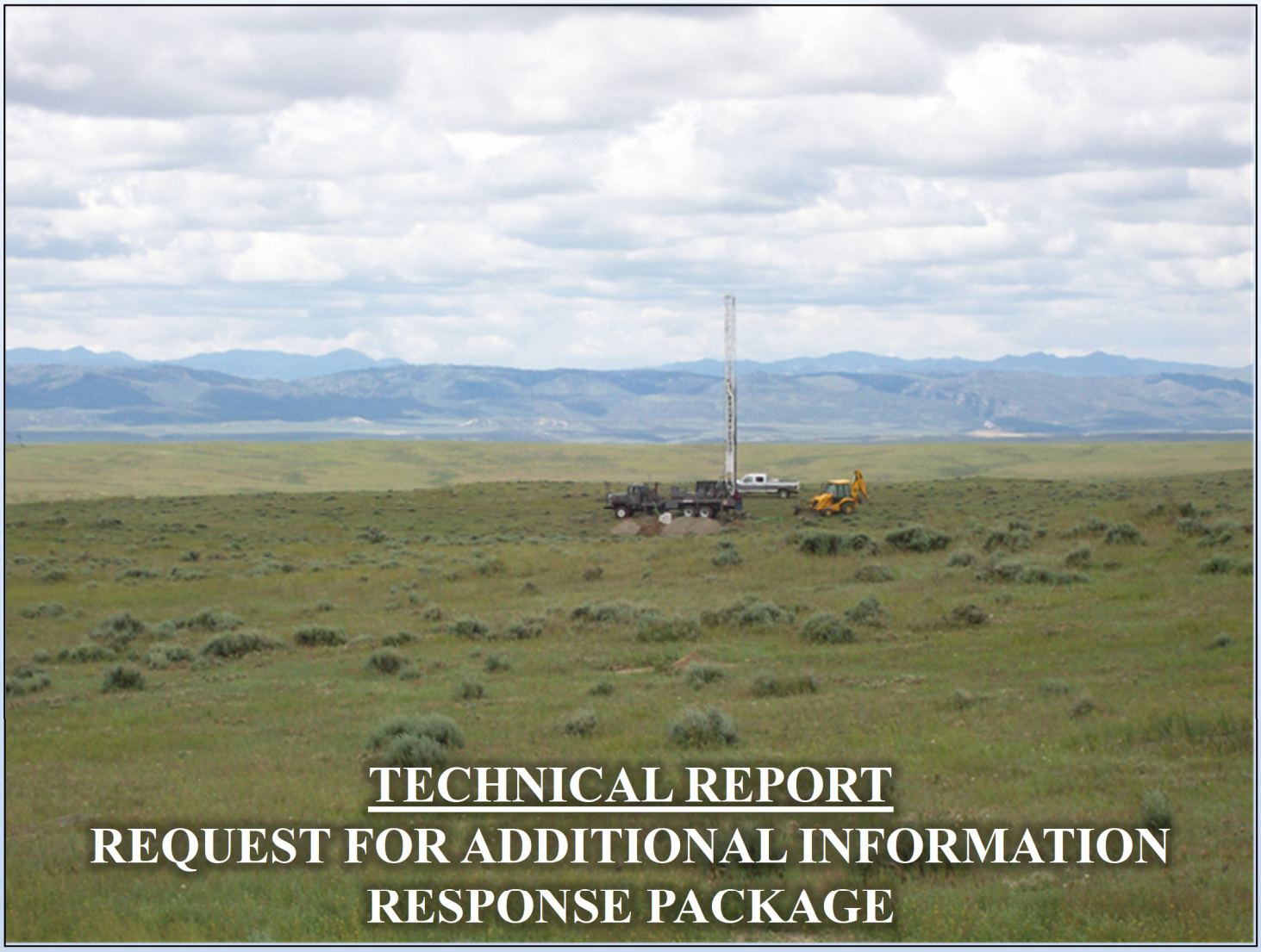
USNRC APPLICATION
SUA-1341 License Amendment
Ludeman Project
Converse County, WY



TECHNICAL REPORT
REQUEST FOR ADDITIONAL INFORMATION
RESPONSE PACKAGE

June 2013

uranium one™
investing in our energy

TABLE OF CONTENTS

List of Tables

List of Figures

List of Appendices

General

RAI GEN-1

Please provide plan views of each of the proposed Satellite areas which show the baseline conditions and features for each phase of the Ludeman Project.

A. Please provide a current, baseline plan view of each of the proposed Satellite, showing each of the physical (i.e., man-made) attributes listed below:

- *buildings and other structures*
- *above- and below-ground electrical lines and poles (and other lines, such as telephone, if present)*
- *above- and under-ground pipes and pipelines as well as their arrangement and related support structures*
- *above- and below-ground tanks*
- *storm-water management features such as collection drains and pipes to the sediment surface impoundment*
- *surface impoundments used for management of liquid byproduct waste*
- *all active water wells, outlines of wellfields, outlines of monitoring-well rings, and header houses*
- *existing and planned structures unrelated to the Proposed Action, such as pipelines and wells associated with oil and gas production*
- *site improvements such as paved and unpaved roads*

B. Please provide a plan view of the Project areas with the same scale and size as the baseline plan view requested above and indicate each of the physical (i.e., man-made) attributes listed above for each phase (i.e., construction, operation, aquifer restoration, and decommissioning) of each of the proposed Satellite areas. Please provide these plan-view figures in an electronic format with similar features to Figure 2.1-2 in the ER, including enlargement of the Satellite areas to allow the details to be discernible. The views of the existing, current Ludeman site will serve as a baseline view and the other phased views will assist in the NRC's description of the Proposed Action and the Alternatives in Section 2 of the EA and in its evaluation of the impacts of the Ludeman Project for each phase. Specifically, comparable figures of each Satellite area are necessary to evaluate the impacts of the NRC's Alternative 3 and to compare impacts among the three Alternatives chosen by the NRC for further analysis (i.e., Alternative 1: Proposed

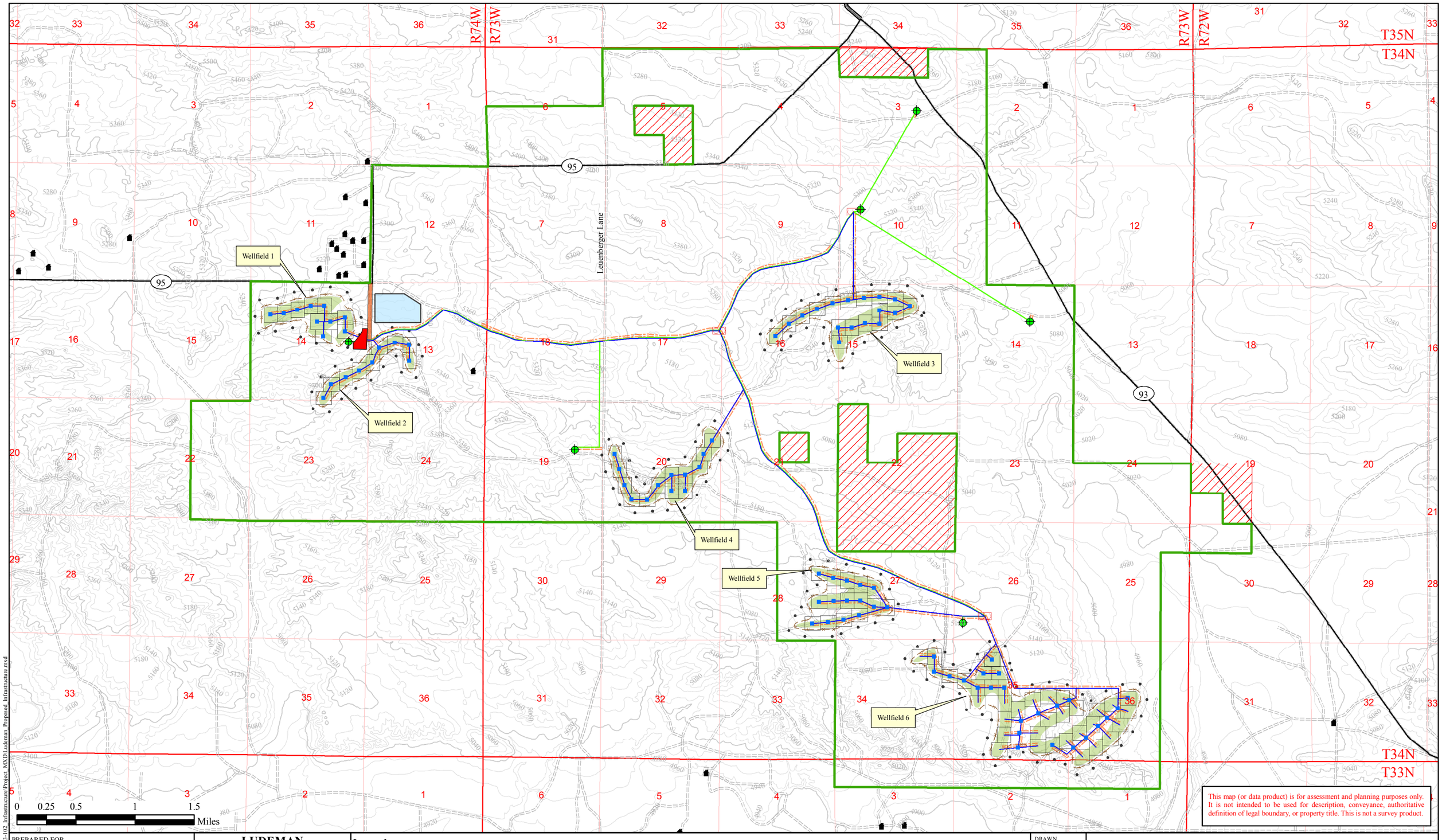
Action, Alternative 2: No-Action Alternative, and Alternative 3: Leuenberger Satellite Eliminated from Proposed Action).

RAI GEN-1(A) Response

The existing TR Figure 2.2-2 provides the baseline plan view for all known physical attributes at the time of the initial submittal of the license application. The figure will be updated to depict the current physical attributes per the bulleted list in A. Some of the physical attributes listed should not be considered baseline features such as wellfield, header house, and planned structures outlines. These features will be depicted on the conceptual infrastructure map per RAI GEN-1(B).

RAI GEN-1(B) Response

The existing TR Figure 3-1 will be updated to depict the proposed project's conceptual infrastructure and other foreseen structures related to the Proposed Action. NRC's request for Uranium One to provide a plan view for all physical attributes for all phases of the project is not required under NUREG 1569 or 1748. Furthermore, this request was not required in previous Uranium One and/or other license applications that were deemed technical comprehensive and currently licensed. Uranium One believes TR Figure 2.2-2 and Figure 3-1 are adequate to assess the nature and extent of present and proposed operations for the proposed Ludeman Project. The revised infrastructure is shown below.



Path: O:\WY Projects\8201-2013-102 Infrastructure\Project MXD\Ludeman Proposed Infrastucture.mxd

PREPARED FOR

uranium one
investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, Wyoming 82601
Phone: (307) 265-0696
Fax: (307) 265-2498

Legend

- Ludeman Project Boundary
- Excluded Area
- Fenced Area
- Residence
- Header House
- Trunkline
- Deep Disposal Well
- Deep Disposal Well Pipeline
- Well Pattern
- Wellfield
- Monitor Well Ring
- Booster Station
- Primary Access
- Secondary Access Road
- Evaporation Ponds Area
- Satellite Plant Area

N W E S

DRAWN BY: RMD
CHECKED BY: CT
APPROVED BY: RMD

Conceptual Infrastructure

REV #	DESCRIPTION	BY	DATE	FIGURE
0	For Submittal	RMD	3-22-13	3
1	Revisions made - Final Draft for Review	CAT	4-9-13	

RAI GEN-2

Please update the status of Uranium One's permitting and licensing activities for the Ludeman Project that is summarized in Table 1-1 of Section 1.13 in the ER, pages 1-30 and 1-31.

Following the submission of Uranium One's license application to the NRC, the Applicant has likely continued to prepare, submit, and receive approval on license and permit applications. An updated Table 1-1 will be used in the development of the EA for the Ludeman Project to incorporate the current information on environmental approvals and permits.

RAI GEN-2 Response

To provide the NRC with current status of environmental approvals Table 1 (shown below) provides updated information for all additional permits anticipated for the proposed project.

Table 1: Environmental Approvals

Issuing Agency	Permit or License	Status
State		
Wyoming Department of Environmental Quality 122 West 25th St Herschler Building Cheyenne, Wyoming 82001	Permit to Mine	Permit to Mine application under review; expected approval by WDEQ in fourth quarter 2013
	Groundwater Reclassification	Groundwater reclassification application under review; expected approval by WDEQ in the fourth quarter 2013
	Underground Injection Control Class I	Class I UIC Permit application under preparation; expected submittal to WDEQ in fourth quarter 2013
	Industrial Stormwater NPDES Permit	An Industrial Stormwater NPDES will be required for the satellite area. Expected submittal 30 days prior to the start of operations
	Construction Stormwater NPDES Permit	Construction Stormwater NPDES authorizations are applied for and issued annually under a general permit based on projected construction activities. The Notice of Intent will be filed at least 30 days before construction activities begin in accordance with WDEQ requirements.
	Wastewater Pond Construction Permit	To be prepared prior to pond construction
	Underground Injection Control Class V, Septic System	The Class V UIC permit will be applied for following installation of an approved site septic system during facility construction.
	Mineral Exploration Permit	Approved Mineral Exploration Permit 339DN is currently in place for the Ludeman Project area.
	Air Quality Permit (Construction)	Application will be submitted six months prior to start of construction
Federal		
U.S. Nuclear Regulatory Commission Washington, DC 20555	Amendment of Materials License SUA-1341	Application submitted herein
U.S. Environmental Protection Agency 1200 Pennsylvania Ave, NW, Washington, DC 20460	Aquifer Exemption	Aquifer Exemption application forwarded to EPA following WDEQ action
U.S. Army Corps of Engineers 2232 Dell Range Blvd., Suite 210 Cheyenne, WY 82009-4942	Nation Wide Permit (NWP) # 12 Authorization	All necessary information provided to the USACE. USACE determined (May 11, 2011) the methods used to identify wetlands within the proposed project area are consistent with activities authorized in NWP #12.
County		
Converse County	County development permits	Access road approach and emergency services agreement will be prepared prior to construction

RAI GEN-3

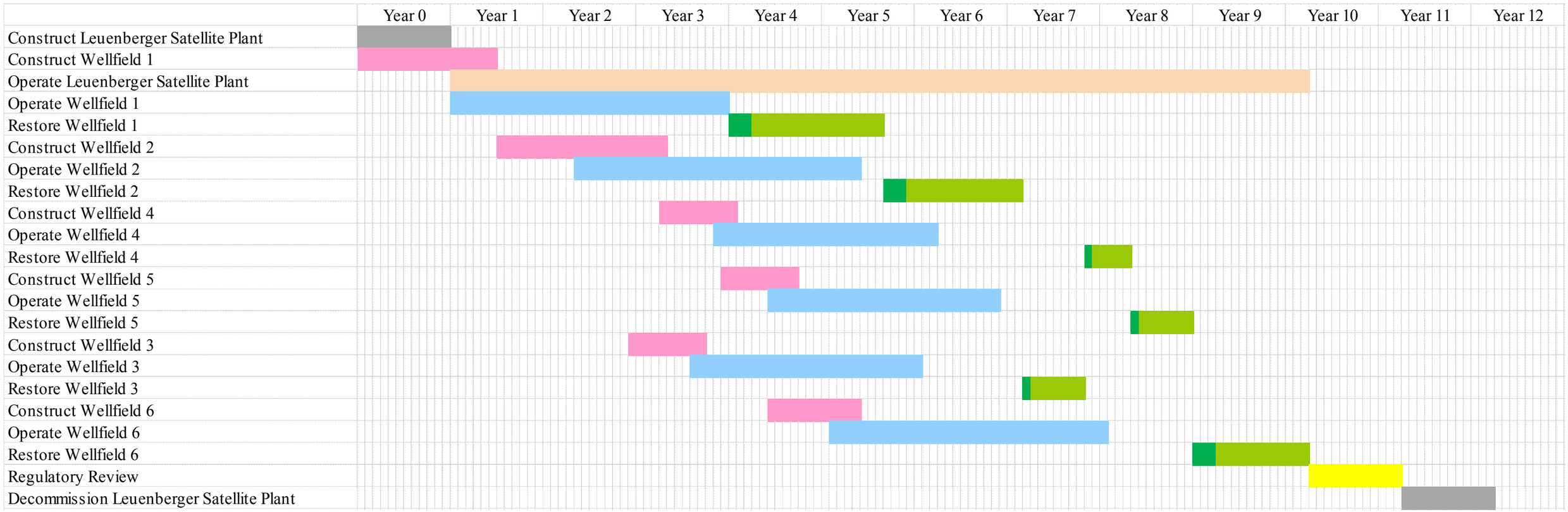
Please note any changes to the order of development of the Satellite areas that is shown in Figure 1-4 of the TR.

Final information on the schedule for the four Project phases at each Satellite will support the NRC's environmental impact analysis in the EA.

RAI GEN-3 Response

As a function of economics of the current and projected status of the uranium industry, Uranium One evaluated the current Ludeman Project application to assess if certain operational components of the proposed plan could be optimized. First and foremost, this evaluation identified the utilization of a single satellite plant as opposed to the three satellites proposed in the original application. A single satellite plant has been deemed more economically feasible and would diminish a number of potential impacts. It is Uranium One's strong opinion this modification will improve the viability of the project and overall reduce any potential impacts.

A revised schedule illustrating the construction, production, restoration and decommissioning phases of the proposed project will replace the original schedule in all applicable sections of the application. The revised conceptual schedule is shown on the following page.



