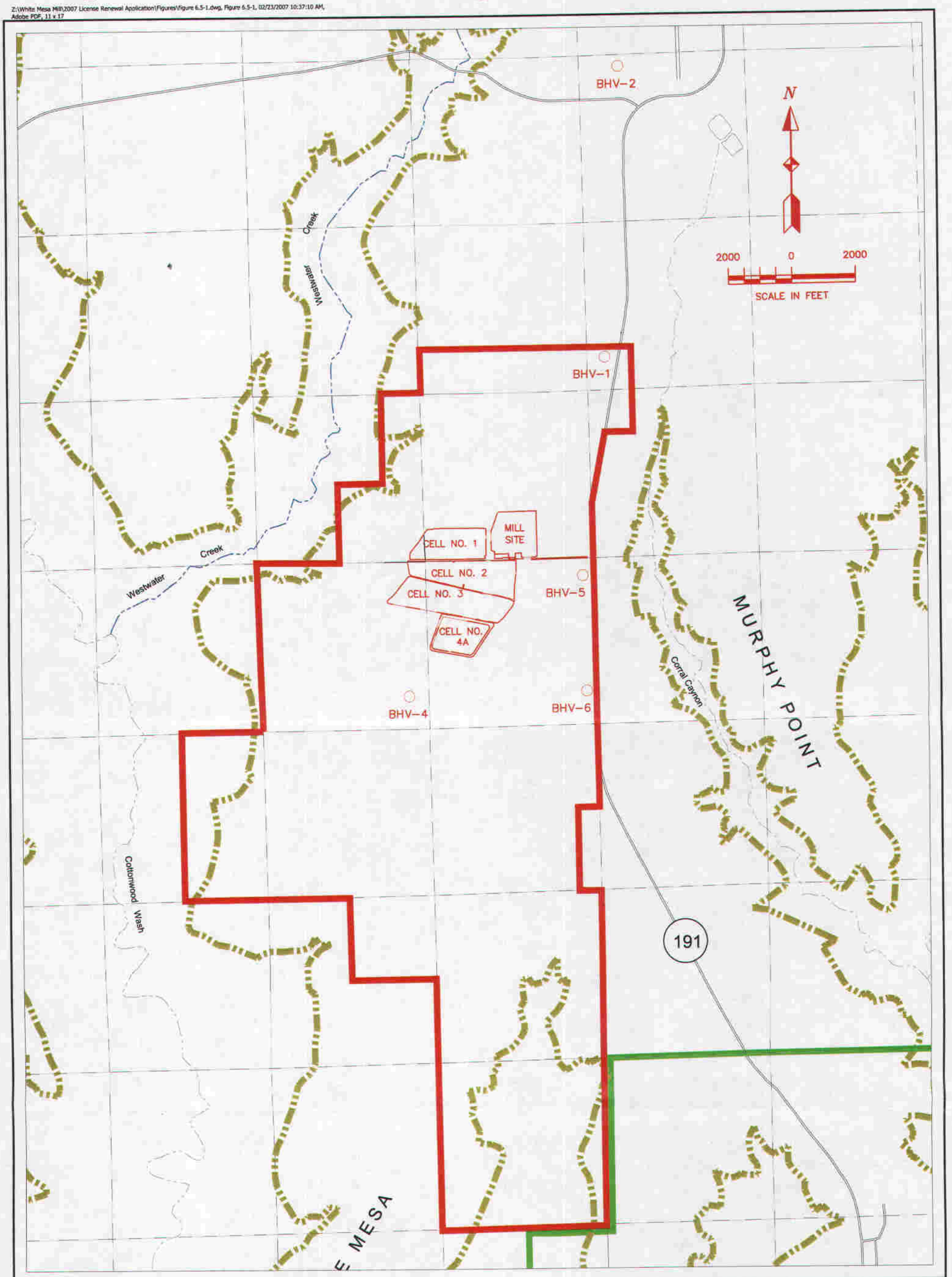
The environmental monitoring program is designed to assess the effect of Mill process and disposal operations on the unrestricted environment. Delineation of specific equipment and procedures is presented in the Environmental Protection Manual, included as Appendix A to this Application.

6.5.1 Ambient Air Monitoring

i. Ambient Particulate

Airborne radionuclide particulate sampling will continue at the five locations currently monitored, termed BHV-1, BHV-2, BHV-4, BHV-5 and BHV-6. With the approval of the NRC and effective November, 1995, BHV-3 was removed from the active air particulate monitoring program. At that time, the Mill proposed (and NRC determined) that a sufficient air monitoring data base had been compiled at station BHV-3 to establish a representative airborne particulate radionuclide background for the Mill. BHV-6 was installed by the Mill at the request of the White Mesa Ute Community. This station began operation in July of 1999 and provides airborne particulate information in the southerly direction between the Mill and the White Mesa Ute Community. Figure 6.5-1 shows the locations of these air particulate monitoring stations.

Z:\White Mesa Mill\2007 License Renewal Application\Figures\figure 6.5-1.dwg, Figure 6.5-1, 02/23/2007 10:37:10 AM, Adobe PDF, 11 x 17



Denison Mines (USA) Corp.

Project	WHITE MESA MILL
REVISIONS Date / By	County: / State: UT
	Location:
	Figure 6.5 - 1 Locations of High Volume Environmental Air Particulate Monitoring Stations
	Scale: AS SHOWN / Date: 02/2007 / figure 6.5-1.dwg
	Author: bm / Drafted By: B. Munkhbaatar

The present sampling system consists of high volume particulate samplers utilizing mass flow controllers to maintain an air flow rate of approximately 32 standard cubic feet per minute. Samplers are operated continuously with a goal for on-stream operating period at ninety percent. Filter rotation is weekly with quarterly site compositing for particulate radionuclide analysis. Analysis is done for U-natural, Th-230, Ra-226, and Pb-210. For further procedure information see Section 1.1 of the Environmental Protection Manual, included as Appendix A to this Application.

See Section 3.13.1.7(a) of the accompanying Environmental Report for a summary of historic monitoring results for airborne particulate. As indicated in the Environmental Report, airborne particulate is well controlled at the Mill. The data obtained since program inception in 1981 indicates that only one individual quarterly measurement has ever exceeded the Effluent Concentration Limit (ECL) at the Mill. With regard to that particular single measurement, while it is important to consider and evaluate an individual measurement exceeding the ECL, for public dose estimation purposes it is the annualized data that are of primary significance. In that instance, the annualized Th-230 data for that monitoring station for that year are well below the ECL for the annual period. In addition to these observations, evaluation of the data by comparison to the Mill's ALARA goals reveals that, with very few exceptions (9 out of 1,944 individual measurements), the gross (background inclusive) measurements also do not exceed the site's ALARA objectives which have been established at 25% of the ECL.

ii. Ambient Radon

With the approval of the NRC, Radon-222 monitoring at the BHV stations was discontinued in 1995, due to the unreliability of monitoring equipment available at that time to detect the new 10 CFR standard of 0.1 pCi/l. From that time until the present, the Mill demonstrated compliance with the requirements of R313-15-301 by calculation authorized by the NRC in September 1995 and as contemplated by R313-15-302 (2) (a).