This map (or data product) is for assessment and planning purposes only. It is not intended to be used for description, conveyance, authoritative definition of legal boundary, or property title. This is not a survey product.

PREPARED FOR

uranium one™
investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.treccorp.com

- Installation and Construction
- Operate Plant
- Operate Production Unit
- Groundwater Sweep
- Reverse Osmosis
- Regulatory Review Period
- Plant/DDW Decommission and Reclamation

N W E S

DRAWN BY: EGS
CHECKED BY: RMD
APPROVED BY: RMD

Proposed Project Schedule

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	EGS	6/20/13	
1	For Submittal	RMD	6/20/13	

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_Project Schedule.mxd

RAI GEN-4

Please provide the documents cited in the ER and TR that are not publicly available, i.e., documents pertaining to exploration, licensing, and permitting activities in the early 1980s for areas within the Ludeman Project. This request includes the following documents which are cited in the ER and TR:

- *Arizona Public Service Company (APS), 1980. Application for In Situ Research and Development Testing License, Peterson In Situ Uranium Extraction Project, Converse County, Wyoming. Wyoming Department of Environmental Quality (WDEQ) Application for In Situ Research and Development Testing License.*
- *COGEMA Mining, Inc., 2004. Wellfield Restoration Report, Irigaray Mine, prepared by Petrotek Engineering Corporation.*
- *Cogema Mining, Inc., 2008. Wellfield Restoration Report Christensen Ranch Project Wyoming, March 2008.*
- *W.E. Galloway and Walton, A.W., 1974. Stratigraphy of the Upper Fort Union Fluvial System, Southern Powder River Basin Relationships to Uranium Mineralization, Technical Service Report No. 1201-6-1-74, Conoco, Inc., November 1974.*
- *Geomatrix Consultants, Inc., 1988. Seismotectonic Evaluation of the Wyoming Basin Geomorphic Province, prepared for the U.S. Bureau of Reclamation, Contract No. 6-CS-81-07310.*
- *Jim Lemmers and Smith, Dave, 1981. Idaho Claims Geologic Evaluation, Powder River Basin, Converse County, Wyoming, UNC Teton Exploration Drilling, Inc., February 20, 1981.*
- *UNC Teton Exploration Drilling, Inc., 1983. Leuenberger In-Situ Pilot Project, M Zone Restoration Stability Report, Converse County, Wyoming, Permit No. 2RD-522, March 18, 1983.*
- *Teton-Nedco Joint Venture, 1980. In-Situ Mining Permit Application, Leuenberger Site, Converse County, Wyoming.*
- *Uranium Resources Inc., 1981. North Platte Project Application and Technical Report.*
- *WDEQ, Land Quality Division (LQD), 2000. Memorandum from Roberta Hoy, WDEQ/LQD to Richard Chancellor, Administrator, WDEQ/LQD, TFN 321197, August 7, 2000.*

- *Conoco, 1982, as cited in the Ludeman ER Section 3.3.3.*

NRC's preparation of the EA requires verification of key information. Additionally, impact analyses must consider past, present, and reasonably foreseeable future events within the designated geographic area. Review of the documents cited in the ER and TR that pertain to uranium recovery projects under development in the 1980s and to groundwater restoration at other in situ uranium recovery (ISR) projects within the Powder River Basin will ensure that the EA accurately describes the environmental setting as well as the environmental and cumulative impacts of the Ludeman Project.

RAI GEN-4 Response

Uranium One is currently not aware of regulatory requirement indicating an applicant must supply NRC with specific reference material which may be cited within the application. Uranium One understands and agrees with the NRC's concerns in accurately describing the environmental setting and potential cumulative impacts as a result of the proposed project. NUREGs 1569 and 1748, and Regulatory Guide 3.46 (Standard Format and Content of License Applications) each list the necessity to accurately portray all outside references cited within an application. However, none of those regulations or guidelines state that cited or reference materials must be subsequently supplied.

To assist the reviewer(s) with their survey, Uranium One has added the NRC accession numbers to the reference citations for the two Cogema wellfield restoration reports dated 2004 (ML053270037, ML053270041, ML053270045) and 2008 (ML081060131, ML081060132, ML081060150). Within the license amendment application those sections include TR Sec. 6 and ER Sec. 9.

Facility Design

RAI FD-1

Please describe any additional facility design attributes and specifications that have been developed since the submission of the license application.

A. *Please provide additional design attributes and specifications for the structures that would be constructed at each of the Satellite areas.*
B. *Please provide information on the topographic setting where each facility and wellfield would be constructed at every Satellite area and how the design would accommodate the topography.*
C. *Please provide additional information on the final design specifications of the surface impoundments (i.e., ponds) that would be constructed at each Satellite facility, including the design for connectivity (i.e., pipelines) between the surface impoundments at the different Satellite areas and the deep-injection wells.*

Any additional available information regarding the facility design, both interior and exterior, at each Satellite area will assist the NRC during its assessment of the environmental impacts of the Proposed Action. Specifically, more detailed facility design than that shown on Figures 3-3 and 3-4 of the TR is needed for each Satellite. In addition, the number of surface impoundments at each Satellite must be clarified and the design of the impoundments finalized. Section 4.2.4.5 of the TR notes that the design presented in Addendum 4-A is preliminary and that an "inclusive surge pond design has not been completed." In addition, Addendum 4-A of the TR notes that the second and third Satellite areas could require only one surface impoundment as the impoundments at the other Satellite areas could be used for redundancy. Final information on the overall design of Satellite areas will support the NRC's environmental impact analysis.

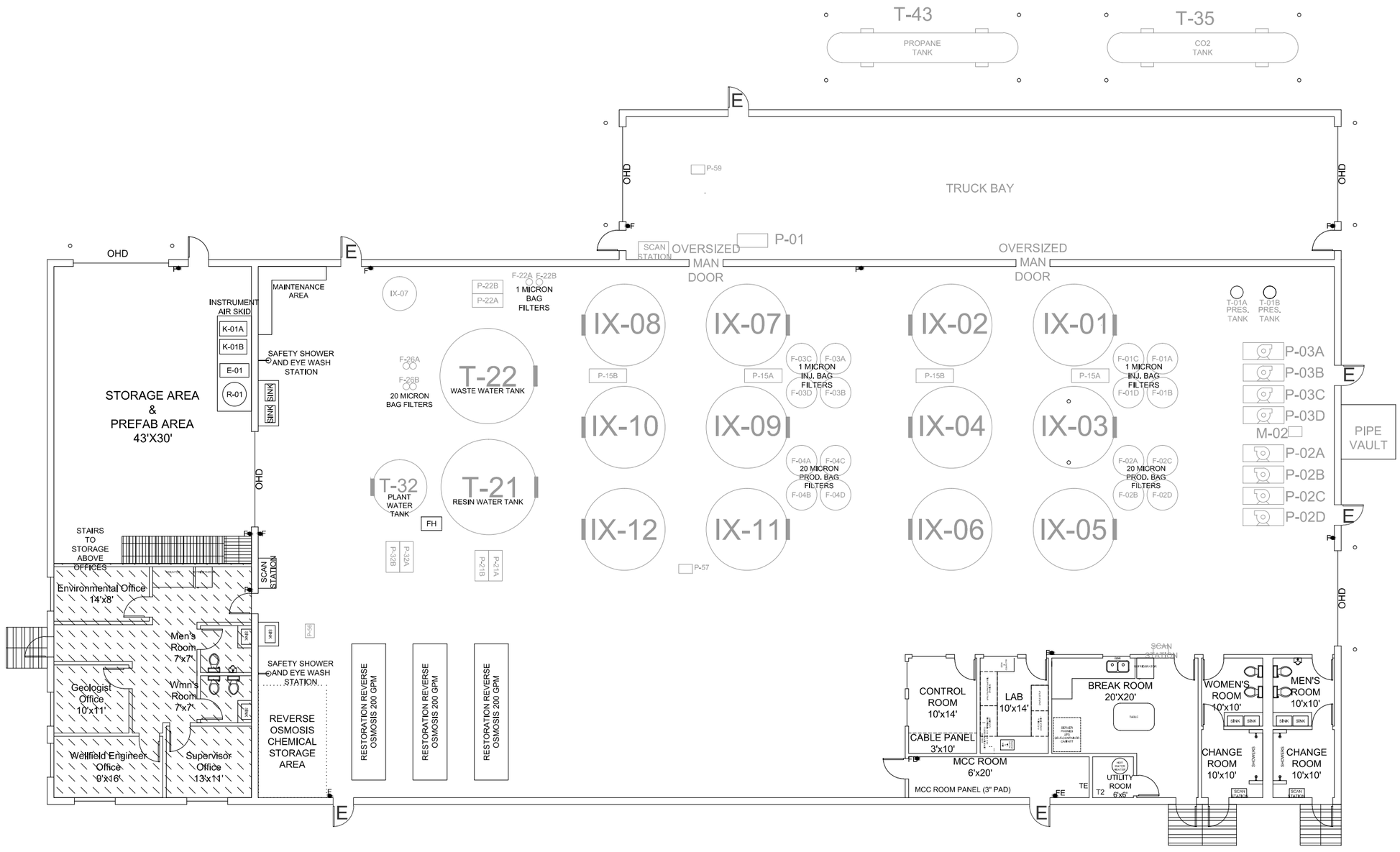
RAI FD-1 (A) (B) (C) Response

Updated facility design information is provided in the revised TR Sections 3 and 4. The revised sections and associated figures provide information on current designs and geotechnical investigation for facilities within the satellite area. The proposed satellite plant layout and site facility layout is provided below.

An evaporation pond design plan will be added as an Addendum 4-B once design is completed. The pond design plan will include:

- Site and material characterization;
- Configuration and location;
- Slope stability analysis;
- Settlement;
- Pond storage/freeboard analysis;
- Surface water diversion design;
- Erosion protection design (embankment slopes and diversion ditches);
- Liner design;
- Leak detection system design;
- Hydrostatic uplift analysis;
- Construction specifications;
- Quality Control testing program (methods and frequencies);
- Operational inspection plans; and
- Closure plans.

In addition, geotechnical investigations will be completed to aid in the development of conceptual layouts of site facilities and to better characterize the expected operating conditions and potential environmental impacts. The results of the geotechnical work will be provided as Addendum 4-C.



DRAWING ISSUE TYPES: PRB = PRE-BID POB = POST-BID IFC = ISSUED FOR CONSTRUCTION POI = POST ISSUED FOR CONSTRUCTION

NO:	DATE	CADD	CHECK	APP'D	ISSUE / REVISION DESCRIPTION	NO:	DATE	CADD	CHECK	APP'D	ISSUE / REVISION DESCRIPTION

uranium one
investing in our energy

NOT FOR CONSTRUCTION REVIEW SET ONLY

TREC, Inc.
Engineering & Environmental Management
www.treccorp.com

BOZEMAN OFFICE
1800 West Koch, Suite 6
Bozeman, MT 59715
Tel: (406) 586-8364
Fax: (406) 522-8460

CASPER OFFICE
900 Werner Court, Suite 150
Casper, WY 82601
Tel: (307) 265-0696
Fax: (307) 265-2498

GREAT FALLS OFFICE
600 Central, Suite 204
Great Falls, MT 59401
Tel: (406) 952-0745

BUTTE OFFICE
521 East Front Street
Butte, MT 59701
Tel: (406) 491-0912

IF THIS BAR DOES NOT EQUAL ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NO.:	CADD:	CHECKED BY:	APPROVED BY:	PLOT DATE:
8201-2013-103	DDJ	AJE	RD	6/6/2013

LUDEMAN SATELLITE PLANT
PLANT FACILITY LAYOUT
LUDEMAN ISR PROJECT
JOHNSON COUNTY, WY

FIGURE

FIG. 1

DRAWING: Z:\CURRENT PROJECTS\8201 URANIUM ONE\8201-2013-103 LUDEMAN POND DESIGN\020-CAD\BASE\8201-2013-103-CDX-01-FACILITY-LAYOUT.DWG

SITE
FENCED AREA
(4.6 ACRES)

LAYDOWN AREA
(1.2 ACRES)

LIQUID PROPANE &
FUEL STORAGE

SOLID 11e.(2)
STORAGE AREA

PARKING

SATELLITE
PLANT

FUTURE
SEPTIC
DRAIN
FIELD

SEPTIC
DRAIN
FIELD

PROPOSED
CULVERT

PROPOSED
ROAD

SURGE POND
FENCED AREA
(2.9 ACRES)

PROPOSED ROAD

SITE
GATED ACCESS

SURGE
POND
(OPTION 1)

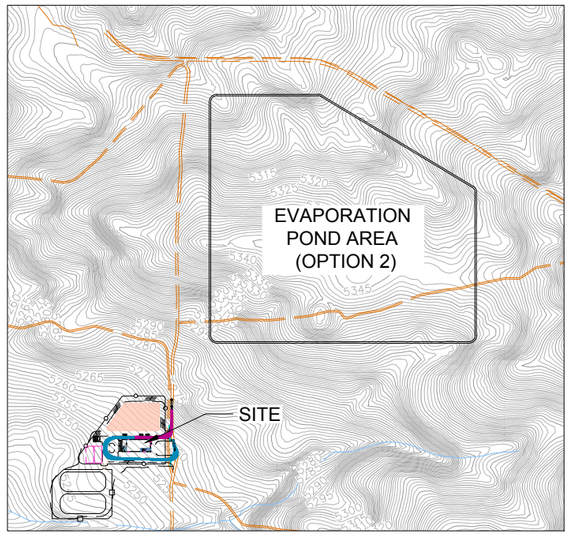
SURGE
POND
(OPTION 1)

EXISTING
DRAINAGE

5275
5255
5250
5245

LEGEND

- 8' HIGH SITE SECURITY FENCE
- 8' HIGH POND GAME FENCE
- LIMITS OF GRADING DISTURBANCE
- SEDIMENT AND EROSION CONTROL BARRIERS
- SITE LAYDOWN AREA
- INBOUND TRUCK PATH (WB-67)
- OUTBOUND TRUCK PATH (WB-67)



EVAPORATION POND INSET
1 INCH = 500 FEET

N

SCALE IN FEET
0 25 50

DRAWING ISSUE TYPES: PRB = PRE-BID POB = POST-BID IFC = ISSUED FOR CONSTRUCTION POI = POST ISSUED FOR CONSTRUCTION

NO:	DATE	CADD	CHECK	APP'D	ISSUE / REVISION DESCRIPTION	NO:	DATE	CADD	CHECK	APP'D	ISSUE / REVISION DESCRIPTION

uranium one™
investing in our energy

NOT FOR CONSTRUCTION REVIEW SET ONLY

TREC, Inc.
Engineering & Environmental Management
www.treccorp.com

BOZEMAN OFFICE
1800 West Koch, Suite 6
Bozeman, MT 59715
Tel: (406) 586-8364
Fax: (406) 522-8460

CASPER OFFICE
900 Werner Court, Suite 150
Casper, WY 82601
Tel: (307) 265-0696
Fax: (307) 265-2498

GREAT FALLS OFFICE
600 Central, Suite 204
Great Falls, MT 59401
Tel: (406) 952-0745

BUTTE OFFICE
521 East Front Street
Butte, MT 59701
Tel: (406) 491-0912

IF THIS BAR DOES NOT EQUAL ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NO.:	CADD:	CHECKED BY:	APPROVED BY:	PLOT DATE:
8201-2013-103	DDJ	AJE	RD	6/6/2013

FIGURE

SITE FACILITY LAYOUT
LUDEMAN ISR PROJECT
URANIUM ONE
JOHNSON COUNTY, WY

FIG. 1

DRAWING: Z:\CURRENT PROJECTS\8201 URANIUM ONE\8201-2013-103 LUDEMAN POND DESIGN\020-CAD\BASE\8201-2013-103-CDX-01-FACILITY-LAYOUT.DWG

RAI FD-2

Please describe the equipment and containment structures used for the resin-transfer process.

Sections 3.2.1 and 4.1.2 of the TR note that a resin-transfer process would be used to move the uranium-loaded resins from the ion-exchange columns to a truck for transport to the Willow Creek Central Processing Plant (CPP). A description of the associated equipment and containment structures is necessary for the NRC to describe the Proposed Action in Section 2 of the EA and to consider mitigation measures in its evaluation of health and safety impacts. This information will support the analysis of these impacts.

RAI FD-2 Response

To assist the NRC in evaluating potential health and safety impacts the following text has been added to Section 3 of the TR:

"Resin transfer will occur within the Satellite facility in a bay designed with containment berms and connection to the plant floor sump which discharges to either the lined liquid 11e.(2) byproduct pond(s) or back into the production circuit in the event of a spill. Transfer to the truck will be facilitated by an approximately six inch diameter hose securable to the truck by a latching mechanism."

RAI FD-3

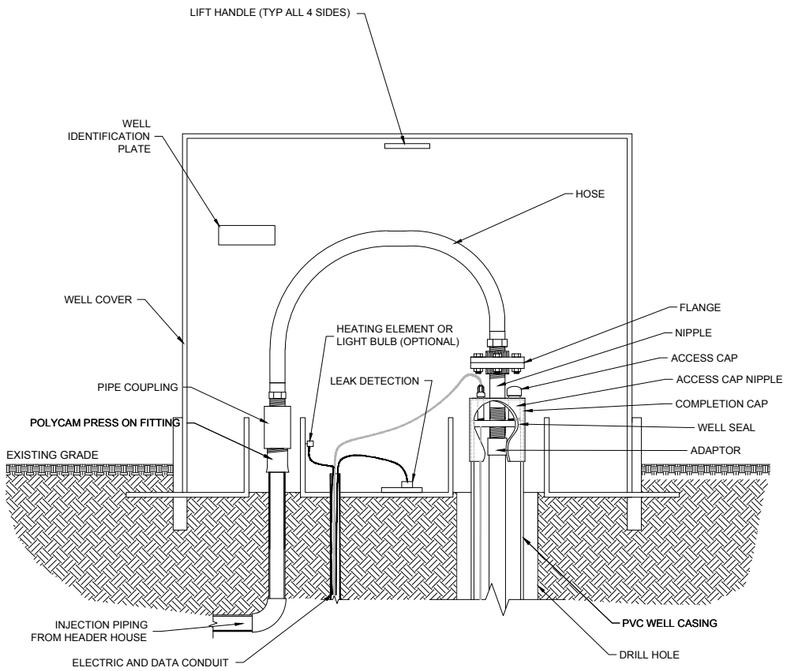
Please provide the design details of a typical header house and wellhead enclosure at a Satellite wellfield.

I*nformation on wellfield structures is necessary for the NRC to evaluate impacts to the underlying soils and to visual and cultural resources. Section 3.1.5 of the TR provides dimensions of the header houses and the number of header houses planned for each Satellite. Section 3.3.1 of the TR refers to "basements" of header houses, but no design information is provided. Section 4.1.2.1 of the TR notes that wellhead enclosures may be vented to reduce radon buildup; however, no information is provided regarding the vents' design. More detailed design information than is provided in Section 5.1 of the ER on the dimensions of wellhead structures, as well as the number of structures at each Satellite, are necessary for the NRC to assess related impacts. Complete information on the design of these structures will support the NRC's impact analysis.*

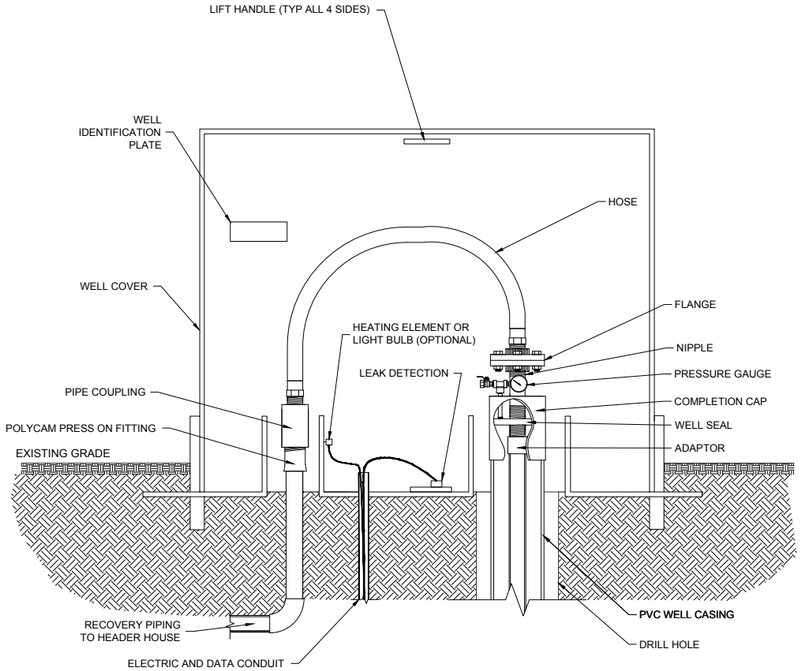
RAI FD-3 Response

Uranium One has addressed the header house design in response to TR RAI-54. Design details including a diagram of a typical header house may be found in the TR RAI-54 response.

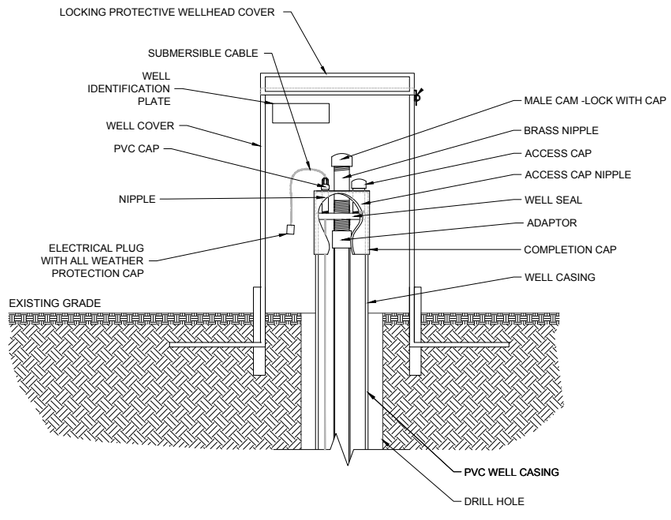
Uranium One is providing a schematic of the typical wellhead enclosures showing design features to support the NRC's impact analysis. At this time Uranium One does not propose to vent the wellhead structures and TR Section 4.1.2.1 will be revised accordingly. The following figure provides wellhead design information and has been added to TR Section 3:



TYPICAL
RECOVERY WELLHEAD



TYPICAL
INJECTION WELLHEAD



TYPICAL
MONITORING WELLHEAD

DRAWING ISSUE TYPES: PRB = PRE-BID POB = POST-BID IFC = ISSUED FOR CONSTRUCTION POI = POST ISSUED FOR CONSTRUCTION

NO:	DATE	CADD	CHECK	APP'D	ISSUE / REVISION DESCRIPTION	NO:	DATE	CADD	CHECK	APP'D	ISSUE / REVISION DESCRIPTION

uranium one™
investing in our energy

NOT FOR CONSTRUCTION REVIEW SET ONLY

TREC, Inc.
Engineering & Environmental Management
www.treccorp.com

BOZEMAN OFFICE
1800 West Koch, Suite 6
Bozeman, MT 59715
Tel: (406) 586-8364
Fax: (406) 522-8460

CASPER OFFICE
900 Werner Court, Suite 150
Casper, WY 82601
Tel: (307) 265-0696
Fax: (307) 265-2498

GREAT FALLS OFFICE
600 Central, Suite 204
Great Falls, MT 59401
Tel: (406) 952-0745

BUTTE OFFICE
521 East Front Street
Butte, MT 59701
Tel: (406) 491-0912

IF THIS BAR DOES NOT EQUAL ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NO.:	CADD:	CHECKED BY:	APPROVED BY:	PLOT DATE:	FIGURE
8201.101	RRU	RMD			2

TYPICAL WELLHEAD DETAILS
LUDEMAN ISR PROJECT

DRAWING: Z:\CURRENT PROJECTS\8201 URANIUM ONE\8201-2013-102 LUDEMAN RAIS\020-CAD\FIGURES\2013-102 WELLHEAD DETAILS.DWG

RAI FD-4

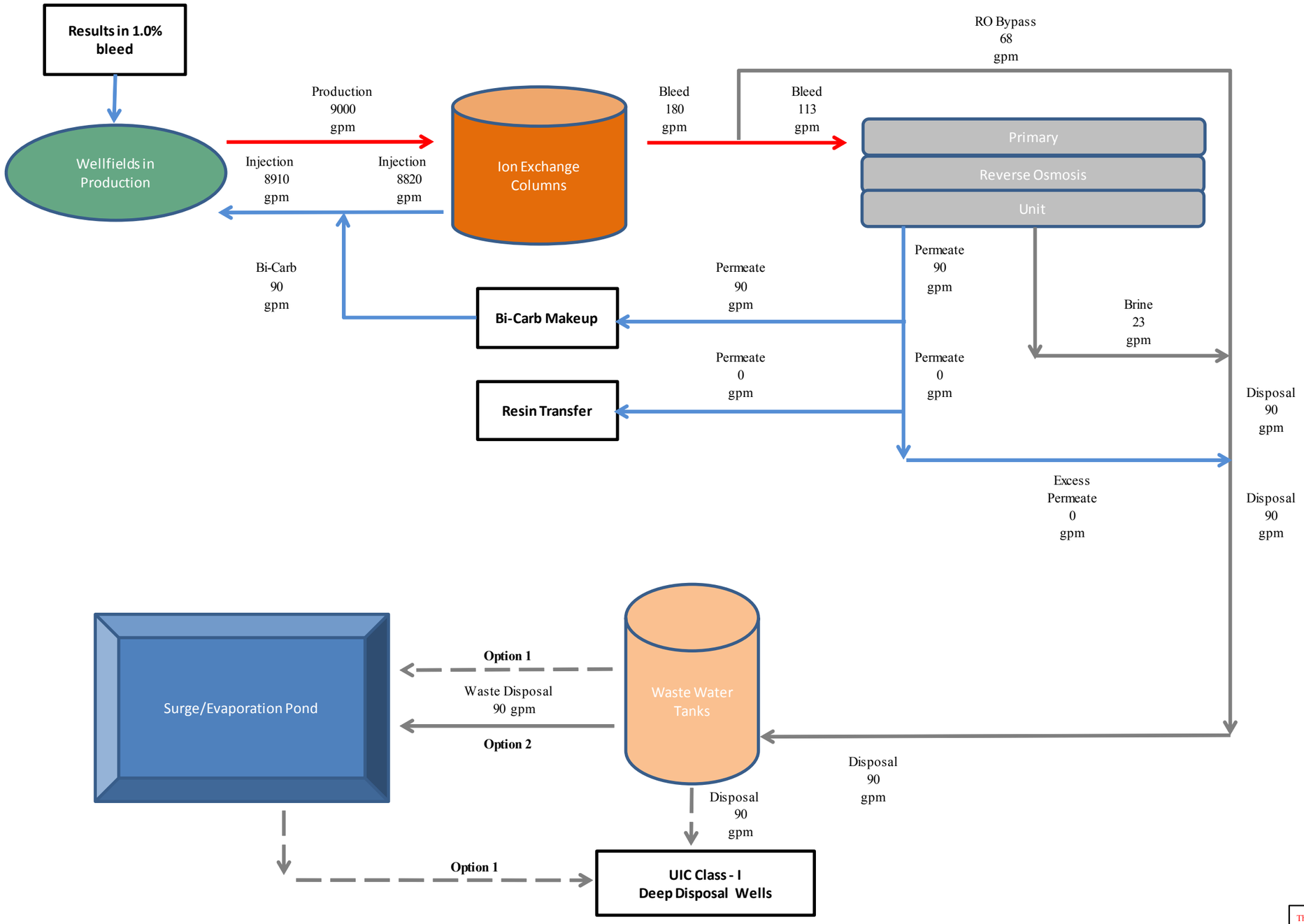
Please provide the water balance for each Project phase at each Satellite facility.

A. *Please modify Figure 3-6 of the TR to include reverse-osmosis treatment of bleed water and the flows of permeate and brine as components of the overall water balance.*
B. *Please address the potential for and volume of excess permeate during the first two years of operation before groundwater restoration begins (shown in Figure 1-4 of the ER) and clarify the proposed disposal method of this waste stream.*

Section 3.1.6.1 of the TR describes the water balance as including injection, recovery, bleed, and process water as well as the respective treatments. The water balance is necessary to evaluate impacts of consumptive use of ground water and the impacts of the management of liquid byproduct wastes. The differences in the water balance among the Satellite areas and during the phases of the Project (construction, operations, restoration, and decommissioning) are not provided by Figures 3-7 and 3-8 and Section 3.1 of the TR. Quantitative data on the water balance will support the NRC's environmental impact analysis.

RAI FD-4 Response

Uranium One has developed new water balance figures and values to both reflect the current water balance flows and provide the NRC quantitative data in support of the environmental impact analysis. The following figures depict the water balance during all phases of the project and have been added to TR Section 4:



Note:Flow rates are approximate and are subject to change.

PREPARED FOR uranium one investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

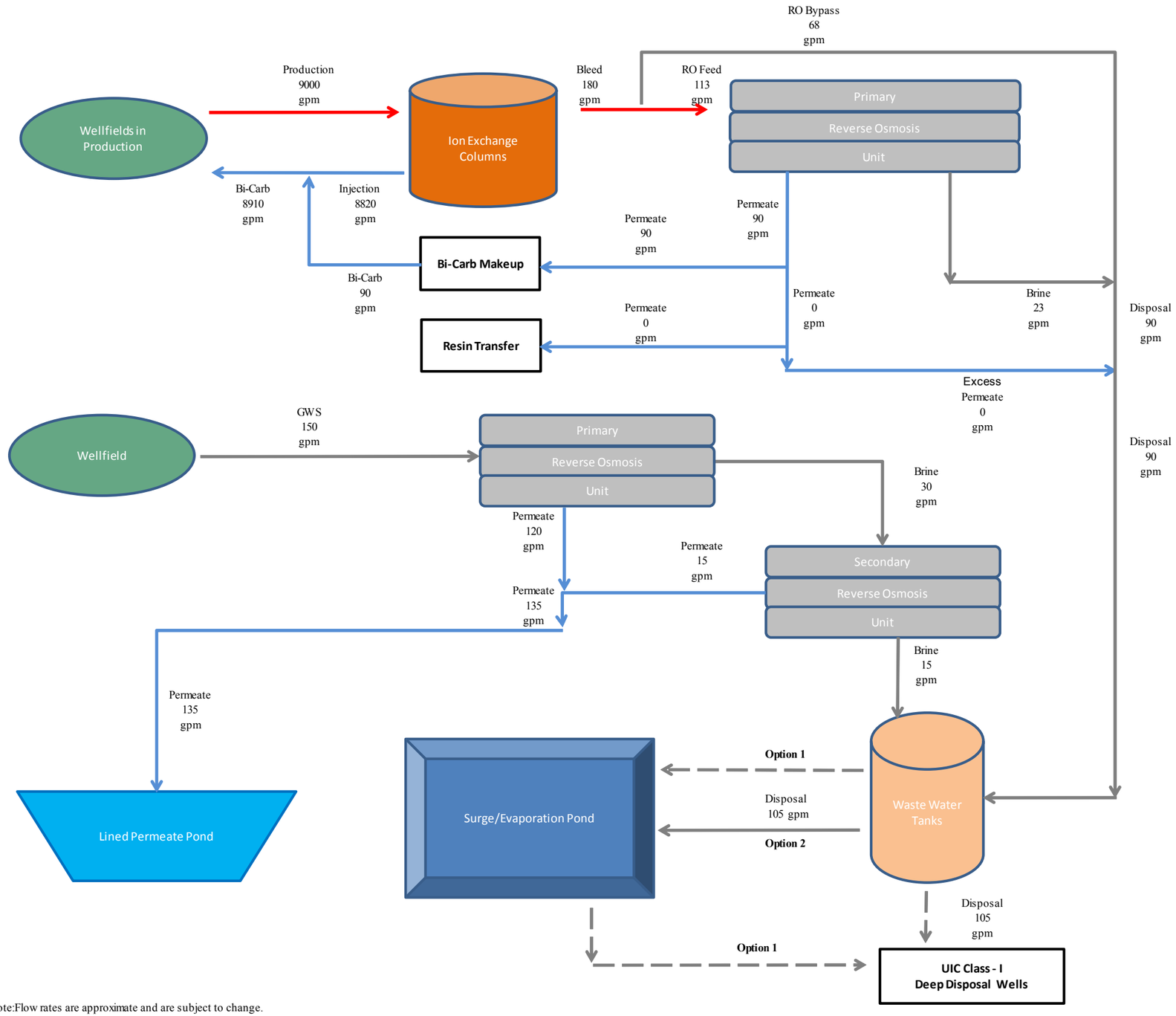
TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.treccorp.com

DRAWN BY: EGS
CHECKED BY: RMD
APPROVED BY: RMD

Production Only

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	EGS	6/20/13	
1	For Submittal	RMD	6/20/13	

Path: O:\WY Projects\8201-2013-102 Infrastructure\Project MXD\Ludeman Water Balance Production Only.mxd



Note:Flow rates are approximate and are subject to change.

This map (or data product) is for assessment and planning purposes only. It is not intended to be used for description, conveyance, authoritative definition of legal boundary, or property title. This is not a survey product.