This calculation was performed by use of the MILDOS code for estimating environmental radiation doses for uranium recovery operations (Strenge and Bender 1981) 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 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% U_3O_8
- Yellowcake production of 4,380 tons of U_3O_8 per year (8.8 million pounds U_3O_8 per year).

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, as well as at all other receptor locations, 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. Mill operations to date have never exceeded the License conditions assumed above.

Detection equipment has improved since 1995, and the Mill has decided that, commencing with the first quarter of 2007, it will re-institute direct measurements of radon at the five air particulate monitoring locations currently utilized for air particulate sampling. System quality assurance will be determined by placing a duplicate monitor at one site continuously. Monitoring methodology will consist of a Trak Etch monitoring system, or the equivalent. Integration duration will be continuous for one quarter with quarterly exchange canisters for analysis. For further procedure information see Section 1.2 of the Environmental Protection Manual included as Appendix A to this Application.

6.5.2 External Radiation

TLD badges, as supplied by Landauer, Inc., or equivalent, are utilized at BHV-1, BHV-2, BHV-3, BHV-4, BHV-5 and BHV-6 to determine ambient external gamma exposures. System quality assurances are determined by placing a duplicate monitor at one site continuously. Exchange of TLD badges are on a quarterly basis. Badges consist of a minimum of five TLD chips. Measurements obtained from location BHV-3 have been designated as background due to BHV-3's remoteness from the Mill site (BHV-3 is located approximately 3.5 miles west of the Mill site). For further procedure information see Section 4.3 of the Environmental Protection Manual included as Appendix A to this Application. See Section 3.13.1.7(c) of the accompanying Environmental Report for a summary of historic monitoring results for external radiation.

6.5.3 Soil and Vegetation

i. Soil Monitoring

Soil samples from the top one centimeter of surface soils are collected annually at each of BHV-1, BHV-2, BHV-3, BHV-4 and BHV-5. A minimum of two kilograms of soil is collected per site and analyzed for U-natural and Ra-226. For further procedure information see Section 4.1 of the Environmental Protection Manual included as Appendix A to this Application. See Section 3.13.1.7.1 of the accompanying Environmental Report for a summary of the historic results for soil monitoring. The Environmental Report concludes that the results of sampling since the previous licensure (1997) were low, less than the unrestricted release limits.

ii. Vegetation Monitoring

Forage vegetation samples are collected three times per year from animal grazing locations to the northeast (near BHV-l (the meteorological station)), northwest (to the immediate west of the site) and southwest (by BHV-4) of the Mill site. Samples are obtained during the grazing season, in

the late fall, early spring, and in late spring. A minimum of three kilograms of vegetation are submitted from each site for analysis of Ra-226 and Pb-210. For further procedure information see Section 4.2 of the Environmental Protection Manual included as Appendix A to this Application. See Section 3.13.7(d) of the accompanying Environmental Report for a summary of the historic results for vegetation monitoring. The Environmental Report concludes that the most recent (2006) results indicate no increase in uptake of Ra-226 and Pb-210 in vegetation.

6.5.3 Meteorological

Meteorological monitoring is done at a site near BHV-1. The sensor and recording equipment are capable of monitoring wind velocity and direction from which the stability classification is calculated. Data integration duration is one-hour with hourly recording of mean speed, mean wind direction, and mean wind stability (as degrees sigma theta).

The data from the meteorological station is retrieved monthly by down loading onto a Campbell Scientific data module, or the equivalent. The data module is sent to an independent meteorological contractor where the module is downloaded to a computer record, and the data is correlated and presented in a Semi-Annual Meteorological Report.

Monitoring for precipitation consists of a daily log of precipitation using a standard NOAA rain gauge, or the equivalent, installed near the administrative office, consistent with NOAA specifications.

Windrose data is summarized in a format compatible with MILDOS and UDAD specifications for 40 CFR 190 compliance. For further procedure information see Section 1.3 of the Environmental Protection Manual included as Appendix A to this Application. A windrose for the site is set out in Section 3.3.1.2 of the accompanying Environmental Report. Meteorological Reports for 2004, 2005 and 2006 also accompany this Application.

6.5.4 Point Emission

Stack emission monitoring from yellowcake facilities follows EPA Method 5 procedures and occurs on a quarterly basis, during operation of the facility. Particulate sampling is analyzed for Unat on a quarterly basis and for Th-230, Ra-226, and Pb-210 on a semi-annual basis. Demister and ore stack emission monitoring follows EPA Method 5 procedure on a semi-annual basis, during operation of the facility. Particulate samples are analyzed for Unat, Th-230, Ra-226, and Pb-2l0. Monitored data includes scrubber system operation levels, process feed levels, particulate emission concentrations, isokinetic conditions, and radionuclide emission concentrations. For further procedure information see Section 1.4 of the Environmental Protection Manual included as Appendix A to this Application. Historic stack emission data are summarized in Section 3.13.1.7(e) of the accompanying Environmental Report.

6.5.5 Water

i. Surface Water Monitoring

Surface water monitoring is conducted at two locations adjacent to the Mill facility known as Westwater Canyon and Cottonwood Creek. Samples are obtained annually from Westwater and quarterly from Cottonwood using grab sampling. For Westwater Creek, samples will be of sediments if a water sample is not available. Field monitored parameters and laboratory monitored parameters are listed in Table 6.5-1. For further procedure information see Section 2.1 of the Environmental Protection Manual included as Appendix A to this Application. See Section 3.7.4 of the accompanying Environmental Report for a summary of the historic results for surface water monitoring.

Table 6.5-1
Operational Phase Surface Water Monitoring Program

Monitoring Sites
Westwater Creek and Cottonwood Creek

Field Requirements

1. temperature C;
2. Specific Conductivity umhos at 25 C;
3. pH at 25 C;
4. Sample date;
5. Sample ID Code;

Vendor Laboratory Requirements

Semiannual*	Quarterly
One gallon Unfiltered and Raw	One gallon Unfiltered and Raw
One gallon Unfiltered, Raw and preserved to pH <2 with HNO_3	One gallon Unfiltered, Raw and Preserved to pH <2 with HNO_3
Total Dissolved Solids	Total Dissolved Solids
Total Suspended Solids	Total Suspended Solids
Gross Alpha	
Suspended Unat	
Dissolved Unat	
Suspended Ra-226	
Dissolved Ra-226	
Suspended Th-230	
Dissolved Th-230	

*Semiannual sample must be taken a minimum of four months apart.
**Annual Westwater Creek sample is analyzed for semi-annual parameters.
Radionuclides and LLDs reported in μCi/ml

ii. Groundwater Monitoring

At the time of renewal of the Mill license by the NRC in March 1997, and up until issuance of the Mill's GWDP in March 2005, the Mill implemented a groundwater detection monitoring program to ensure compliance with 10 CFR Part 40, Appendix A, in accordance with the provisions of Mill License condition 11.3A. The detection monitoring program was in accordance with the report entitled, "Points of Compliance, White Mesa Uranium Mill," submitted by letter to the NRC dated October 5, 1994. Under that program, the Mill sampled monitoring wells MW-5, MW-11, MW-12, MW-14, MW-15 and MW-17 on a quarterly basis. Samples were analyzed for chloride, potassium, nickel and uranium, and the results of such sampling were included in the Mill's Semi-Annual Effluent Monitoring Reports that were filed with the NRC up until August 2004 and with the DRC subsequent thereto.