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_Water_Balance_GW_Sweep.mxd

PREPARED FOR

uranium one
investing in our energy

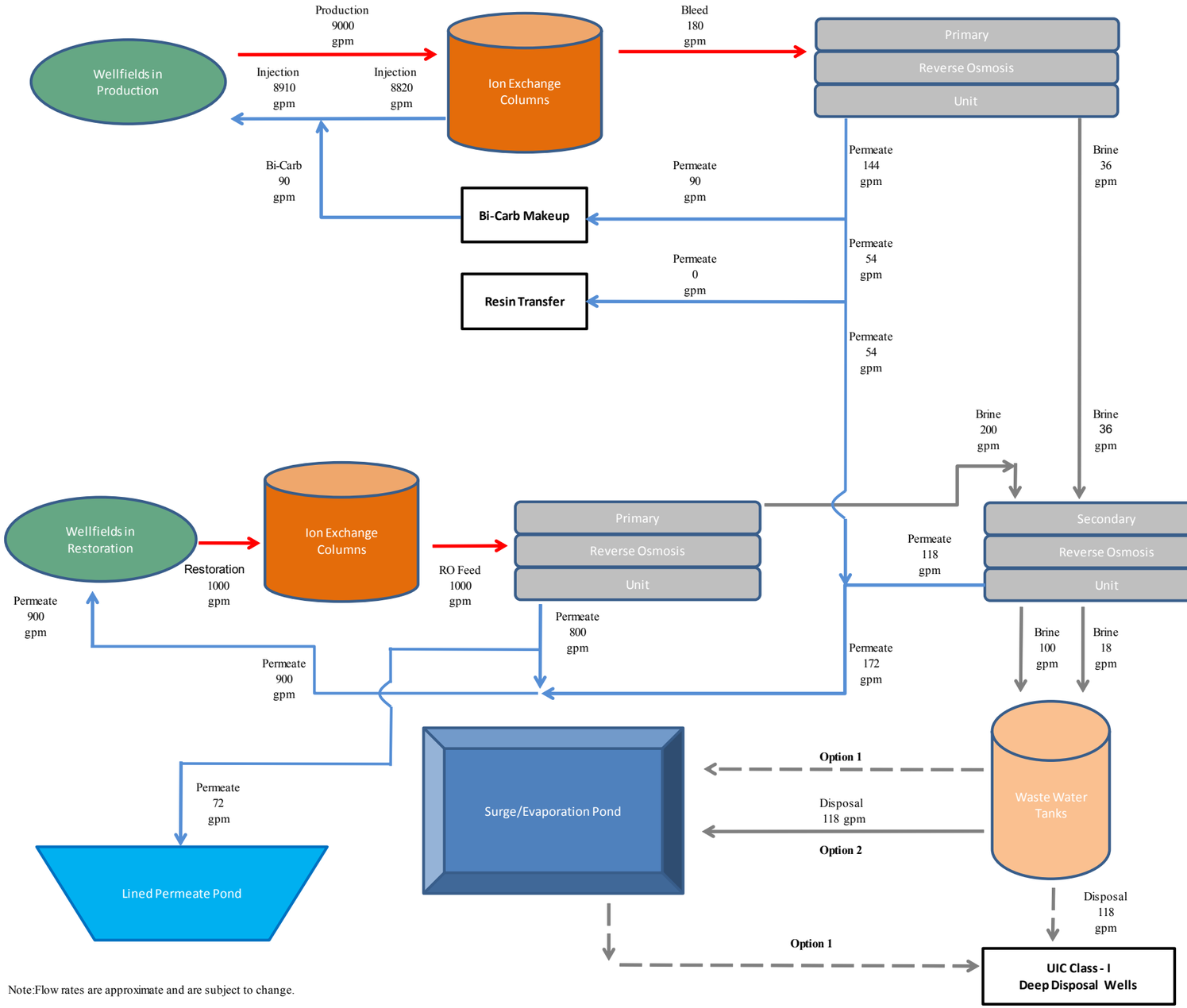
LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.trecorp.com

DRAWN BY: EGS
CHECKED BY: RMD
APPROVED BY: RMD

Production Groundwater Sweep Phase (Optional)

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	EGS	6/20/13	
1	For Submittal	EGS	6/20/13	



Note:Flow rates are approximate and are subject to change.

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_Water_Balance_Production_Restoration.mxd

PREPARED FOR
uranium one
investing in our energy

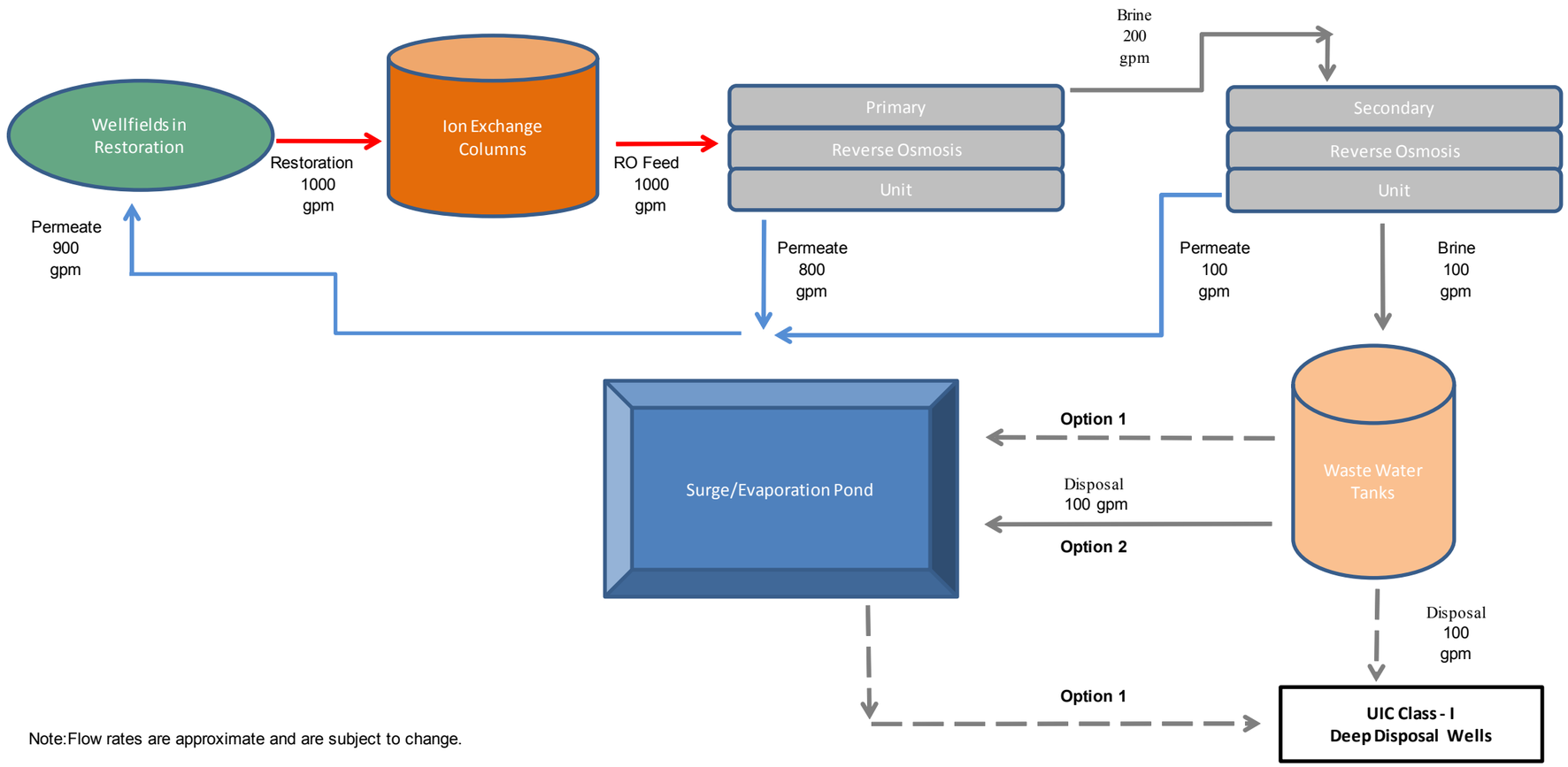
LUDEMAN PROJECT
CONVERSE COUNTY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.trecorp.com

DRAWN BY: EGS
CHECKED BY: RMD
APPROVED BY: RMD

Production Restoration

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	EGS	6/20/13	
1	For Submittal	RMD	6/20/13	



Note:Flow rates are approximate and are subject to change.

PREPARED FOR

uranium one™ investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.treccorp.com

DRAWN BY: EGS
CHECKED BY: RMD
APPROVED BY: RMD

Restoration Only

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Description	EGS	6/20/13	
1	For Submittal	RMD	6/20/13	
2				

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_Water_Balance_Restoration_Only.mxd

Cumulative Impacts

RAI CI-1

Please provide additional information on the cumulative-impact analysis contained in Section 4.14 of the ER.

A. *Please state explicitly the geographic and temporal parameters used to develop the scope of the cumulative-impact assessment.*

B. *Please define the geographic boundaries of the areas that were used in ER Section 4.14 for each resource area to assess the respective cumulative impacts, and please explain why these areas were selected. Explain how these choices compare with the criteria from Section 5 and Appendix F of the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (GEIS) (NUREG-1910 Volume 2, ADAMS Accession No. ML091480188).*

C. *Please identify and describe reasonably foreseeable future actions (RFFA) that could potentially contribute to the impacts of the proposed Ludeman Project in addition to available information regarding the schedule for development of identified actions.*

D. *Please provide quantitative information about each past, present, and reasonably foreseeable action that was used by Uranium One to assess cumulative impacts for each resource area. For example, the volume of waste disposed of by deep-well injection at other ISR facilities located within a defined geographic area must be clarified so that a comparison of the volume projected to be disposed of at the Ludeman Project can be made. For transportation, the traffic to and from other present projects and RFFA within the transportation cumulative-impact geographic area must be quantified. This will allow comparison of the Project's baseline conditions with any traffic increases as a result of the Ludeman Project.*

In order for the NRC to assess the cumulative impacts of past, present, and RFFA under Section 5 of the GEIS, the geographic boundaries (i.e., scope) of each area must be explicitly established for every resource area as noted in Step 2 of the 11-step process established by the Council on Environmental Quality and included as Appendix F to the GEIS. A discussion of RFFA must be included in all cumulative-impact analyses. Analyses of cumulative impacts must be based upon, to the extent possible, quantitative comparisons between the projected impacts from the Ludeman Project and the cumulative impacts of other actions in the defined geographic and temporal scope for

each resource area. Additional detail on the impacts of these actions will assist in the NRC's environmental impact analysis.

RAI CI-1 Response

Uranium One has developed a cumulative impacts section that is now included within the Environmental Report. The cumulative impacts provide sufficient detail to satisfy the criteria outlined by the NRC in the request for additional information above. This cumulative impacts section is included within this response package as Appendix A.

RAI CI-2

Please incorporate the increase in production at the Smith Ranch Project (including Satellite areas) that would result from the renewal of Cameco's license SUA-1548 (the application was submitted to the NRC in February 2012) into the assessment of cumulative impacts.

Cameco's license-renewal application proposes uranium-production increases at the Highland Central Processing Plant and increases in the flow rates at the Gas Hills, North Butte and the Reynolds Ranch Satellites. These increases could result in resource-area cumulative impacts. Additional detail on impacts from these actions will assist in the NRC's environmental impact analysis.

RAI CI-2 Response

Uranium One respectively reminds NRC there is ample historical and current reports at NRC's disposal (NUREG 1910) of the small to moderate impacts on area resources as a result of Powder River Basin ISR operations. It is Uranium One's belief that the combination of the historically documented ISR impacts and the anticipated cumulative impacts described in this application is in fact sufficient to determine the regulatory license requirements. Uranium One's impact analysis includes the addition of a cumulative impact section (ER Section 4) which will be submitted with the revised application.

Land Use

RAI LU-1

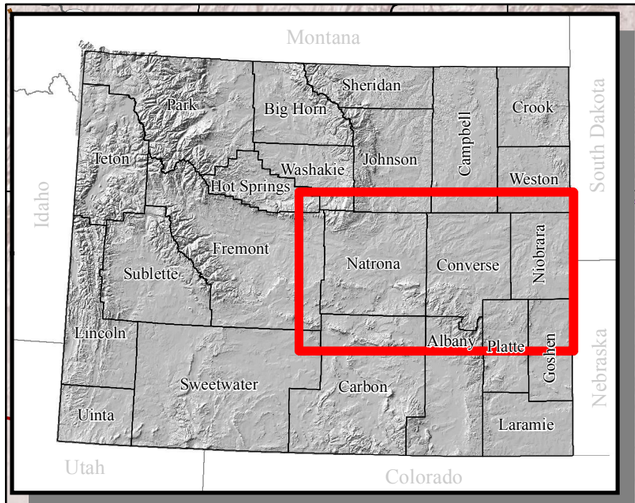
Please clarify the location and use of recreational lands within the Ludeman Project and the surrounding area.

A. *Please provide a map showing the location of recreational areas and trails (e.g., the Child's Cutoff Trail) on the Ludeman Project and in the surrounding area.*
B. *Please specify whether hunting occurs on Federal or State lands within the Project boundaries.*
C. *Please discuss the impacts to recreational areas from the proposed Ludeman Project.*

Section 3.1.2 of the ER lists, but does not map, the location of recreational lands, with the exception of the Bozeman Trail. The ER also identifies U.S. Bureau of Land Management (BLM) and State of Wyoming lands located within the Ludeman Project area, but it does not identify whether hunting presently occurs on these lands. This information is needed for the NRC to accurately characterize existing land uses in the area and to determine whether the proposed project would significantly interfere with or limit access to recreation.

RAI LU-1(A) Response

To better facilitate the NRC's characterization of existing land uses and potential recreational impacts a map of recreational areas and trails in the vicinity of the proposed project will be inserted in ER Section 3 and is provided below.



JOHNSON

CAMPBELL

WESTON

NIOBRARA

CONVERSE

NATRONA

FREMONT

CARBON

ALBANY

PLATTE

GOSHEN

SWEETWATER

Midwest

Edgerton

Teapot Rock

33 Mile Road

Bozeman Trail

Railroad

Hell's Half Acre

Bridger Trail

Bar Nunn

Casper

Fort Caspar

Edness K. Wilkins State Park

Lee McCune Braille Trail

Beartrap Meadow County Park

Casper Mountain County Park

Rolling Hills

Glenrock

Child's Cutoff

Fort Fetterman

Converse County Park

Ayers Natural Bridge

Douglas

Lance Creek Fossil Area

Lost Springs

Manville

Lusk

Van Tassell

Texas Trail

Glendo State Park

Glendo

Chevenne-Deadwood State Road

Guernsey

Hartville

Fort Laramie

Laramie Peak Trail

Rock Creek - Fort Fetterman Stage Road

Split Rock

Devil's Gate

Bairoil

Miracle Mile

PREPARED FOR

uranium one
investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.treccorp.com

Legend

- Ludeman Project Boundary
- 50 Mile Review Boundary
- County Line
- Interstate
- Highway
- Major Road
- Local Road
- Scenic Highways & Byways
- Thunder Basin National Grassland
- National Forest
- Historic Forts
- Historic Trails
- Hiking Trails
- City, County & State Parks
- Natural Areas

1:750,000
0 5 10 15 20 Miles

N W E S

DRAWN BY: CAT
CHECKED BY: RMD
APPROVED BY: RMD

Recreational Areas: 50 Mile Review

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	CAT	4/4/13	6
1	For Submittal	RMD	6/20/13	

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_Rec_Areas.mxd

RAI LU-1(B) Response

The following language has been added to ER Sec. 3:

"State Lands within the proposed project Area are not readily accessible to members of the hunting public as access would have to be gained through private lands. There may be some limited hunting opportunity on Federal Lands that are now excluded from the permit area, but these also are extremely limited in access as the majority of land ownership is private."

RAI LU-1(C) Response

The following language is located in ER Sec. 4:

"Restrictions on Recreational Activities

Currently, the primary recreational activity in the vicinity of the proposed project is hunting that occurs by permission on private lands, which will be restricted to protect workers. Hunting will be restricted within the proposed project area on private lands for the life of the project. There is no public access to private lands and limited recreation opportunity on State of Wyoming lands within the proposed project or adjacent areas. Therefore, the potential impact on such land uses due to the restricted access areas is anticipated to be small in this regard. There are no other recreational impacts anticipated. All federal lands administered by the BLM have been excluded from the permitted project area."

RAI LU-2

Please clarify the total areas that would be disturbed by proposed project facilities, wellfields, and roads associated with each Satellite.

A. *Please clarify the amount of land that would be disturbed by each Satellite facility and its associated wellfields.*
B. *Please clarify the correct width and length of each access road on the Ludeman Project and within the two-mile buffer zone, as well as the areas disturbed by each road at each Satellite.*
C. *Please clarify whether fences are included as part of the acreage of the disturbed areas or provide the areas of disturbance for the fences at each Satellite.*

The ER contains discrepancies (noted in the table below) in the road widths and the area of disturbance associated with the various Project facilities and wellfields. In addition, it is not clear what is included in various calculations of disturbance (e.g., infrastructure, wellfields, fences, surface impoundments) or whether disturbed area includes all of the acreage within a fenced area or just some part of it.

Resources that could be impacted by land disturbances include land use, soils, ecology, visual resources, cultural resources, and air quality as well as public and occupational health and safety. An accurate description of all Project-related land disturbances is needed for the NRC to accurately identify and evaluate potential direct and cumulative impacts that could result from the proposed Ludeman Project.

RAI LU-2 (A) (B) (C) Response

Disturbance calculation discrepancies throughout the document have been revised and a table describing the disturbance calculations will be added to Section 4 of the ER and Section 7 of the TR to assist the NRC in accurately identifying and evaluating potential direct and cumulative impacts. The disturbance calculation table is shown below depicting the satellite facility and associated wellfields, lengths and widths of access roads, and fenced areas.

Table 2: Disturbance Calculations

Component	Dimensions		Area of Disturbance		Project Acres 18,850
	Width (*ft*)	Length (*ft*)	ft^2	Acres	(%)
Satellite Area					
Sattellite Building	80	190	15,200	0.35	0.002
Laydown/Parking/Septic Area				4.25	0.023
Fenced Area				4.6	0.02
Liquid 11e.(2) Byproduct: Surge Ponds / Deep Disposal Wells (Option 1)					
Surge Pond Surface Area (2 total)	130	300	78,000	1.8	0.010
Surge Pond Fenced Area				2.9	0.02
Deep Disposal Well pipe lines	8	21, 301	170,411	3.9	0.02
Deep Disposal Well Pad (6 total)				6	0.032
Liquid 11e.(2) Byproduct: Evaporation Ponds (Option 2)					
Evaporation Pond Surface Area				56	0.30
Fenced Area				60	0.32
Roads					
Secondary Access (outside wellfields)	12	76,976	923,712	21.2	0.11
Wellfield Roads (within wellfields)	12	53,745	644,940	14.8	0.08
Trunk lines / Pipe Lines					
Main Trunk Lines (outside wellfields)	25	81,775	2,044,375	46.9	0.25
Booster Stations					
Building Area (3 total)	20	30	1,800	0.04	0.000
Total Booster Station Disturbance	40	50	6,000	0.14	0.001
Wellfield Areas					
Wellfield (All area within wellfields - includes roads, piping, structures, etc.)				764	4.05
Fenced Wellfield Area				1,222	6.48
Monitor Ring Wells (232 total)	7	20	34, 300	1	0.004
Header Houses (87 total)	10	20	17,400	0.4	0.002
				Acres	% of Project
Total Controlled Area (Option 1)				**1,236**	**6.55**
Total Controlled Area (Option 2)				**1,287**	**6.83**
Total Disturbance Area (Option 1)				**859**	**4.55**
Total Disturbance Area (Option 2)				**909**	**4.82**

RAI LU-3

Please clarify the description of past, existing, and proposed energy projects in the vicinity of the Ludeman Project area.

A. *Please identify any renewable energy facilities (e.g., wind farms) in the vicinity of the Project area.*
B. *Please identify past, existing, proposed, and/or pending oil and gas operations in the Project vicinity.*

A complete identification of past, present, and RFFA related to energy development in the vicinity of the Ludeman Project area is needed by the NRC to accurately characterize nearby land use, to evaluate potential impacts from the Ludeman Project, and to assess cumulative impacts. For example, based on an examination of Converse County maps and land-use information, two existing wind farms are located northwest of Glenrock, and two wind farms were recently proposed (2011) southwest of Glenrock. In addition, the Powder River Basin has a history of oil and gas production, and hydrofracking of the Niobrara Formation within the Ludeman Project has recently been implemented. The energy activities described should include exploration, production, and transportation to provide a complete picture of energy-related land use in the vicinity surrounding the Project.

RAI LU-3 (A) (B) Response

This RAI has been resolved through the response to RAI CI-1 located in Appendix A of this document as this question is in regards to cumulative impacts. The response to RAI CI-1 describes both renewable energy facilities and oil and gas operations in the vicinity of the Ludeman Project area. The response to TR RAI-10 also discusses oil and gas activities in the vicinity and includes a table and map of oil/gas wells within the review area.

RAI LU-4

Please clarify the number of residences in the Negley Subdivision.

The presence of the Negley residential subdivision, which is contiguous to the northwest Project boundary and is located within the two-mile buffer zone, is not mentioned in the description of land use or in the evaluation of impacts presented in Section 4.1 of the ER. Although the locations of residences are mapped on Figure 3.1-2, the number of actual residences is not identified. The report entitled Assessment of the Hydraulic Relationship of the Negley Subdivision to the Ludeman ISR Uranium Project indicates that the Subdivision consists of approximately 30 individual landowners and notes the presence of 22 wells, but it does not specify the number of residences. The number of residences is needed for the NRC to accurately characterize existing, adjacent land use and to evaluate potential impacts to residential lands.

RAI LU-4 Response

Although the residences within the Negley subdivision were identified within the original application, Uranium One has added another specific reference to assist the NRC in accurately characterizing existing adjacent land use. The following language was added to ER Sec. 3.1.2 to assist the NRC in identifying the current number of residences:

"The Negley Subdivision currently consists of 13 residences (June, 2013)."

RAI LU-5

Please provide detail on the number of acres to be taken out of agricultural production.

A. *Please provide the number of acres that would be taken out of agricultural production for each Satellite facility and its associated wellfields for each of the four Project phases.*
B. *Please describe the locations within the Ludeman Project where agricultural land would be removed from production.*

Table 2-2 of the ER states up to eight acres would be taken out of agricultural production (i.e., livestock grazing) under the Proposed Action, but no detail is provided. Information on changes in land use is necessary to accurately assess impacts to land use, socioeconomics, and cultural resources.

RAI LU-5 (A) Response

A table describing the disturbance locations and calculations will be added to Section 4 of the ER and Section 7 of the TR. The disturbance calculation table is shown in the LU-2 response. While there are no croplands within the proposed project area, the majority of the area is considered grazing lands and portions of this will be temporarily restricted by the project as areas will be fenced for safety purposes. Upon project completion and restoration the majority of these areas will be returned to grazing lands. As this project is developed in stages and wellfields will go into and out of development, production, restoration, and reclamation over the life of the proposed project (as illustrated in the project schedule) it is not practicable to produce complex matrixes of acreages impacted during each month over multiple years. As the total amount of grazing lands impacted is only a small portion of the entire project area the NRC may use the entire cumulative area impacted over the life of the project during the entire estimated life of the project if they so wish. In doing so, even if the maximum estimated land use changes occur over the life of the project the potential impacts would be minor as to neither destabilize nor noticeably alter any important attribute of the resource.

RAI LU-5 (B) Response

The areas to be fenced (and thereby removed from grazing production) are shown on Figure 1 of this Response Package. The calculated acreages for these areas is included within Table 2 as shown in the LU-2 response.

Transportation

RAI TR-1

A. Please provide additional information regarding the design of the primary access roads (e.g., pavement widths, design-basis speeds, current conditions, and current uses), other than State highways.

B. Please provide information regarding the entity that currently maintains each of these roads (e.g., the county or private landowner) and traffic count data for all of the roads that would be used as the primary access route.

Section 3.2.1 of the ER includes a statement that county and local roads would be used to access the Ludeman Project. Section 2.1.2 of the TR references paved roads used as access to different portions of the Ludeman Project. Information is provided about State highways; however, additional information is needed regarding the other public roads that would be used for the Ludeman Project in order for the NRC to evaluate impacts to the road system and to other resources due to proposed changes to the road system.

RAI TR-1(A) Response

To assist the NRC in evaluating potential transportation impacts resulting from the Proposed Action and also characterize existing infrastructure Uranium One has provided additional details below and within ER Section 3.2 regarding primary access roads (other than state highways). The language added is as follows:

"There is one Converse County Road within the proposed project boundary. County Road 26 (Leuenberger Lane) bisects the western half of the property in a north-south direction. This is an improved, unpaved all-weather road. Converse County is responsible for the maintenance of county roads though Uranium One will maintain contact with the county government to assist with maintenance as necessary.

Primary access to the satellite facility will occur on a private, un-named road. This road is an existing improved, unpaved all-weather road approximately 30 feet across recently upgraded to this status as it also serves as the primary access to a gas plant. This road will not require improvements to serve as the primary access for the Satellite primary access nor will it place additional burden on public road maintenance as it is a private road as mentioned previously."

RAI TR-1(B) Response

Uranium One appreciates the NRC would like to characterize existing traffic volumes and the potential impacts that increases in traffic from the proposed project may incur. Uranium One would also gladly provide the NRC with traffic count data for the Leuenberger Lane county road and the private access road should it be available, However, these are very rural and infrequently traveled roads with no traffic count data available.

Uranium One can, however, provide the NRC with the entities responsible for maintenance of these roads. The Leuenberger Lane county road is maintained by Converse County, The private access road that will function as the primary access to the satellite facility is maintained privately.

RAI TR-2

Please explain the traffic-count data for State Highway 95 in the vicinity of the Ludeman Project area.

The TR and ER appear to cite conflicting traffic data for the two State roads that would be used to access the Ludeman Project area, as shown in the table below. Existing traffic data is required to evaluate potential impacts to area roads resulting from Ludeman Project-related traffic.

RAI TR-2 Response

Uranium One has accessed the most current and complete traffic count data available for the State Highways in the vicinity of the Ludeman Project area and provides the information both within this response and within the transportation baseline information (ER Section 3.2) in the license application.

The following traffic count section and accompanying tables were added as Section 3.2.7 (Traffic):

"As noted in NUREG-1910 (GEIS Sec. 3.3.2), there are several automated traffic counter locations operated by the Wyoming Department of Transportation (WYDOT) in the proposed project region shown in Figure 3.2-1. Data obtained from WYDOT can be used as a baseline and provide insight into the variations in traffic volumes. When projecting potential future traffic counts, WYDOT utilizes a 1.5% annual increase. Tables 3.2-1 and 3.2-2 depict recent traffic count data and projected traffic counts respectively. The most recent Average Annual Daily Traffic (AADT) data available for each site is as follows (WYDOT 2013). *(Note: 2012 data was not available for all traffic counter locations; where available, the 2012 data is utilized)*

For the routine traffic routes in and out of the proposed project area, the following WYDOT traffic data is appropriate:

- WYDOT counter east of Glenrock on State Highway 95 at milepost 2.8 (Rolling Hills); the AADT for 2011 was 1,429 which was down slightly (0.8%) from 1,441 in 2010;

- WYDOT counter west of Douglas on State Highway 93 at milepost 8.8 (Orpha); the AADT for 2011 was 335 which was down slightly (0.8%) from 388 in 2010; and
- WYDOT counter east of Casper on I-25N at the Converse/Natrona County line at milepost 170.2; the AADT for 2012 was 8,838 which was up (8.1%) from 8,173 in 2011.

For the proposed primary traffic route for the resin shipments to and from the Ludeman site to the Willow Creek processing facilities, the following WYDOT traffic data is appropriate:

- WYDOT counter east of Glenrock on State Highway 95 at milepost 2.8 (Rolling Hills); the AADT for 2011 was 1,429 which was down slightly (0.8%) from 1,441 in 2010;
- WYDOT counter east of Casper on US. 20/26/87 (Old Glenrock Hwy) at milepost 180.5; the AADT for 2012 was 2,765 which was up slightly (2.4%) from 2,700 in 2011;
- WYDOT counter north of Casper on I-25N at milepost 194.3; the AADT for 2012 was 6,134 which was up (6.5%) from 5,761 in 2011; and
- WYDOT counter east of Midwest on State Highway 387 at milepost 139.9 (Pine Tree Junction); the AADT in 2011 was 951 which was up (15%) from 827 in 2010.

For the potential 11e.(2) solid byproduct shipments from the proposed Ludeman Project to the Shirley Basin disposal facility, the following WYDOT traffic data is appropriate:

- WYDOT counter east of Glenrock on State Highway 95 at milepost 2.8 (Rolling Hills); the AADT for 2011 was 1,429 which was down slightly (0.8%) from 1,441 in 2010;
- WYDOT counter east of Casper on US 20/26/87 (Old Glenrock Hwy) at milepost 180.5; the AADT for 2012 was 2,765 which was up slightly (2.4%) from 2,700 in 2011; and
- WYDOT counter on State Highway 220 southwest of Casper at milepost 97.3; the AADT for 2011 was 3,567 which was down slightly (0.3%) from 3,579 in 2010.

Table 3: WYDOT Traffic Counts

Annual Average Daily Traffic (AADT) Traffic Counter Location	2011 AADT (vehicles/day)	2010 AADT (vehicles/day)	2009 AADT (vehicles/day)
State Hwy 93 (milepost 8.8)	335	338	342
State Hwy 95 (milepost 2.8)	1,429	1,441	1,459
State Hwy 387 (milepost 139.9)	951	827	788
U.S. Hwy 18 (milepost 0.46)	2,234	2,201	2,149
U.S. Hwy 20/26/87 (Old Glenrock Hwy) (milepost 180.5)	2,700	2,770	2,696
Interstate 25 (Casper-East) (milepost 170.2)	8,173	8,049	7,768
Interstate 25 (Casper-North) (milepost 194.3)	5,761	5,502	5,338
State Hwy 220 (Casper-Southwest) (milepost 97.3)	3,567	3,579	n/a

Source: WYDOT 2013

Table 4: WYDOT Projected Traffic Counts

WYDOT Traffic Counter Locations	2010 (vehicles/day)	2015 (vehicles/day)	2020 (vehicles/day)	2030 (vehicles/day)
State Hwy 93 (milepost 8.8)	338	364	392	455
State Hwy 95 (milepost 2.8)	1,441	1,553	1,673	1,942
State Hwy 387 (milepost139.9)	827	892	962	1,117
U.S. Hwy 18 (milepost 0.46)	2,201	2,373	2,558	2,970
U.S. Hwy 20/26/87 (milepost 180.5)	2,770	2,983	3,213	3,730
Interstate 25 (milepost 170.2)	8,049	8,674	9,346	10,842
Interstate 25 (milepost 194.3)	5,502	5,929	6,389	7,412
State Hwy 220 (milepost 97.3)	3,579	3,858	4,159	4,829

Source: WYDOT 2013 utilizing 1.5% annual increase

RAI TR-3

Please provide additional information on anticipated traffic counts during each phase of the project for every Satellite.

Transportation impacts must be evaluated for each phase of the Ludeman Project at each Satellite. Therefore, the estimated number of trips made by employees and trips for shipments and deliveries are required for each of the four Project phases (i.e., construction, operation, aquifer restoration, and decommissioning). For each of the phases at each Satellite, please provide the number of workers commuting to the Satellite each day; the number of supply or other deliveries; and the anticipated number of loaded-resin, byproduct material, solid-waste, and other shipments. This data is necessary for the NRC to evaluate potential impacts to the roads that would be used by Project-related traffic.

RAI TR-3 Response

Uranium One has included additional transportation discussion in ER Section 4.2 that addresses potential impacts. This new discussion (shown below) considers the project phases and traffic types during project phases sufficient for a conceptual understanding of potential traffic related impacts required for assessment by the NRC for licensing purposes.

"POTENTIAL TRANSPORTATION IMPACTS

The following sections describe the potential impacts during activities associated with each phase of the Proposed Action, including construction of access roads and transportation of materials and workers to and from the proposed project area.

It is anticipated that the Proposed Action will not have noticeable impact to local transportation systems.

Proposed Action

The primary transportation routes to the proposed project area from nearby communities are State Highways 93 and 95. These highways connect the proposed project area to regional population and economic centers along I-25N southwest and southeast of the project area.

State Highway 93 connects the eastern edge of the proposed project area to the community of Douglas which is located approximately 17 miles to the southeast. State Highway 95 connects the western edge of the proposed project area to the community of Glenrock which is located approximately 12 miles to the southwest. Each of these communities contains interchanges for access to I-25N. The community of Casper, considered a regional hub for transportation, is located 22 miles west of Glenrock along I-25N. County Road 26 (Leuenberger Lane) bisects the western half of the proposed project area in a north-south direction. There are numerous unnamed private access roads off State Highways 93 and 95 into the proposed project area.

Potential Construction Impacts

The limited duration of construction activities suggest potential impacts will be minimal. Any temporary dust and noise impacts to nearby receptors or to Uranium One's staff or contractors are anticipated to be small. Mitigation measures for potential construction impacts can be reviewed in Section 6 of this ER.

Access Road Construction

State Highways 95 and 93 traverse the proposed project area and are considered the primary access roads to most of the proposed project Area. Construction materials will be delivered to the site on these highways. These same state highways provide access for agricultural and oil and gas activities in the area. The proposed location of the Satellite Plant is approximately 0.5 miles from State Highway 95 on an unnamed but improved gravel road that services a gas facility. This road will not require additional improvements to allow access for Satellite Plant construction and operations.

Secondary access roads will include roads constructed between the Satellite Plant and wellfields will be 12 to 20 foot wide gravel surfaced roads that will allow easy movement of opposing vehicles, at low speeds, on an all-weather surface. Secondary access roads will generally follow existing topography, and little cut or fill will be required for their construction. Temporary tertiary access to wellfields and monitor wells will generally be un-constructed; two-track trails approximately 8 to 10 feet wide. Temporary tertiary access will typically not have any surfacing and will generally have no cut or fill associated with their construction. As these roadways become unused they will be

reclaimed to their natural condition by ripping the soil, as needed, to reduce compaction and re-seeding.

Access road construction activities will have minor and temporary air quality impacts, which are discussed in detail in TR Section 4.6. The potential transportation impacts of these minor improvements are anticipated to be small and consistent with the findings of NUREG 1910.

Traffic

The projected Wyoming Department of Transportation (WYDOT) Annual Average of Daily Traffic (AADT) volume data for State Highways 93 and 95 during the all phases of the project are presented in Table 3.2-2 of this ER. The projected increases in vehicle traffic resulting from the Proposed Action are calculated for each local highway segment used for access to the proposed project. For future projection purposes, WYDOT uses a 1.5 percent annual increase. The projected AADT in 2015 at milepost 8.8 on Highway 93 at Orpha (ER Figure 3.2-1) is 364 vehicles including 38 heavy-duty trucks or 10.4 percent of the total. The AADT in 2015 at milepost 2.8 on Highway 95 at Rolling Hills (ER Figure 3.2-1) is 1,553 vehicles including 75 heavy-duty trucks or 4.8 percent of the total.

This vehicle traffic increase calculation addresses the maximum amount of traffic that could be expected for each local highway. Truck traffic includes trucks that haul heavy equipment (cranes, bulldozers, graders, track hoes, trenchers, front-end loaders, etc.) to the construction site, and haul the facilities and equipment during the construction phase of the project. The maximum daily vehicle traffic volume related to the proposed project is projected to be approximately 75 vehicles or 20.6 percent of the projected total at Orpha, and approximately 4.8 percent of the projected total number of vehicles at Rolling Hills. The average daily estimated increase in auto traffic is based on the workforce level, which varies depending upon the phase of the project. Vehicle traffic includes passenger vehicles, light duty trucks, other personal or work vehicles, and commercial delivery and pickup vehicles to and from the proposed project site during construction and operation.

Potential Operations Impacts

All shipments will be transported by appropriately licensed transporters and subject to both federal (NRC 10 CFR Part 71; DOT 49 CFR Part 173) and state transportation regulations. The following sections identify the materials that will be shipped during operations. Potentially, up to 75 vehicles will be traveling to and from the site on a daily basis, approximately 15 of which will be for the delivery of packages and office supplies, process related fuels and chemicals.

Transportation of regulated materials to and from the proposed project can be classified as follows:

- Shipments of process chemicals or fuel from suppliers to the site;
- Shipments of non-11e.(2) byproduct material; and
- Shipment of solid 11e.(2) byproduct material from the site to a licensed disposal facility. Uranium One currently has a signed agreement with the NRC-approved Shirley Basin disposal facility for SUA-1341..