On March 8, 2005, the Co-Executive Secretary of the Utah Water Quality Board issued the Mill's GWDP, which includes a groundwater monitoring program that supersedes and replaces the groundwater monitoring requirements set out in Mill License Condition 11.3A. Under the GWDP, 21 monitoring wells are monitored for 47 constituents. Sampling is performed under a Groundwater Monitoring Quality Assurance Plan, prepared under Part I.H.6 of the GWDP, a copy of which is included as Appendix M to this Application.

Groundwater monitoring under the Mill's GWDP commenced in March 2005, the results of which are included in the Mill's quarterly Groundwater and DMT Performance Standard Monitoring Reports that are filed with the Co-Executive Secretary of the Utah Water Quality Board. A copy of each such Report since March 2005 is included with this Application.

On August 28, 2006, Denison received a Notice of Violation ("NOV") from the Co-Executive Secretary of the Utah Water Quality Board which lists three violations of the Mill's GWDP. Specifically, the NOV cited a number of constituents that had been detected in groundwater monitoring wells in excess of the compliance limits set out in the GWDP. This NOV was not unexpected, because the interim groundwater protection limits set out in the GWDP were set prior to the establishment by the Co-Executive Secretary of background groundwater quality at the site. Both Denison and the Co-Executive Secretary recognized at the time of issuance of the GWDP that because background groundwater quality at the Mill had not yet been approved at that time, the Co-Executive Secretary could not determine if any constituent in groundwater is naturally occurring and therefore detectable or undetectable for purposes of selecting groundwater protection limits in each monitoring well at the site. Consequently, the Co-Executive Secretary initially assigned the groundwater protection limits as if all constituents were "undetectable". However, in the Statement of Basis for the GWDP, the Co-Executive Secretary acknowledged that after submittal and Co-Executive Secretary approval of the existing well Background Groundwater Quality Report, pursuant to Part I.H.3 of the GWDP, the GWDP can be reopened and the groundwater protection limits in the permit modified to reflect natural background. The Co-Executive Secretary also acknowledged in the Statement of Basis that this approach to set the initial limits in the GWDP, does not account for natural variations in groundwater quality and that false positives in the groundwater monitoring data may occur until the Background Groundwater Quality Report is submitted, approved by the Co-Executive

Secretary, and the permit limits re-established in the GWDP. Recognizing that it is not possible to determine whether or not an exceedance of any of the current GWDP limits is due to natural causes prior to review and acceptance by the Co-Executive Secretary of the Background Groundwater Quality Report, the Co-Executive Secretary and Denison agreed, in response to the NOV, on a revised date of January 2, 2007 to complete and submit the Background Groundwater Quality Report.

The Background Groundwater Quality Report was prepared for Denison by Intera, Inc., an engineering firm, and submitted to the Co-Executive Secretary on January 2, 2007. Intera concluded in the Report that "[a]fter extensive analysis of the data, we have concluded that there have been no impacts to groundwater from Mill activities." Intera based this conclusion on a number of factors, including the following:

- There are a number of exceedances of permit limits in upgradient and far downgradient wells at the site, which cannot be considered to have been impacted by Mill operations to date. Exceedances of permit limits in monitoring wells nearer to the site itself are therefore consistent with natural background in the area. In situations where the constituent that exceeds the permit limit is not trending upward, the proper conclusion is that it is representative of natural background.

- There are numerous cases of both increasing and decreasing trends in constituents in upgradient, far downgradient, and Mill site wells, which provide evidence that there are natural forces at work that are impacting groundwater quality across the entire site.

- In almost all cases where there are increasing trends in constituents in wells at the site, there are more pronounced increasing trends in those constituents in upgradient wells. Furthermore, and more importantly, in no case is there any evidence in the wells in question of increasing trends in indicator parameters, such as chloride or fluoride, which are considered the most mobile and best indicators of potential tailings cell leakage at the site. Intera considered the combination of these factors to be conclusive evidence that all increasing trends at the site are caused by natural forces and not by Mill activities.

The Background Groundwater Quality Report supports Denison's position that the exceedances of GWDP limits referred to in the NOV are due to natural background forces and that the permit limits must be adjusted accordingly, as contemplated by the GWDP.

6.5.6 Seeps and Springs Monitoring

As required by Part I.H.9 of the GWDP, the Mill submitted to the Co-Executive Secretary of the Utah Water Quality Board for approval of a plan for groundwater sampling and analysis of all seeps and springs found downgradient or lateral gradient from the tailings cells at the Mill. This Plan is currently under review by the Co-Executive Secretary. Part I.F.6 of the GWDP provides that after approval of the work plan and report required by Part I.H.9, the GWDP may be modified to require annual monitoring and reporting of selected seeps or springs in the vicinity of the Mill. At the time of this Application, the GWDP had not been modified to require any such monitoring or reporting. Some seeps and springs sampling data was gathered in 1977, prior

to Mill construction, and in 2003-2004 by the Mill. These results are discussed in Section 3.7.4 of the accompanying Environmental Report.

6.5.7 Solid Waste

Section 3.1 of the Environmental Protection Manual included as Appendix A to this Application sets out the monitoring procedures for the Mills tailings cells. Section 3.1 of the Environmental Protection Manual also incorporates the Discharge Minimization Technology ("DMT") Monitoring Plan requirements under Part I.H.13 of the GWDP. These procedures are designed as a systematic program for constant surveillance and documentation of the integrity of the tailings impoundment system including dike stability, liner integrity, and transport systems. The scope of the surveillance program includes geotechnical, structural, hydraulic and electrical/mechanical evaluations of the operations. The program also includes comprehensive usage of procedures, documentation, management and engineering reviews of the surveillance program and impoundment system's performance.

The procedures detail training programs for surveillance personnel, inspection requirements and frequencies, performance evaluation requirements and technical evaluation report format and content.

The surveillance program includes daily, weekly, monthly, quarterly and annual documented inspections and monitoring of the tailings impoundments and ancillary structures, such as diversion structures and transport pipeline integrity. Annual technical stability and integrity evaluations are performed by qualified professional engineers to ensure continued performance of the system. These evaluations are submitted to and reviewed by both the Division of Radiation Control and the State of Utah Dam Safety Engineer.

In addition, the management program monitors and evaluates the performance of liquid evaporation systems, fugitive dust control generation, and waterfowl and burrowing animal habituation.

Part I.D.3 of the GWDP sets out the DMT performance standards under the GWDP. These requirements are required to be contained in a DMT Monitoring Plan, which has been incorporated into Section 3.1 of the Environmental Protection Manual, included as Appendix A to this Application. The DMT performance standards relating to the Mill's tailings cells, Roberts Pond, and the Mill's feedstock storage area are the following:

- The Mill shall at all times maintain the average wastewater head in the slimes drain access pipe to be as low as reasonably achievable in each tailings disposal cell; for Cell 3, this requirement shall apply after initiation of de-watering activities in that cell;

- Upon closure of any tailings cell, the Mill shall ensure that the maximum elevation of the tailings waste solids does not exceed the top of the flexible membrane liner ("FML") for the cell;

- The Mill shall operate Roberts Pond so as to provide a minimum 2-foot freeboard at all

times. Under no circumstances shall the water level in Roberts Pond exceed an elevation of 5,624 feet above mean sea level. In the event that the wastewater elevation exceeds this maximum level, the Mill shall remove the excess wastewater and place it in tailings cell 1 within 72 hours of discovery. At the time of Mill site closure, Denison shall reclaim and decommission Roberts Pond in compliance with the final Reclamation Plan for the site; and

- Open-air or bulk storage of all feedstock materials at the Mill awaiting Mill processing shall be limited to the eastern portion of the Mill site area, as delineated in Part I.D.3.d of the GWDP and Section 3.1 of the Environmental Protection Manual. Storage of feedstock materials at the Mill outside this area shall be performed and maintained only in closed, water-tight containers. At the time of Mill site closure, Denison shall reclaim and decommission the feedstock storage area in compliance with the Reclamation Plan for the Mill.

As required by Part I.E.6 of the GWDP, under the DMT Monitoring Plan, included in Section 3.1 of the Environmental Protection Manual, the Mill performs the following additional performance monitoring:

- The Mill monitors and records weekly the elevation of wastewater in tailings cells 1 and 3 to ensure compliance with the maximum wastewater elevation criteria mandated by condition 10.3 of the License;

- The Mill monitors and records weekly the depth to wastewater in the slimes drain access pipes at tailings cells 2 and 3 to determine maximum and minimum fluid head before and after a pumping cycle, respectively; for Cell 3, this requirement shall apply upon initiation of tailings de-watering operations in that cell;

- The Mill monitors and records weekly wastewater levels at Roberts Pond to determine compliance with the DMT operations standards in Part I.D.3; and

- The Mill performs a weekly inspection of the feedstock storage area to:
  - Confirm the bulk feedstock materials are maintained within the delineated feedstock storage area; and
  - Verify that all feedstock materials located outside the delineated feedstock storage area are maintained in water-tight containers.

These DMT performance standard monitoring results are reported in the Mill's quarterly Groundwater and DMT Performance Standard Monitoring Reports, copies of which are included with this Application. Since, the DMT Monitoring Plan provisions of the Environmental Protection Manual are just in the process of being approved at the date of this application, weekly depth to wastewater in the slimes drains monitoring results are not included in those reports.

6.5.8 MILDOS AREA Modeling

For purposes of this Application, the MILDOS AREA modeling for the Mill was updated, assuming the Mill was processing high grade Arizona Strip ores at full capacity. Section 3.13.1.6 of the Environmental Report discusses this modeling in detail and concludes that even running at full capacity in high-grade Arizona Strip ores the maximum potential doses to the public are well within applicable regulatory standards and ALARA goals.

6.5.9 Summary of Effectiveness of Environmental Controls and Monitoring

As is evident from the various historic environmental monitoring results discussed in this Section, the Mill has operated in compliance with all applicable regulatory standards and ALARA goals and in a manner that has not resulted in any significant impacts to public health, safety the environment. The MILDOS AREA modeling confirms that the current design and operation controls at the Mill are sufficient to result in operations at full capacity processing high-grade ores that are within the regulatory standards and applicable ALARA goals.

As a result of these historic monitoring results and updated modeling, it is evident that the Mill's equipment, facilities and procedures are adequate to minimize danger to public health or the environment and that renewal of the Mill's License will not be inimical to the health and safety of the public.

7. MILL ACCIDENTS

A spectrum of potential Mill accidents ranging from insignificant to serious has been established by probabilities of occurrence. These accidents were evaluated during each cycle of license application and renewal. In addition, Denison received process risks February, 2007. Table 7.0-1 shows the results of all analyses for each type of accident with severity and probability ratings as specified below. Emergency plans and countermeasures for coping with the accidents are also described.

The severity classification of an accident is based on its potential impact on health, safety, and the environment and is not a strict measure of dollar loss. The "severity" categories are as follows:

Severity	Description
1	Insignificant - No impact. Corrective actions would include steps to correct symptoms.
2	Significant - Slight impact. Corrective actions would include steps to address potential system deficiencies.
3	Serious - Corrective action necessary. Minor local and/or regional impact, such as closing State Highway 191 for one to two hours.
4	Very Serious - Corrective action necessary. Major local and/or regional impact. An example would be the evacuation of any area resident.

The probability categories are defined as follows:

Probability	Description
1	Highly Improbable - Frequency of occurrence is expected to be over one hundred years.
2	Improbable - Frequency of occurrence is expected to be within ten to one hundred years.
3	Possible - Frequency of occurrence is expected to be within one to ten years.
4	Probable - Frequency of occurrence is expected to be within one year.

Table 7.0-1
Spectrum of Potential Mill Accidents

Type of Accident	Severity	Probability	Risk Category*
Process Accidents			
Unloading/storage of Ammonia	3	2	6
Unloading/storage of Propane	3	2	6
Leach Tank Failure	2	2	4
Ammonia Explosion	3	2	6
SX Fire	3	2	6
Yellowcake Dryer Fire / Explosion	3	2	6
Vanadium Roaster Fire Explosion	3	2	6
Acts of God			
Tornado	4	1	4
Flood Water Breach	3	1	3
Seismic Damage	3	1	3
Tailings Accidents			
Structural Failure	3	1	3
Transportation Accidents			
Concentrate Shipments	3	3	9
Ore Shipments	2	3	6
Reagent Shipments	3	3	9

*(Severity) x (Probability) = (Risk Category)

The product of the severity classification times the probability category, termed the risk category, can be used to determine what type of safeguards should be in place and functional. A risk category of 8 or less can be handled by the normal training, auditing, implementation of procedures, and administration functions set forth in this application. A potential accident with a risk category between 8 and 12 may have resources allocated to lower the risk. These resources are properly defined and allocated during a normal budget cycle. A potential accident with a risk category of greater than 12 has greater impact and is reviewed and further evaluated within a shorter time frame.

7.1 Process Accidents

The following process accidents have been deemed to be credible and potentially capable of severe consequences.

7.1.1 Unloading/Storage of Ammonia or Propane

A release of ammonia or propane could occur through tank failure, overfilling, and failures of piping, loading hoses, hose couplings, and emergency relief valves. These risks are mitigated by regular inspection and maintenance of the equipment and proper training of personnel.

No radiological impacts are foreseen from a release of ammonia or propane.