Process Chemicals and Fuel Shipment

Periodic bulk chemical, fuel, and supply deliveries will be made to the Satellite Plant throughout the operational life of the project. Transportation of process chemicals and fuel will follow all applicable DOT hazardous material shipping regulations and requirements. Truck shipments of process chemicals to the proposed project site could result in potential local environmental impacts if trucks are involved in an accident. In the unlikely case of an accident, all spills will be immediately remediated within the affected area. The process chemicals used at an ISR facility in truck load quantities are common to many industries and present no potentially abnormal risk. Types of deliveries potentially will include carbon dioxide, oxygen, soda ash and fuel.

Transportation accidents involving fuel (e.g. diesel, gasoline, and propane) shipment also present potential environmental impacts. During operation it is estimated that approximately one shipment of fuel will be transported to the site each week.. Fuel will be transported from a nearby town such as Glenrock or Douglas which will minimize the trip distance and keep the probability of an accident very low.

Since most of the material could be removed, no significant potential long-term environmental impacts will result from an accident involving the process chemicals.

Loaded Resin Shipment

Uranium-loaded IX resin would be transported in tanker trailers with 500 ft^3 capacity to Uranium One's Willow Creek processing facilities in Johnson County, Wyoming. Based on a typical concentration of 50 g/L U_3O_8 (ISR GEIS Section 4.2.2.2), each truckload of uranium-loaded IX resin will contain approximately 1,500 pounds U_3O_8. Based on the Satellite Plant and Willow Creek processing rates, a potential of up to two uranium-loaded IX resin shipments would be made to the facility each day.

Solid 11e.(2) Byproduct Material Shipment

All solid 11e.(2) byproduct material including unusable contaminated equipment, filters, spent resin, etc. generated during operations will be transported off-site to a licensed disposal facility. Because of the low levels of radioactivity involved, these shipments are considered to have minimal potential environmental impact in the event of an accident. Shipments are generally made in bulk in sealed roll-off containers in accordance with the applicable DOT hazardous materials shipping provisions. Such requirements are provided in 10 CFR 71.5 (Transportation of Licensed Materials).

In accordance with NRC License SUA-1341 a disposal agreement is in place with the Pathfinder Mines Corp. (PMC) Shirley Basin facility. Prior to operations that agreement will be updated to include the proposed project. The Shirley Basin facility is located approximately 100 highway miles from the proposed project. The expected transport route to the PMC facility will be west on State Highway 95, west on U.S. Highway 18/20 (Old Glenrock Hwy), southwest on State Highway 220, and south on State Highway 487 to the PMC facility access road. The expected annual byproduct material production rate for the proposed project is approximately 250 cubic yards. Based on the use of covered roll-off containers with a nominal capacity of 20 cubic yards, Uranium One expects 12 to 13 byproduct material shipments per year. This level of traffic would not significantly increase the project related traffic compared to the estimated commuting and truck traffic associated with the project.

Solid Non-11e.(2) Byproduct Material Shipment

Transportation of nonradioactive solid waste will be made using a contract waste hauling company to a licensed disposal facility. The preferred alternative disposal site is the Glenrock disposal facility located in Glenrock, Wyoming due to its proximity to the proposed project site. The Glenrock facility is located approximately 10 highway miles from the proposed project southwest on State Highway 95. The expected annual nonradioactive solid waste production rate for the proposed project is 2,000 cubic yards. Typical contract waste haulage vehicles range in capacity from 20 to 40 cubic yards. Based on a conservative assumption of the use of haulage vehicles with a nominal capacity of 30 cubic yards, Uranium One expects 100 nonradioactive solid waste shipments per year, or an average of approximately 2 shipments per week. This level of traffic would not significantly increase the project-related traffic compared to the estimated commuting and truck traffic associated with the project.

Hazardous Waste Shipment

Uranium One expects that the proposed project will be classified as a conditionally exempt small quantity generator (CESQG) by WDEQ/SHWD. In this classification the proposed project facility will generate less than 220 lbs of hazardous waste in a calendar year, generate less than 2.2 lbs of acute hazardous waste in a month, and store less than 2,200 lbs of hazardous waste on-site at any one time (WDEQ/SHWD 2011).

Hazardous materials generated from the proposed project may include used batteries, expired laboratory reagents, fluorescent light bulbs, solvents, cleaners, and degreasers. These items will be transported to an off-site treatment, storage and disposal or recycling facility which is permitted to manage hazardous waste material by WDEQ/SHWD. Uranium One estimates that one trip per month will be necessary and will result in minimal traffic impacts. The Glenrock Area Waste Facility will accept some hazardous materials, those not accepted at the Glenrock facility may be transported to the City of Casper Special Wastes Division facility for disposal.

Potential Groundwater Restoration Impacts

The potential transportation impacts during groundwater restoration after production ceases are expected to be less than potential impacts during operations. The number of

workers on site is expected to decline during the late phases of groundwater restoration. The shipments of process chemicals will similarly decrease due to a decrease in the number of resin elutions and uranium precipitations during the active phase of groundwater restoration.

Potential Decommissioning Impacts

During decommissioning, a small increase in truck traffic along with personal vehicles will occur due to the increased number of contractors and shipments associated with decommissioning activities, focused particularly in the Satellite Plant area. Fuel shipments will increase as a result of the operation of heavy equipment. Decommissioning will result in an increase in shipments of solid 11e.(2) byproduct material and solid non-11e.(2) byproduct material. It is estimated that the frequency of 11e.(2) byproduct material shipments will increase from approximately 12 per year during operation and aquifer restoration to between 100 and 200 shipments per year during decommissioning. These will still be relatively infrequent compared to passenger vehicles and will have a small impact on traffic. Solid non-11e.(2) waste shipments are expected to increase from about 1 per week during operation and aquifer restoration to about 2 per week during decommissioning. Hazardous waste shipments are expected to remain unchanged at about 1 per month throughout all project phases. Potential transportation impacts are expected to be similar during decommissioning as those occurring during the previous three project phases."

RAI TR-4

Please provide additional information on shipments of uranium-loaded resins, barren-eluted resins, and yellowcake to/from the Willow Creek CPP.

A. *Please provide traffic-count data along the proposed transportation route to Willow Creek.*
B. *Please provide the current frequency of shipments (uranium-loaded resins, barren-eluted resins, and yellowcake) to and from Willow Creek.*
C. *Please quantify the anticipated increase in yellowcake shipments from Willow Creek as a result of the Ludeman Project.*

Shipments to the Willow Creek CPP would use several State and local roads. In order for the NRC to evaluate the potential impacts to these roads, additional information is needed. This information is required for an evaluation of potential impacts to these roads.

RAI TR-4(A) Response

Uranium One has provided traffic-count data along the proposed transportation route to Willow Creek within the response in RAI TR-2.

RAI TR-4(B) Response

Uranium One anticipates approximately two shipments each of barren and loaded resins between the Willow Creek CPP and Ludeman Satellite facility each day. Current and projected frequencies of resins and yellowcake shipped from or received at the Willow Creek facility were reviewed as part of the license renewal for SUA-1341 and are covered under the auspices of SUA-1341.

RAI TR-4(C) Response

As noted in SUA-1341 (License Condition 10.5), the Willow Creek CPP is currently licensed to produce and transport up to 2.5 million pounds of yellowcake per year. The addition of the Ludeman Project will not exceed this limit established under license SUA-1341. The impacts associated with the production of yellowcake at the Willow Creek facility was previously evaluated as part of the license renewal of SUA-1341 issued March 7, 2013.

Geology and Soils

RAI Geology-1

Please provide information on the potential for seismicity induced by the deep-well injection of waste water proposed for the Ludeman Project.

In some areas of the United States, seismicity has been induced in response to the deep injection of waste waters or other fluids, due to fractures in weak rock and/or lubrication of existing faults. The potential for seismicity due to the operations proposed for the Ludeman Project is not addressed in Section 4.3.1 of the ER. If induced seismicity is not probable due to the nature of the geologic setting or the proposed operating methods, this improbability should be reported and explained. This information is necessary for the NRC to evaluate the potential geologic impacts of the Ludeman Project.

RAI Geology-1 Response

While there have been speculations that deep well injection along faults may have induced seismicity in some areas of the United States, the subject is still quite debatable as state, federal, and university researchers do not agree with each other's findings. Induced seismicity has never been reported or even suggested as a result of uranium ISR operations. The Ludeman Project lies over four miles from the nearest fault and is situated over stable formations.

The following text has been added to ER Section 4.3 to allow the NRC to better evaluate potential geologic impacts of the Ludeman Project:

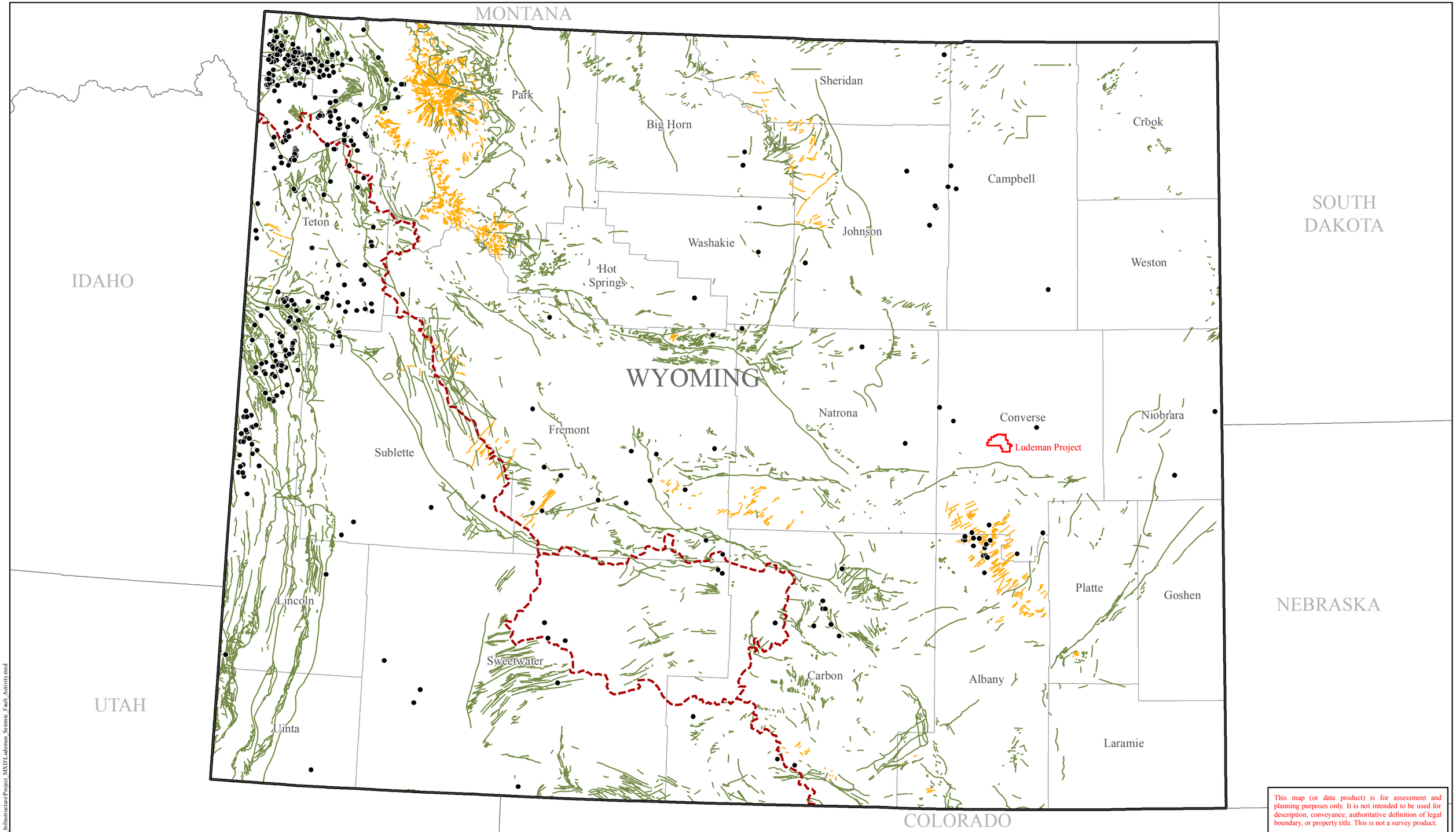
"Potential geological impacts from operations are highly unlikely and expected to be small. No significant matrix compression or ground subsidence is expected, as the net withdrawal of fluid from the target sandstone during operations and restoration will be on the order of one percent or less. Further, once ISR and restoration operations are completed, groundwater levels will return to near original conditions under a natural gradient.

As previously mentioned in Section 4.3, the primary geologic hazard to the facility is that from earthquakes, which could potentially damage a pipeline, process vessel, chemical storage tank, or the surge/evaporation ponds and cause a contaminant release. Since the low probability of an earthquake occurring in the relatively short project schedule and

that the Satellite Plant building will be designed according to the 2,500-year probabilistic map, the risk of contaminant release from an earthquake is very small.

Induced seismicity is not a probable impact as the nearest fault line is over 4 miles from the project boundary. Additionally, the geologic settings of the proposed project area as described in Section 3.3 of this ER are stable and not conducive to seismic activity."

The figure below has been added to ER Section 3.3 to illustrate known faults in relation to the project area:



This map (or data product) is for assessment and planning purposes only. It is not intended to be used for description, conveyance, authoritative definition of legal boundary, or property title. This is not a survey product.

PREPARED FOR
uranium one
investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.trecorp.com

Legend
- Ludeman Project Boundary
- Historical Earthquake
- Fault
- Dike
- Continental Divide

1:2,000,000
0 10 20 40 Miles

N W E S

DRAWN BY: EGS
CHECKED BY: CAT
APPROVED BY: RMD

Historical Seismic Activity and Known Faults for Wyoming

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	EGS	6/3/13	7
1	For Submittal	RMD	6/20/13	
2				

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_Seismic_Fault_Activity.mxd

RAI Soil-1

Please describe the measures that would be implemented to mitigate impacts to soils from construction activities and other soil disturbances during the four Project phases.

Section 4.3.2 of the ER states that the soils at the proposed Satellite facilities have a severe potential for wind erosion and that the soils in the proposed wellfields have a moderate-to-severe risk of erosion from both water and wind. Additionally, this section of the ER states that soil-erosion mitigation would be conducted in accordance with applicable WDEQ/LQD rules, and then it discusses typical erosion-protection measures that could be implemented at the Ludeman Project. It is not clear what specific measures Uranium One intends to implement that would mitigate potential soil erosion related to the Proposed Action. A description of the specific mitigation measures is required for the NRC to assess the mitigation of potential impacts in the EA.

RAI Soil-1 Response

Uranium One will be implementing multiple mitigation measures throughout the project to allow for feasible project development while minimizing potential negative environmental impacts. Additional details regarding specific erosion-protection measures have been included within the license application and presented below to better facilitate the NRC's assessment of these mitigations.

"Topsoil and Subsoil Handling

Prior to surface disturbance activities from construction of building sites, storage areas, surge/evaportion pond site, and access roads, topsoil will be salvaged in accordance with WDEQ/LQD guidelines and conditions of the WDEQ/LQD Permit to Mine for this proposed project. Areas to be stripped will be staked and typical earth moving equipment, such as rubber tire scrapers, bulldozers, or front end loaders will be used for stripping and stockpiling.

Stockpiles will be used for the temporary storage of topsoil material. These stockpiles will be placed on the leeward hill sides when practicable and out of drainage channels to avoid excessive wind and water erosion. All stockpiles will be built with slopes of 3:1 grade or flatter. These stockpiles will be clearly marked with a "topsoil" label and unique ID. Traffic flow during stockpiling and re-spreading will be minimized to reduce

compaction. Each topsoil stockpile will be seeded as soon as practicable with an appropriate seed mix to help prevent erosion.

During excavation of mud pits associated with well construction, exploration drilling, and delineation drilling activities, topsoil will be separated from the subsoil with a backhoe. The topsoil will be removed and placed in a separate temporary stockpile, while the subsoil is removed and deposited next to the mud pit. When the use of the mud pit is complete, usually within 30 days, the subsoil will be re-deposited in the mud pit followed by replacement of topsoil.

Similar procedures will be utilized during pipeline and utility trench construction. Here the topsoil and subsoil will be stored separately, typically on opposite sides of the trench, with the topsoil being placed on top of the subsoil after the trench has been backfilled. Alternately, the topsoil may also be bladed to the side to allow for pipeline or utility installation and then bladed back after construction is complete.

Where subsoil removal will occur, such as the satellite plant area, subsoil will generally not be stockpiled. Instead it will be transported to fill areas such as surge/evaporation pond embankments and will be used as fill to construct roads. During the decommissioning phase, the soils will be replaced and the satellite plant area will be contoured (unless other agreements are made with the land owner for post decommissioning land and facility use) to match pre-construction topography where required.

Re-vegetation

Following topsoil replacement and any other seed bed prep needed (e.g. ripping or disking), disturbed areas will be re-vegetated via seeding with a preselected and approved seed mix. Seeding will be conducted by drill or broadcast methods depending upon the type of seed being planted. The WDEQ/LQD approved Reclamation Plan will address the types and quantities of mulch (if utilized) and seasonal re-vegetation restrictions. The reclamation plan will be developed to address WDEQ-LQD requirements as well as the land owner needs and desires.

WDEQ/LQD (Guideline No. 2, 2004) defines the extended reference area concept which will be used to evaluate the success of final re-vegetation and productivity. The extended

reference area refers to all of the undisturbed portions of a vegetation type which have experienced disturbance in any phase of the ISR process. At the conclusion of decommissioning, quantitative vegetation data for extended reference areas representing each disturbed vegetation type will be directly compared by statistical analysis to quantitative vegetative data from reclaimed vegetation types. WDEQ/LQD requires a confidence level of 80 percent with no mathematical adjustments for climatic change. Qualitative comparisons between extended reference areas and reclaimed areas will also be required for each disturbed vegetation type. Uranium One will consult WDEQ/LQD when choosing the extended reference area and when selecting the standard procedures for qualitative comparisons.