7.1.2 Leach Tank Failure

The rubber lined leach tanks contain the ore/sulfuric acid slurry. Tank failure due to corrosion and break-out is a possibility. Procedures and practices are in place and functioning to minimize this possibility. Failure due to loss of structural integrity is also possible. The tanks are evaluated during each relining cycle to determine structural stability and the potential need for replacement.

Radiological impacts are minimal from an occurrence of this type. Any release of material would be contained in the leach area or would flow to Roberts Pond for containment, as designed.

7.1.3 Ammonia Explosion in a Building

An ammonia-air explosive mixture could be formed inside the Mill and Solvent Extraction buildings if a line ruptured. Existing controls include emergency powered vent fans, operator presence at all times for surveillance, one-half inch piping that minimizes potential release amounts, and emergency procedures.

Radiological impacts from the explosion would be minimal and most likely contained within the restricted area. Any contamination would be recycled or disposed of, as appropriate.

7.1.4 SX Fire

The possibility of a major fire in the solvent extraction building is remote, as very strict safety precautions are adhered to. This part of the process is kept isolated and in separate buildings due to the large quantities of kerosene present. These facilities are equipped with an independent fire detection and protection system.

In spite of the safety precautions, if a major fire were to occur, the radiological environmental effects would be confined within a few hundred feet of the buildings. Recovery of uranium that would be scattered by the burning solvent would be accomplished and a survey of the site would be required. Uranium-contaminated soil would be processed in the Mill circuit or disposed of in tailings, as appropriate.

In the 1980s, two solvent extraction fires occurred at other uranium Mills in the U.S. Neither fire resulted in appreciable release of uranium to the unrestricted environment, and essentially complete recovery of the uranium was obtained. Consequently, the impact from such an event at the Mill would be limited to (1) cleanup of contaminated material, (2) replacement of destroyed Mill components, and (3) a short duration release of non-radioactive combustion products to the atmosphere. In the event of a fire in the solvent extraction building, the fire suppression system delivers foam to the affected area. The foam is designed to spray for 25 minutes, followed by water at 100 psig and up to 2,000 gpm. See the Emergency Response Plan included as Appendix D to this Application.

7.1.5 Uranium or Vanadium Dryer/Roaster Fire/Explosion

The possibility of a fire or explosion in the uranium dryer or vanadium roaster is remote due to Industrial Safety Codes, regular maintenance and operations inspection of the dryer and ancillary equipment, instrumentation and control and fire system monitoring of the area. In the event a fire were to break out, both the uranium dryer and vanadium dryers are within separate enclosures in the Mill building, which will help to contain the fire. In the event of an explosion of the uranium dryer there is the potential for a release; however, the dispersion of the radioactive material will be very likely within the Mill property boundaries. In the event that the contamination did go beyond the Mill boundaries, it is likely that the contamination would not result in a significant increase over background levels in the area due to the limited amount of material and dispersion.

7.2 Acts of God

7.2.1 Tornado

The environmental impacts from a tornado would be transport of tailings solids and liquids or product from the Mill area into the environment. This dispersed material would contain some uranium, radium, and thorium. An increase in background radiation could result, and, if sufficient quantities are detected and isolated, they would be cleaned up.

7.2.2 Flood Water Breaching of Retention System

In general, flood water breaching of tailings embankments presents one of the greatest dangers for the sudden release of tailings solids and impounded water. Within the tailing cells themselves, sufficient volume is available to store any flood which would occur, including the probable maximum flood (PMF). Availability of freeboard volume is addressed in Section 3.1 of the Environmental Protection Manual included as Appendix A to this Application. If a storm event greater than the PMF breached the dikes, there is the strong possibility that no increase in background levels would be observed due to the catastrophically large volumes of water which would be flowing in the area.

The possibility of floods in Westwater Creek, Corral Creek, or Cottonwood Wash causing damage to the tailings retention facility is extremely remote. This is due to the approximately 200 foot elevation difference between the streambeds of the creeks and the toe of the tailings dikes.

7.2.3 Seismic Damage

The seismic rupture of the tailings retention slurry pipeline would result in a minor impact on the environment. The tailings retention system pipe is in the same drainage basin as the retention system. Any tailings slurry released by a pipe rupture, no matter what the cause, would flow downhill where it would be impounded inside a tailings cell.

7.3 Tailings Accidents

7.3.1 Structural Failure of Tailings Dikes

All tailings dikes have been designed with an ample margin of safety as per NRC staff guidance. This has included design calculations showing dike stability even when the dike is saturated with moisture during a seismic event, the most severe failure mode. In addition, the tailings discharge system is checked at least once per shift during operation, or once per day during Mill standby, as outlined in Section 3.1 of the Environmental Protection Manual included as Appendix A to this Application.

Although the discharge from a dike failure would soon cross the restricted area boundary, the flow path is over three miles in length before leaving the Mill property. Ample opportunity would exist for construction of temporary dikes and berms to minimize off-site contamination. The contamination from such an event would be cleaned up and returned to the tailings area.

7.4 Transportation Accidents

7.4.1 Concentrate Shipments

Concentrates will be shipped in sealed 55-gallon drums built to withstand normal handling and minor accidents. Each drum will contain approximately 900 pounds of yellowcake. A maximum of 45 drums will be shipped in each closed van. The drums will be sealed and marked

"Radioactive LSA" (low specific activity), and the trucks will be properly marked. Because most of the radioactive daughter products of uranium are removed in the extraction process and radioactive buildup of daughter products is slow, yellowcake has a very low level of radioactivity and is therefore classified by the Department of Transportation as a low specific activity material.

The environmental impact of a transportation accident involving release of the product would be minimal. Yellowcake, having a high density, even in a severe accident in which multiple drums are breached, would not easily disperse. More than likely, the drums and any released material would remain within the damaged vehicle or in an area of close proximity of the accident site.

Driver or carrier instructions are given to each driver of each transport leaving the plant site with a load of yellowcake. 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. A copy of these instructions is included in the Transportation Accidents Plan included as Appendix N to this Application.

Mill personnel would respond if requested for the initial spill response to handle any yellowcake transport accident. A procedure for this likelihood is included in the Transportation Accidents Plan included as Appendix N to this Application. Denison reserves the right to contract with a carrier or firm properly trained to handle any yellowcake transport accident.

7.4.2 Ore Shipments

Ore is shipped in 20 to 25 ton shipments in highway trailers that are covered by tarpaulins. The truck trailers are labeled "Radioactive LSA". Because the ore is large particles and is typically wet (2 to 5% moisture), the potential for a release from an accident involving an ore shipment truck is quite small. In the event of an accident, the ore transportation company will respond to clean up any spilled material and ensure that the area is clean. Mill personnel will support the transportation contractor in cleaning up the affected area and radiological scanning of the impacted area.

7.4.3 Reagent Shipments

Reagents are shipped in properly marked trailers and the drivers are trained in hazardous materials transportation and accident procedures. In the event of an accident, all of the reagent suppliers' transportation contractors are required to have emergency response contractors to respond to an accident and a potential spill. Many of the reagents that are used at the Mill are shipped on a daily basis to other industrial facilities throughout the U.S. The potential for an accident is minimized due to quick response of the transportation contractor's emergency response team and the training of many of the country's emergency response services.

7.5 On Site Spill Countermeasures

In the event of a transportation-related accident on the Mill property, 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. A Radioactive Material Spill Kit is available and under the control of the Radiation Department. 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.

Any fire at the site will be controlled by local experienced fire fighting personnel wearing appropriate respiratory protective equipment.

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.

As per R313-15 requirements, the DRC will be notified promptly of any accident of this type. A copy of the Mill's Spill Response Plan what is attached as Appendix 1 to the Mill's Stormwater Best Management Practices Plan included as Appendix C to this Application.

7.6 Emergency Procedures

Emergency procedures are established by the Radiation Safety Officer for accidents that could occur. Personnel safety, environmental conditions and prompt corrective actions are taken as well as notification of regulatory officials. Employees are indoctrinated as to emergency and remedial measures in the event of an accident which poses a health and safety hazard. These include evacuation procedures, clean-up measures, and follow-up medical examinations if warranted.

Tanks which are likely to overflow are equipped with high level alarms to reduce the possibility of spillage due to tank overflow. Dikes and/or curbs are constructed around process and storage tanks (excluding the water tank) to confine the material in the event of a tank spill. In the event of an ammonia tank spill, the material would be expected to evaporate quickly. A sulfuric acid tank spill would flow via a specially excavated channel to the catchment basin where it would be fully contained and subsequently cleaned up. Tank safety and containment is discussed in detail in Section 4.1.12.

Due to the design of the tailings disposal system, a break or breach in the containment area is not likely. In this event, however, any released material will be contained by the downstream catchment dike. If a break occurrs, the pumping system would be shut off, personnel removed from the immediate area, and the Executive Secretary notified. The break would be repaired and the affected area cleaned up in the safest and most expeditious manner. The advice and direction of the Executive Secretary would be sought and heeded throughout the episode.

Procedures for responding to other types of emergencies requiring removal or isolation of personnel (e.g., evacuation in case of fire, protection of employees from various spills and pipe breaks, and general first aid) are set out in the Mill's Emergency Response Plan attached as Appendix D to this Application.

7.6.1 GWDP Contingency Plan

In addition to the foregoing procedures, Part I.H.16 of the GWDP requires that Denison submit a Contingency Plan for Executive Secretary approval that provides a detailed list of actions the Mill will take to regain compliance with GWDP limits and DMT requirements defined in Parts I.C and I.D of the GWDP. The Contingency Plan submitted by Denison is currently under review by the Executive Secretary.

8 RECLAMATION PLAN

The Reclamation Plan was transmitted to the Executive Secretary by letter dated ____, and is hereby incorporated by reference. The financial surety, including the amount for the long term care fund, currently required under Mill License condition 9.5 is $11,893,975. This amount is reviewed annually by Denison and the Executive Secretary, as required by Mill License condition 9.5.

Part I.D. 7 of the GWDP provides that, upon commencement of decommissioning, Denison shall reclaim the Mill site and all related facilities, stabilize the tailings cells, and construct a cover system over the tailings cells in compliance with all engineering design and specifications in the Mill's Reclamation Plan.

In that respect, Part I.D.6 of the GWDP provides that before reclamation and closure of any tailings disposal cell, the Mill shall ensure that the final design, construction, and operation of the cover system at each tailings cell will comply with all requirements of the approved Reclamation Plan, and will for a period of not less than 200 years meet the following minimum performance requirements:

- Minimize infiltration of precipitation or other surface water into the tailings, including, but not limited to the radon barrier;

- Prevent the accumulation of leachate head within the tailings waste layer that could rise above or over-top the maximum FML liner elevation internal to any disposal cell, i.e., create a "bathtub" effect; and

- Ensure that groundwater quality at the compliance monitoring wells does not exceed the Groundwater Quality Standards or Groundwater Compliance Limits specified in the GWDP.

Part I.D.7 also provides that the Co-Executive Secretary reserves the right to require modifications to the Reclamation Plan for purposes of compliance with the Utah Groundwater Quality Protection Regulations, including but not limited to containment and control of contaminants, or discharges, or potential discharges to Waters of the State.

In order to ensure that the Reclamation Plan meets the requirements of the Utah Groundwater Quality Protection Regulations, Part I.H.11 of the GWDP requires that Denison submit for Co-Executive Secretary approval an infiltration and contaminant transport modeling report that demonstrates the long-term ability of the tailings cells cover system to adequately contain and control tailings contaminants and protect nearby groundwater quality of the uppermost aquifer. Such Report shall demonstrate how the tailings cell engineering design and specifications will comply with the minimum performance requirements of Part I.D.6 of the GWDP. Denison submitted a work plan for such modeling report for Co-Executive Secretary approval on September 9, 2005, as required, and is currently in the process of completing such report.

9. LISTING AND DESCRIPTION OF VIOLATIONS, INCIDENT INVESTIGATIONS, EXCURSIONS AND REGULATORY EXCEEDANCES AND LICENSE AMENDMENTS

9.1 Regulatory Authorities

Denison is proud of its regulatory compliance record with regard to environmental, health and safety performance. Operations at the Mill are regulated as follows:

Environmental Control and Radiation Safety (August 2004 to present)	DRC
Environmental Control and Radiation Safety (1980 through August 2004)	NRC
Occupational Safety and Health	MSHA
Air Quality	Utah Department of Environmental Quality, Division of Air Quality (DAQ)
Water Quality	Utah Department of Environmental Quality, Division of Water Quality (DWQ)

9.2 License Violations Identified During NRC or State of Utah Site Inspections Since March 31, 1997.

9.2.1 Environmental Control and Radiation Safety Notices of Violation

The Mill operated under NRC Source Material License number SUA-1358 from its initial startup through August 2004. At that time, Utah became an NRC agreement state and responsibility for regulating licensed activities transferred from NRC to the State of Utah.

As a condition of the NRC Mill License, the Mill was subject to scheduled annual or semi-annual compliance inspections by NRC, as well as periodic unannounced NRC inspections. NRC assessed one of four levels of severity for each violation resulting from an inspection. Level I violations are the highest level of severity; Level IV violations are the least severe and are issued for administrative violations having virtually no environmental or health and safety implications.

During the period from March 31, 1997 to August 2004, the Mill received only 7 Notices of Violation (NOVs) from NRC, six administrative NOVs from inspections, and one administrative NOV issued by the NRC Uranium Recovery Branch. A summary of NOVs is provided in Table

9.2-1. As indicated in Table 9.2-1, Denison did not receive an NOV with a severity higher than level IV. All corrective actions have been completed, and all NOVs closed. The Mill has no pending NOVs. Copies of the inspection reports and NOVs received since the last license renewal in March 1997 are provided in Appendix O.

No violations under the License have been cited by DRC since August 2004.