Uranium One will demonstrate re-vegetation success through quantitative and qualitative comparisons between external reference areas and reclaimed areas for each disturbed vegetation type prior to release of the WDEQ/LQD reclamation bond.

Storm Water Control

Engineering controls will be implemented to minimize potential soil loss by routing storm water away from disturbed areas. These may include the following:

- Constructing a storm water control system within the satellite plant area consisting of :
  - Storm water conveyance system to discharge storm water away from facilities; and
  - Grading the satellite plant area to drain down gradient.
- Constructing culverts designed to pass runoff resulting from the 10-year, 24-hour precipitation event where secondary access roads cross ephemeral stream channels.

Sediment Control

Uranium One will implement sediment control mitigation measures in all disturbed areas to minimize soil loss and water quality impacts from sediment transport. Sediment control mitigation measures utilized at the proposed project may include:

- Minimize disturbances in sensitive areas, such as those adjacent to ephemeral stream channels;

- Utilizing temporary sediment control BMPs such as silt fence, sediment logs, or straw bale check dams. Silt fence will typically be used at the toes of disturbed slopes to trap sediment. Sediment logs and straw bale check dams will typically be used in disturbed drainages to capture sediment;
- Incorporating wing ditches into topsoil stockpiles; and
- Promptly restoring and seeding disturbed areas, typically within one construction season.

Wind Erosion Protection

Mitigation measures designed to minimize soil loss from wind erosion include:

- Minimize disturbed area to the extent practicable;
- Placing topsoil stockpiles on leeward sides of hills when appropriate or feasible;
- Restoring and re-seeding disturbed areas promptly, typically within one construction season.

Soil Compaction Mitigation Measures

Uranium One will mitigate potential soil compaction impacts by using existing roads where practicable. Two state and one county roads traverse the proposed project area, and numerous private two track access roads are found throughout the proposed project area. These will be used by Uranium One employees and contractors during all project phases to prevent unnecessary new road development. In addition, Uranium One will minimize secondary access road widths to wellfield facilities. During decommissioning, soils which have undergone compaction, such as access roads, will be ripped as needed to loosen soils.

Loss of Soil Productivity Mitigation Measures

The following mitigation measures will be implemented by Uranium One to minimize potential loss of soil productivity:

- Segregating topsoil from subsoil during construction;
- Protecting topsoil stockpiles from wind and water erosion (see ER Section 6.3.2.1);

- Seeding topsoil stockpiles during inactive periods with an appropriate perennial seed mix;
- Redistributing topsoil and applying a permanent seed mix approved by WDEQ/LQD and/or landowner during decommissioning; and
- Comparing re-vegetated areas with extended reference areas using a statistical, quantitative comparison and a qualitative comparison as approved by WDEQ/LQD.

Soil Contamination Mitigation Measures

It is remotely possible that soils could be contaminated by spills or leaks during the various project phases. During wellfield construction, potential soil contamination impacts from drilling fluid and drilling mud will be minimized by directing drilling fluids and muds into mud pits to control the spread of fluids. During well maintenance activities, contaminated liquids from injection and recovery wells will be contained in the storage pond for disposal through deep injection well or disposal in the site evaporation ponds. Minor fuel and oil leaks will be promptly cleaned up and contaminated soil removed and disposed off-site in approved facility. Soils contaminated with process fluids resulting from spills or leaks will follow SUA – 1341, License Condition 12.2 and will be identified in the NRC approved decommissioning plan."

Water Resources

RAI WR-1

Please provide additional information on the isopach maps of the sand and shale units under the Ludeman Project area.

A. *Please extend the isopach maps to include the area between the southern Project boundary and the North Platte River.*
B. *Please add outlines of all ore bodies on the isopach maps and identify the production sand unit for each ore body.*

Uranium recovery operations at the Leuenberger Satellite could potentially affect the wells in the Negley Subdivision and operations at the Peterson Satellite could potentially affect the North Platte River. The requested revisions to the isopach maps will allow the NRC to evaluate the potential impacts of uranium recovery operations at the Leuenberger and Peterson Satellites on adjacent areas (i.e., the Negley Subdivision and the North Platte River).

RAI WR-1 (A) (B) Response

Uranium One is evaluating the geologic setting based on additional data that was not available during the development of the initial application. The isopach maps will be updated accordingly based on the new data and submitted to the NRC as soon as reasonable possible. The sand unit within the production zone for each wellfield is provided in RAI WR-2.

RAI WR-2

Please identify the sand unit within which the production zone would be located for each wellfield at every Satellite.

The ER refers frequently to the "70, 80, and 90 sand" production zones, but it does not identify the respective sand units that would be developed in each of the individual wellfields in each Satellite area. This information will assist in the NRC's evaluation of the potential impacts of uranium recovery operations at each Project Satellite on adjacent areas.

RAI WR-2 Response

To allow for the NRC's evaluation of potential recovery operations impacts, the respective sand units that will be developed for each of the individual wellfields is provided in the table below. In addition, the overlying unit, underlying unit and estimated unit depths for each wellfield have been incorporated into the following table:

Table 5: Proposed Wellfields and Associated Sand Units

Wellfield Number	Wellfield Acreage	Production Zone		Overlying Unit		Underlying Unit	
		Sand	Depth (ft)	Sand	Depth (ft)	Sand	Depth (ft)
1	93	90	194-345	100	43-128	80	295-450
		80	295-450	90	194-345	70	414-478
2*	58	70	695-747	80	563-652	60	704-770
3	131	70	470-690	80	352-532	60	538-733
4	104	70	480-590	80	286-463	60	561-694
5	107	80	224-383	90	151-279	70	303-550
		70	303-550	80	224-383	60	362-565
6	271	90	53-271	100	41-172	80	122-331

Note: this is preliminary data; more complete data will be included in the Wellfield Data Package which will be submitted to the WDEQ/LQD prior to production

*The sands units in wellfield 2 are currently being further evaluated and will be updated for the final application to ensure accurate description.

RAI WR-3

Please provide an assessment of the long-term drawdown in the 70, 80, 90, 100, 110, and 120 sands that would result from Uranium One's development of the three wellfields at the Leuenberger Satellite and Wellfield 2 at the Peterson Satellite (as shown on ER Figure 1-6).

Section 3.4.2.4.1 of the ER discusses historical aquifer tests and Section 3.4.2.4.2 discusses the 2008 pump tests that were conducted by Uranium One to evaluate the hydraulic connection between the sand units at the Satellite areas. These tests, however, were of less than one week in duration and do not necessarily represent the hydraulic conditions that would be present during long-term pumping of the aquifers for uranium recovery. Projections of the effects of long-term uranium recovery on the sand units at the Leuenberger Satellite and Peterson Wellfield 2, as well as the surrounding areas, are necessary for the NRC to evaluate the potential impacts to nearby wells in the Negley Subdivision and the North Platte River. The projection of drawdown must explicitly address the connectivity between the sand units.

RAI WR-3 Response

Appendix B of the TR Response Package provides an assessment of the long-term drawdown in the Production Zone Sands (70, 80, and 90 Sands).

RAI WR-4

Please provide a potentiometric surface map for the 100 and 110 sands in the Leuenberger Satellite/Negley Subdivision area that is based on sufficient potentiometric data to provide a reliable evaluation of the potentiometric surface and groundwater flow direction in these units.

Many of the wells in the Negley Subdivision are screened in the 100 and 110 sand units. These sands are above the production-zone sands identified at the Leuenberger Satellite; therefore, the current potentiometric surface of these two sand units is needed to assess groundwater impacts on the Negley Subdivision. The potentiometric-surface maps for the 100 sand shown as Figures 3.4-16 and 3.4-17 in Section 3.4 of the ER are based upon data from three wells. The map for the 110 sand is based upon data from two wells. These data are not sufficient to construct potentiometric-surface maps for this area. More accurate maps of these sand units are necessary for the NRC to evaluate potential groundwater impacts from the Leuenberger Satellite on nearby wells.

RAI WR-4 Response

Uranium One has updated potentiometric maps for the 100 and 110 Sand units to facilitate the NRC's request for supplemental data further validating groundwater baseline characteristics. These updated maps will replace the current potentiometric maps within the application and are provided within the response to TR RAI-19.

RAI WR-5

Please provide additional information regarding water use during all four Project phases at each of the proposed Satellites areas.

A. *Please provide the consumptive use of ground water in gallons per day, or in an equivalent measure, for each of the four Project phases at each Satellite area.*
B. *Please estimate the volumes of non-production water (e.g., domestic consumption, dust control, and crop irrigation) that would be used during each of the four Project phases at each of the Satellite areas.*
C. *Please identify the source(s) of the volumes of water estimated above in B., including the location(s) of the source(s) and targeted aquifer zone if ground water would be used.*

Section 2.2.3 of the TR describes existing uses of ground and surface waters within the Project area and the two-mile buffer zone. In addition, non-production water uses, such as domestic consumption and dust control, must be evaluated. These uses could vary during the different phases of the Proposed Action, and they could depend upon other factors, such as the size of the Satellite's workforce or seasonal dust-control requirements. Information regarding water use is necessary for the NRC to evaluate potential water-resource impacts.

RAI WR-5 (A) Response

The anticipated consumptive use of groundwater (per day) for each phase are listed below:

Production Only: 129,600 gallons
Production/Groundwater Sweep (Optional): 345,600 gallons
Production/Restoration: 273,000 gallons
Restoration Only: 144,000 gallons

Uranium One has added these values to the groundwater impacts discussion in ER Section 4 Environmental Impacts.

RAI WR-5 (B) Response

Using the U.S. DOE Federal Water Use Indices average daily water consumption rate of 15 gallons per person per day and a maximum of 44 employees, the domestic consumption will be approximately 660 gallons per day. Water will not be used for crop irrigation. Dust control is a possibility, but will not have a set watering schedule in place. As there are few residences near the project, and the project will experience minimal amounts of heavy traffic, dust is not likely to be of concern and is consistent NUREG 1910. Water amounts used for suppression are likely to be small and on an as-needed basis.

RAI WR-5 (C) Response

Uranium One anticipates installing a groundwater well in the vicinity of the satellite facility for all domestic needs. The well will be permitted by the Wyoming State Engineers Office.

RAI WR-6

Please clarify the measures that would be implemented to mitigate impacts from consumptive groundwater use by the Ludeman Project.

Section 5.4.2 of the ER describes potential impacts on ground water outside the Ludeman Project area due to consumptive use. In Section 5.4.2.1.2 of the ER, Uranium One identifies three mitigation measures that "would be considered" if water levels drop in affected non-project-related wells. In order for measures to be considered in the EA as mitigating and reducing impacts, Uranium One must commit to implementing the measures. Specific information on mitigation measures committed to by Uranium One will support the environmental impact analysis of water resources.

RAI WR-6 Response

To allow for the mitigation measures to be considered in the EA Uranium One will make a commitment to implementing water resource mitigations to the extent practicable.

The statement regarding water resource mitigations in ER 5.4 has been revised to read:

"If significant impacts to either the adjacent domestic wells or to stock wells in the vicinity of the proposed project are observed (e.g., water levels drop to a point that impairs the usefulness of the wells), Uranium One commits to implementing measures that will mitigate these potential impacts to the extent practicable. The following mitigation measures would be considered in determining the best technique including but not limited to:

- Lowering the pump level in the wells, if possible;
- Deepening the wells, if possible; or
- Replacing the wells with new wells completed in deeper sands that are not impacted by ISR operations."

RAI WR-7

Please provide information to verify that historical exploration drill holes have been located and properly abandoned.

Section 2.4.1.3 of the GEIS notes "improperly abandoned exploration drillholes" can cause an excursion of lixiviant from the production zone. Section 1.3 of the ER discusses exploration and aquifer testing that occurred in the Ludeman Project area during the late 1970s and early 1980s. If the drillholes from these activities were not properly plugged, this could increase the potential for vertical excursions that could impact water quality in adjacent aquifers. A discussion of the abandonment of these drillholes will support the environmental impact analysis in the EA.

RAI WR-7 Response

To better assist the NRC in supporting the environmental impact analysis within the EA, Uranium One has added a discussion regarding the abandonment of historic drillholes to TR Section 2.6 of the license application as follows. Both the drill hole maps and drill hole table mentioned in the text have been updated within the application.

"Uranium One proposes to use the following procedures for plugging historic drill holes discovered during future working operations in the proposed wellfield areas:

- A search for historic holes will be conducted while working within the area of each proposed wellfield; any hole discovered will be analyzed for proper plugging and will be plugged (if necessary) in accordance with WDEQ procedures;
- If Uranium One possesses the electric log of any historic drill hole which is located within 500 feet of a proposed wellfield as agreed upon with the WDEQ/LQD then Uranium One will be prepared to search for and plug such holes; and
- Uranium One will properly plug (if plugging is necessary) any historic drill hole encountered while working anywhere within the proposed project area."

RAI WR-8

Please provide additional information on the storm-water management approaches and proposed storm-water management infrastructure for each Satellite area.

A. *Please provide a general description of the storm-water management approaches (e.g., infiltration, evaporation, detention, or dispersion) that would be implemented at each of the Satellite areas.*
B. *Please provide a figure illustrating the anticipated layout of each Satellite area, including proposed waste-management surface impoundments, other storm-water-management infrastructure, and any surface-water drainages to which this infrastructure discharges.*

As described in Section 4.1 of the ER, each Satellite area would disturb approximately 1.5 acres, much of which would be for the construction of buildings and paved areas. Runoff from the impervious surfaces associated with these facilities could increase erosion or otherwise affect nearby ephemeral drainages. The NRC requires this information on the proposed storm-water-management techniques to assess the potential environmental impacts from storm-water runoff.

RAI WR-8 (A) Response

Uranium One has supplemented the application with additional details regarding storm-water-management to assist the NRC in their assessment of potential impacts. The Storm Water Control response to RAI Soil-1 answered a portion of Part A of this RAI in ER Sec. 5.3.2. The following language was also added as new ER Sec. 5.4.1.2 (Flood Protection):

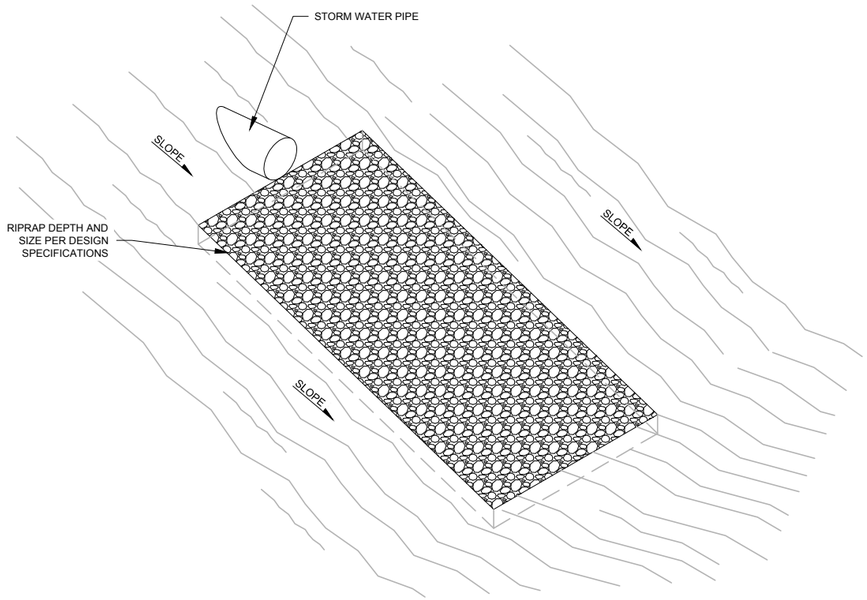
"All significant structures and operations will be located outside of floodplains. In particular, the satellite plant and its ancillary facilities, chemical storage, storage pond, etc., will all be located above the 100 year floodplain. Drainage structures will be designed to route storm water runoff away from structures, roads, and the backup storage pond. Details of the storm water management will be addressed in SWPPP(s) prepared in support of the construction and industrial WYPDES permits required by WDEQ/WQD for this project. One of the key features of the SWPPP(s) will be demonstrating how BMPs are designed to minimize exposure to pollutants. This will be accomplished in part through flood protection. It will also involve erosion and sediment control measures described previously.

Protection of equipment and facilities from large runoff events typically will be accomplished by placement on high ground out of the flood plain. The injection, recovery and monitor wells will be protected from flooding by installation of cement seals around the well casings.

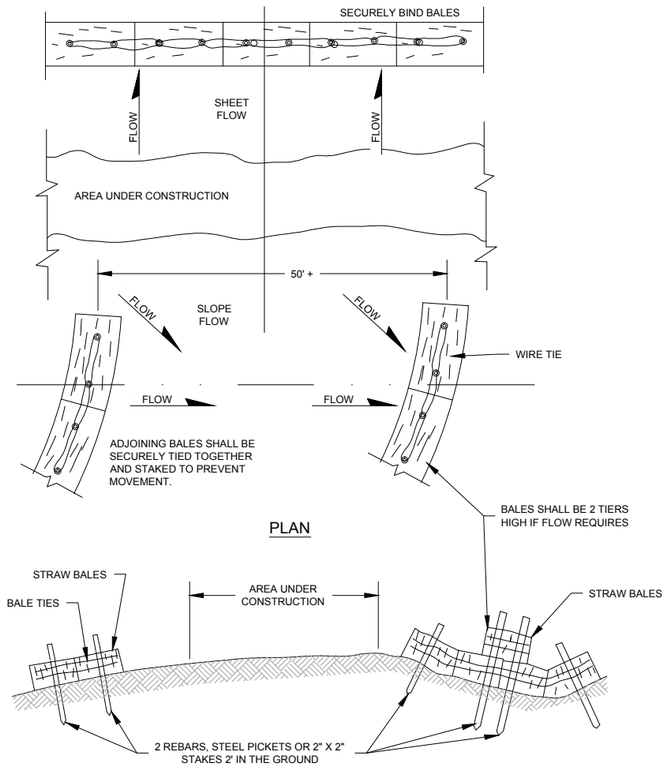
The satellite plant at the proposed project will not be located in the channel of any ephemeral stream. To minimize surface water impacts, runoff will be routed around facilities and continue on its downstream gradient."