Table 9.2-1
NRC and UDEQ Inspections at White Mesa Mill
since March 31, 1997

Inspection Date	Agency	NOVS	Status
------	NRC	1 Violation May 8, 1997, not as a result of an inspection	Closed
July 15-17, 1997	NRC	3 Violations – All Severity Level IV	Closed
January 13-15, 1998	NRC	No Violations	------
June 9-11, 1998	NRC	No Apparent Violations	------
August 18, 1998	NRC	Dam Safety Audit No Violations	------
March 25, 1999	NRC	1 Violation – Severity Level IV	Closed
July 29, 1999	NRC	No Violations	------
November 18, 1999	NRC	No Violations	------
July 25, 2000	NRC	Dam Safety Audit No Violations	------
July 27, 2000	NRC	2 Violations – Severity Level IV	Closed
April 4, 2001	NRC	No Violations	------
September 19, 2001	NRC	No Violations	------
July 23, 2002	NRC	Dam Safety Audit No Violations	------
August 22, 2002	NRC	No Violations	------
February 19, 2004	NRC	No Violations	------

Inspection Date	Agency	NOVS	Status
	DWQ	August 23, 1999 Notice of Violation and Groundwater Correction Order addressing chloroform Resulting from Split Sampling Event	Corrective Action Plan in progress
	DWQ	October 25, 2004 Review of Monitoring Report No Violations	------
March 22, 2005	DRC	Dam Safety Audit No Violations	------
September 20, 2005	DRC	Dam Safety Audit No Violations	------
	DWQ	8 Violations of GWDP July 17, 2006, not as a result of an inspection	3 withdrawn by DWQ 5 Closed
	DWQ	3 Violations of GWDP August 24, 2006, not as a result of an inspection	Resulted in Consent Agreement of October 23, 2006
December 13, 2006	DRC	No Violations	------

9.2.2 Air Quality Notices of Violation

As described in Section 1 of this Application, the Mill holds Air Approval Order No. DAQE-AN12005-06 issued by DAQ. Records which must be maintained as part of the compliance with the Air Approval Order include fuel consumption, production rate, equipment maintenance records, emission inventory, upset and breakdown episodes, and fugitive emission controls. Stack testing to show compliance with emission limitations stated in the Air Approval Order, which is observed by DAQ, is required to be conducted within 180 days of startup. To date, this testing has indicated no exceedances of the permissible limits. Emission inventories submitted annually to DAQ document that the facility has consistently operated within the emission limits. All of the records required to demonstrate compliance with the remaining Air Approval Order conditions are maintained at the Mill and are available for review by DAQ. The Mill has never received a citation or Notice of Violation under this permit.

9.2.3 Water Quality Notices of Violation

In May 1999, DWQ participated in a groundwater split sampling event at the White Mesa Mill. After reviewing results from the sampling event, DWQ issued a Notice of Violation and Groundwater Corrective Action Order on August 23, 1999 requiring Denison to address elevated chloroform levels identified in one monitoring well, MW-4. Denison is currently preparing a

corrective action plan to address this NOV, and the NOV remains open pending DWQ's acceptance of the plan and subsequent corrective action.

As described in Section 1 of this Application, the Mill operates under GWDP No. UGW370004 issued by the DWQ. Since August 2004, the Mill has received two letters from the Co-Executive Secretary of the Utah Water Quality Board under the GWDP which identify 11 violations. None of these NOVs resulted from inspections; all resulted from the Co-Executive Secretary's review of groundwater monitoring report data. Eight of the violations, addressing groundwater monitoring data reporting, were identified in the Co-Executive Secretary letter of July 17, 2006. Three of these were subsequently withdrawn by the Co-Executive Secretary and 5 were closed. Three violations, addressing groundwater quality standards, were identified in the Co-Executive Secretary's letter of August 24, 2006. These violations resulted in development of a Consent Agreement between Denison and DWQ which stipulated a revised date for submittal of the Background Ground Water Quality Report for Existing Wells. This report was submitted in January 2007 and is currently under review by the Co-Executive Secretary. These WDP NOVs are also summarized in Table 9.2-1.

9.3 Occupational Safety and Health Citations

The Mine Safety and Health Administration (MSHA) oversees compliance with both the occupational safety and health requirements of the Occupational Safety and Health Administration (OSHA) applicable to above-ground operations such as milling, as well as additional requirements applicable to below-ground hazards specific to mining operations.

The Mill has no predetermined schedule of MSHA audits, but is subject to unannounced MSHA inspections approximately twice per year. In addition, Denison requests that MSHA provide Courtesy Audit Visits (i.e., voluntary inspections) following installation or startup of major capital modifications at the Mill.

Since March 1997, the Mill has received a total of 71 citations from MSHA, as outlined in Table 9.3-1. For some of the citations, the corrective actions were addressed on the same day as the MSHA inspection, and the citations were terminated instantaneously. For other citations, the corrective actions were implemented after the conclusion of the inspection visit and documented in corrective action memoranda on file at the Mill. The Mill has one outstanding citation for which the corrective action is still in progress. The MSHA inspection in February 2007 resulted in 7 citations, of which 6 were closed within a day of the inspection. One remaining citation requires the purchase and installation of additional shower equipment, which is currently underway. The citation and corrective action will be closed when Denison confirms that equipment installation has been completed.

Table 9.3-1
MSHA Citations at the Mill Since March 31, 1997

Inspection Date	Citations	Status
No Inspections 1997	------	------
January 1998	4 Citations	Closed
November 1998	10 Citations	Closed
August/September 1999	2 Citations	Closed
January 2000	1 Citation	Closed
March 2000	No Citations	------
August 2000	No Citations	------
January 2001	6 Citations	Closed
June 2001	3 Citations	Closed
July 2002	4 Citations	Closed
November 2002	6 Citations	Closed
No Inspections 2003	------	------
June 2004	1 Citation	Closed
December 2004	5 Citations	Closed
June 2005	4 Citations	Closed
November 15, 2005	3 Citations	Closed
November 30, 2005	3 Citations	Closed
April 2006	12 Citations	Closed
February 2007	7 Citations	6 Closed 1 Open – Corrective Action in Progress

9.4 Excursions, Incident Investigations or Root Cause Analyses, and Resultant Cleanup Histories or Status since March 31, 1997.

The Mill received one NRC request, on September 13, 1999, to conduct an investigation to prove or disprove four allegations regarding operational practices. Based on an investigation report filed November 29, 1999, all allegations were disproved and closed.

The Mill filed one Spill Investigation/Transportation Accident Report to DRC on October 13, 1999. The independent transportation subcontractor overturned a truck hauling an intermodal container ("IMC") from the Ashland 1 Tonawanda site, resulting in a spill of approximately seven cubic yards of low specific activity alternate feed material. The material was removed, transferred to another container, and shipped to the Mill. The area was surveyed for residual contamination.

In October 1999, US Army Corps of Engineers contractor, IT Corporation, notified Denison that they had mistakenly shipped one IMC of lead-contaminated soil from the Boston Artery Tunnel Project to the Mill. The material in the mis-shipped IMC had already been received at the Mill and incorporated in Ore Lot #78 on the Mill ore pad. Denison filed a Segregation Plan for Soil Lot #78 on May 22, 2000, which was approved by the Utah Division of Solid and Hazardous Waste, and the NRC in June and July, 2000 respectively. The plan was implemented in July 2000.

Mill staff determined on March 27, 2001 that the infiltration rate into the leak detection system of inactive tailings Cell 4A appeared to exceed the 1 gpm level prescribed in the Mill's license condition 11.3.D. There is a one foot thick clay liner beneath the leak detection system in Cell 4-A. Cell 4A has since been cleaned out and is in the process of being re-lined.

Table 9.4-1 summarizes these exclusions, incident investigations, root cause analyses and resultant clean-ups.

Table 9.4-1
Incident Investigations Since March 31, 1997

DATE	AGENCY	INVESTIGATION	STATUS
September 13, 1999	NRC	4 NRC Allegations Investigated in November 1999	Closed
September 30, 1999	DRC	Transportation Accident	Closed
October 22, 1999	NRC	Mis-shipped inter-modal container from Boston Artery Tunnel project	Closed
March 27, 2001	NRC	Cell 4-A Leak Detection System	Closed

9.5 Exceedances of Regulatory Standards or License Conditions Pertaining to Radiation Exposure, Contamination, or Release Limits Since March 31, 1997.

The Mill has not incurred any exceedences of regulatory standards or license conditions pertaining to radiation exposure, contamination, or release limits.

9.6 License Amendments Since March 1997

Since the last license renewal in March 1997, the License was amended 25 times by the NRC and since August 2004, three times by the Executive Secretary. Table 9.6-1 and Table 9.6-2 summarize these amendments.

Table 9.6-1
Summary of NRC Mill License Amendments since March 31, 1997

License Amendment Number	Date Of Approval	Subject of Amendment
1	April 2, 1997	Processing of Cotter Concentrate Source Material
2	May 9, 1997	Financial Surety Update
3	June 13, 1997	Financial Surety Update
4	August 15, 1997	Processing of Source Material from Cabot Performance Materials
5	April 17, 1998	Stack, Surface Water, and Groundwater Effluent Sampling Requirements
6	June 23, 1998	Processing of Source Material from Ashland 2 FUSRAP Site
7	August 28, 1998	Annual 8-hour Air Sample Collection
8	September 25, 1998	Groundwater Points of Compliance Monitoring Program; Leak Detection System Monitoring Requirements
9	November 2, 1998	Processing of Source Material from Cameco
10	February 3, 1999	Processing of Source Material from Ashland 1 and Seaway Area D FUSRAP Site
11	February 24, 1999	Increase in Volume of Source Material from Ashland 2 FUSRAP Site
12	July 28, 1999	Processing of Source Material from the St. Louis FUSRAP Site
13	February 10, 2000	Financial Surety Update; Decommissioning Radiological Monitoring
14	July 7, 2000	Processing of Source Material from the Linde FUSRAP Site

License Amendment Number	Date Of Approval	Subject of Amendment
15	July 21, 2000	Financial Surety Update
16	September 15, 2000	Freeboard Limits for Tailings Cells
17	December 27, 2000	Processing of Source Material from W.R. Grace Chattanooga Site
18	December 29, 2000	Processing of Source Material from Heritage Minerals Inc.
19	April 6, 2001	Financial Surety Update
20	December 11, 2001	Processing of Source Material from Molycorp Mountain Pass Site
21	September 5, 2002	Financial Surety Update
22	September 23, 2002	Processing of Source Material from Maywood FUSRAP Site
23	December 31, 2003	Financial Surety Update
24	February 2, 2004	Financial Surety Update
25	April 5, 2004	Financial Surety Update

Table 9.6-2
Summary of DRC Mill License Amendments since August, 2004

License Amendment Number	Date Of Approval	Subject of Amendment
1	August 10, 2005	Financial Surety Update
2	August 24, 2006	Financial Surety Update for Mill and Tailings System
3	June, 2006	Processing of Source Material From FMRI, Inc., and ancillary amendments

10. CONCLUSIONS

This Application describes the activities undertaken at the Mill, and the facilities, equipment, processes and procedures utilized to conduct such activities. This Application also describes the key monitoring and DMT performance standard requirements and other protections contained in the Mill's GWDP. Appended to this Application are the critical procedures and programs used at the Mill, and also included with this Application are the relevant monitoring reports as well as inspection reports and a listing and description of any violations, incident investigations, excursions and regulatory exceedances and ancillary documentation since the last License renewal in 1997.

Also accompanying this report is a detailed Environmental Report that presents a discussion of the following:

- An assessment of the radiological and non-radiological impacts to public health from the activities to be conducted pursuant to the License;
- An assessment of any impacts on the environment, including any impacts on waterways and groundwater, resulting from the activities conducted pursuant to the License;
- An assessment of any impacts on safety, including the safety of workers at the Mill, resulting from the activities to be conducted pursuant to the License
- Consideration of alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to the License; and
- Consideration of the long-term impacts including decommissioning, decontamination, and reclamation impacts, associated with activities to be conducted pursuant to the License.

As indicated in the various sections of this Application, the Environmental Report demonstrates that there will be no significant impacts to public health, safety or the environment from continued operation of the Mill under the existing terms and conditions of the License and GWDP. Environmental monitoring results for air particulate, direct radiation, radon, groundwater, surface water, vegetation and soil sampling since the last License renewal in 1997 do not indicate any exceedances of applicable regulatory standards or ALARA goals. This indicates that the existing facilities, equipment, procedures and training of personnel are adequate to minimize danger to public health and safety or the environment. Furthermore, these facilities, equipment, procedures and training are reviewed by Denison on an ongoing basis under the Mill's ALARA Program to ensure that any impacts to public health, safety or the environment are maintained as low as reasonably achievable. Furthermore, MILDOS AREA modeling demonstrates that the facilities, equipment and procedures at the Mill are sufficient to allow for the Mill to be operated at full capacity on high grade ores in full compliance with regulatory standards and ALARA goals.

Similarly, the Environmental Report demonstrates that occupational exposures to radiation have been maintained below regulatory standards and, with very few exceptions, below the ALARA goals for exposures to workers. Again, this demonstrates that the existing facilities, equipment, procedures and training of personnel are adequate to minimize exposures to workers and to maintain such exposures as low as is reasonably achievable.

As a result, Denison believes that with this Application, the accompanying Environmental Report and accompanying documentation, the Executive Secretary has been provided sufficient information to determine that:

a) Denison and all personnel at the Mill are qualified by reason of training or experience to perform their functions in a manner as to minimize danger to public health and safety or the environment;

b) the existing equipment, facilities, and procedures at the Mill are adequate to minimize danger to public health and safety or the environment;

c) the renewal of the Mill's license will not be inimical to the health and safety of the public;

d) the applicable requirements of R313-24 and all other applicable regulations have been satisfied;

e) renewal of the License will not significantly affect the quality of the environment; and

f) to the extent that that original siting of the Mill has resulted in any environmental costs, after weighing the environmental, economic, technical and other benefits against such environmental costs and considering available alternatives, the action called for is the issuance of the proposed license renewal.