RAI WR-8 (B) Response

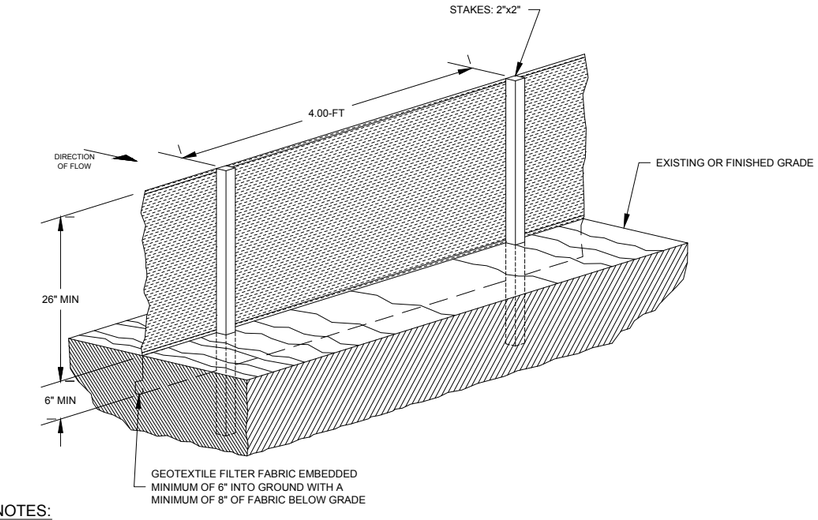
Uranium One will use several storm water control best management practices in the design of the project infrastructure as depicted in the figure below. This figure illustrates several of the techniques that may be used to control storm water discharge. As the final site engineering has yet to be completed, the exact location of every culvert, berm, straw wattle, silt fence, or other storm-water management mechanism cannot be depicted. Figure 2 and Figure 4 of this response package depict the conceptual site layout, infrastructure and illustrated storm-water control mechanisms.



225 RIPRAP APRON TYPICAL (NOT TO SCALE)



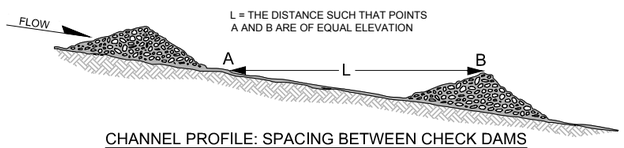
820 STRAW BALE SEDIMENT BARRIER TYPICAL (NOT TO SCALE)



NOTES:

1. SILT FENCE SHALL BE CONSTRUCTED BEFORE UPSLOPE GROUND COVER IS REMOVED. CLEARING, GRUBBING, AND STUMPING CAN OCCUR BEFORE SILT FENCE INSTALLATION IF GROUND COVER IS NOT REMOVED. SILT FENCE IS TO REMAIN IN PLACE AND BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND REMOVED WITH THE FINAL GRADING AND SITE STABILIZATION.
2. WHERE POSSIBLE, SILT FENCE SHALL BE PLACED ON THE FLATTEST AREA AVAILABLE.
3. A RUN OF SILT FENCE SHOULD FOLLOW THE CONTOUR AS CLOSE AS POSSIBLE WITH THE ENDS TURNED UPSLOPE TO POND WATER BEHIND THE FENCE.
4. THE SILT FENCE SHOULD BE BURIED AT LEAST 6" DEEP AND HAVE A TOTAL OF 8" OF FABRIC BELOW THE GROUND. THIS CAN BE ACCOMPLISHED WITH A TRENCHER, CABLE LAYING MACHINE, SLICING MACHINE OR OTHER SUITABLE DEVICE WHICH WILL ENSURE AN ADEQUATELY UNIFORM TRENCH DEPTH. BACKFILL IS TO BE COMPACTED.
5. THE STAKES SHALL BE PLACED ON THE DOWN SLOPE SIDE OF THE GEOTEXTILE. THE STAKES SHALL BE A MINIMUM OF 2X2 NOMINAL (1-1/2" X 1-1/2" ACTUAL) HARDWOOD STAKE OF SOUND QUALITY. STEEL T-POSTS MAY BE SUBSTITUTED IF GROUND CONDITIONS REQUIRE.
6. WHERE TWO SILT FENCE SECTIONS ARE COMBINED INTO ONE RUN THE END STAKES SHALL BE CONNECTED TOGETHER, NOT SIMPLY OVERLAPPED.
7. IF RUNOFF OVERTOPS THE SILT FENCE, FLOWS AROUND THE ENDS, OR IN ANY OTHER WAY BECOMES A CONCENTRATED FLOW, ONE OF THE FOLLOWING SHALL BE PERFORMED, AS APPROPRIATE: 1) AN ADDITIONAL RUN OF SILT FENCE SHALL BE PLACED UPSTREAM, 2) THE LAYOUT OF THE SILT FENCE SHALL BE CHANGED, 3) ACCUMULATED SEDIMENT SHALL BE REMOVED, OR 4) OTHER PRACTICES SHALL BE IMPLEMENTED.

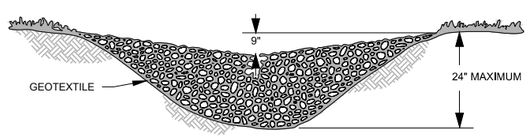
830 SILT FENCE TYPICAL (NOT TO SCALE)



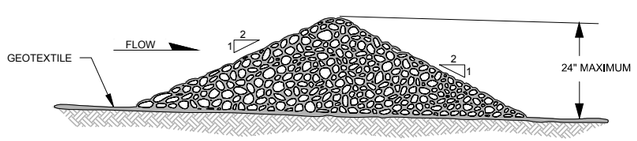
CHANNEL PROFILE: SPACING BETWEEN CHECK DAMS

STONE CHECK DAMS

STONE CHECK DAMS SHOULD BE CONSTRUCTED OF GRADED SIZE 2-10" STONE. MECHANICAL OR HAND PLACEMENT SHALL BE REQUIRED TO INSURE COMPLETE COVERAGE OF ENTIRE WIDTH OF DITCH OR SWALE, AND THAT CENTER OF DAM IS LOWER THAN EDGES.

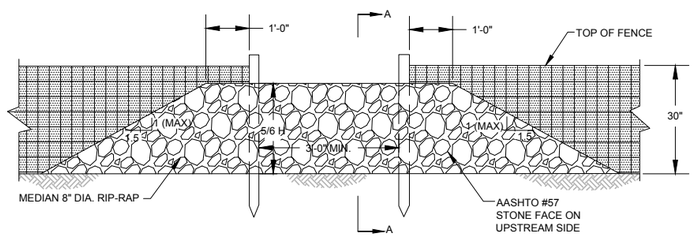


CHANNEL SECTION: STONE CHECK DAM



CHANNEL PROFILE: CHECK DAM

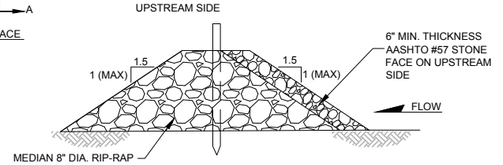
832 CHECK DAM (STONE) TYPICAL (NOT TO SCALE)



ELEVATION - UP-SLOPE FACE

NOTES:

1. INSTALL AT ALL LOCATIONS ALONG SILT FENCE WHERE RUNOFF CONCENTRATION AND PONDING BUILDUP HAS THE POTENTIAL TO UNDERMINE OR OVERTOP SILT FENCE.
2. SEDIMENT TO BE REMOVED WHEN ACCUMULATIONS REACH 25% CAPACITY.
3. WASHED STONE (#57) TO BE REMOVED AND REPLACED ONCE IT BECOMES CLOGGED WITH SEDIMENT.



SECTION A-A

834 ROCK OUTLET TYPICAL (NOT TO SCALE)

uranium one investing in our energy

Ludeman Project
Typical Erosion and Sediment Control BMP Details

Figure 8

Drawn: TBK	Checked: RD	Approved: RD

Rev. #	Description	Date
-	-	-
-	-	-
-	-	-

RAI WR-9

Please discuss the rationale for Uranium One's analyses of some chemical constituents in filtered-water samples and some analyses of unfiltered samples. Please provide this information for all water-quality data reported and referenced in the ER and for the proposed groundwater and surface-water monitoring plans and protocols.

The reporting of water-quality constituents as dissolved or total concentrations is a key aspect in the evaluation of water quality. The selection of analytical methods would be based upon regulations, rules, and guidance from the NRC, U.S. Environmental Protection Agency, and the WDEQ. A description of the rationale for chemical analyses of filtered or unfiltered samples is needed by the NRC to evaluate the water-quality data presented in the ER. This information will support the environmental impact analysis of water resources.

RAI WR-9 Response

The option of filtered and/or unfiltered was available because of the short distance to the laboratory as now clarified in the application text. The paragraph in question was edited in both ER Sec. 3.4 and TR Sec. 2.7. to assist the NRC in its support of water quality resources impact assessment The text now appears as follows:

Each sample bottle was labeled with a permanent marker denoting the project number, the well name, and the date and time of sampling. One sample was collected unfiltered and immediately preserved with sulfuric acid; all other samples were collected unpreserved (raw) and unfiltered. Samples were not filtered in the field due to the short distance from the site to the Laboratory. The samples were immediately stored in a cooler to maintain a relatively constant temperature of 4° C and delivered to Energy Laboratories in Casper, Wyoming. Samples were then analyzed for WDEQ/LQD Guideline 8 parameters for uranium recovery. Samples were tested either unfiltered (total) or filtered (dissolved) depending upon the lab protocols for the particular test or whether one method would generate more consistent analytical results. None of the samples were filtered in the field. Chain of Custody documents accompanied the samples and relinquished to the laboratory.

Ecology

RAI ECO-1

Please provide additional details regarding mitigation measures to minimize impacts to birds.

Birds specified in the Migratory Bird Species of Management Concern in Wyoming list that were observed on the Ludeman Project are summarized in Table 3.5-21 of Addendum 3.5-K of the ER. Section 5.5 of the ER describes measures that would be used to mitigate impacts to the habitat, nesting, and roosting of protected birds; however, it does not address the potential impacts to birds from the surface impoundments. If the design of the impoundments includes elements that would mitigate impacts to birds, please describe them. This information will support the NRC's environmental impact analysis of ecological resources.

RAI ECO-1 Response

Uranium One has added discussion specific to potential impacts to birds from impoundments and mitigations for those impacts. The text now included within the application is as follows:

"Nearly 30 years of documented historical experience at the Willow Creek facility has yielded little, if any, impact to birds as a result of surface impoundments. However, Uranium One commits to work with the USFWS and WGFD to evaluate and, if necessary, develop specific mitigation measures should impacts be identified. These could include but are not limited to the following:

- If direct impacts to raptors or migratory bird species of management concern result from ISR development and operations, a Monitoring and Mitigation Plan for those species will be prepared and approved by the USFWS and WGFD;
- A wide range of both passive and active deterrents exist for minimizing the potential impact of the impoundments on birds. Some of these options that may be considered should the need arise are:
    - Bird Repellants (Sound and Sight)
    - Bird Balls (float on pond surface acting as a barrier)
    - Hazing by trained personnel
    - Automated hazing products."

Meteorology and Air Quality

Uranium One has developed comprehensive responses to the meteorology and air quality requests for additional information as a part of this RAI response package. As this section was fairly extensive and included the addition of several new figures and tables, it was produced as a stand-alone document included as Appendix B of the ER Response Package.

Visual Resources

RAI VIS-1

Please provide additional information on the visual resource management (VRM) classes of the Ludeman Project area.

A. *Please provide documentation of the field reconnaissance of visual resources conducted in June and August 2008 and referred to in ER Section 3.9.6.*
B. *Please provide a map that shows the VRM classes within the Ludeman Project area, the two-mile buffer zone, and a 25-mile radius of the Project area.*
C. *Please provide a table that details the number of acres for each VRM class within the Ludeman Project, the two-mile buffer zone, and a 25-mile radius during each Project phase at each Satellite.*

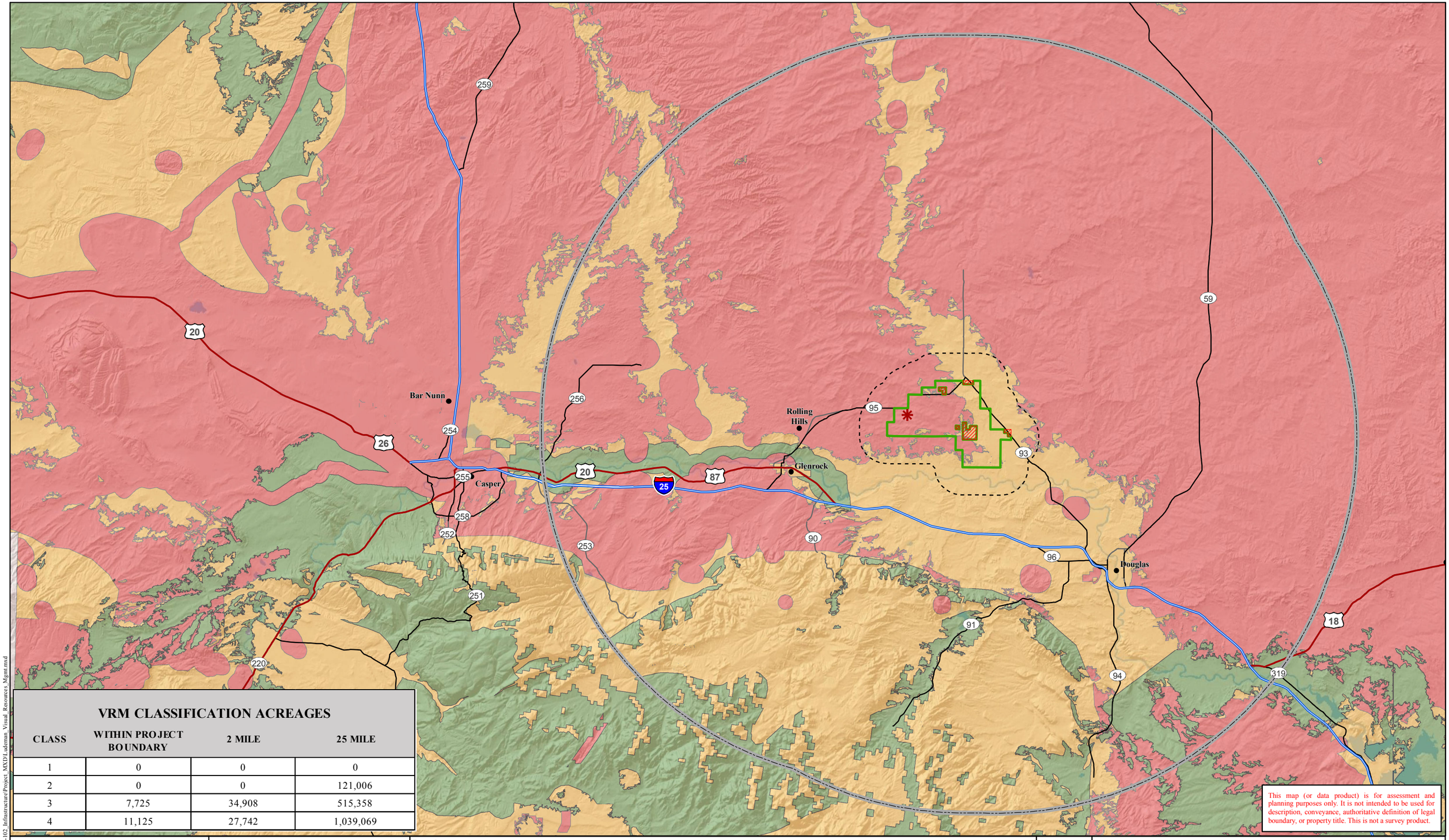
Section 3.9.6 of the ER refers to a field reconnaissance of visual resources that was conducted in 2008; however, documentation of this reconnaissance is not provided. This information related to the visual environment will provide a quantitative comparison of the area of anticipated land disturbance within each of the VRM classes and an overall comparison of the Project footprint versus the Project area. Information regarding management classes within the 25-mile radius of the Project will support an analysis of the cumulative visual impacts of the Project.

RAI VIS-1 (A) Response

Documentation of the field reconnaissance of visual resources is in fact the scenic quality inventory table, visual resource map, and photos presented in TR Section 2.4 and associated addenda. This documentation was recorded and developed in the field electronically via laptop and mobile GIS/GPS equipment. Field observations are consistent with methodologies publicly available within BLM Handbook H-8410-1 – Visual Resource Inventory should the NRC wish to further review classification guidance.

RAI VIS-1 (B) Response

To assist the NRC's assessment of visual resource impacts Uranium One has developed a map depicting the VRM classes within the project boundary, 2-mile, and 25-mile radius. This new map has been added to ER Section 3.9 and is also shown below.



VRM CLASSIFICATION ACREAGES

CLASS	WITHIN PROJECT BOUNDARY	2 MILE	25 MILE
1	0	0	0
2	0	0	121,006
3	7,725	34,908	515,358
4	11,125	27,742	1,039,069

This map (or data product) is for assessment and planning purposes only. It is not intended to be used for description, conveyance, authoritative definition of legal boundary, or property title. This is not a survey product.

PREPARED FOR

uranium one
investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.treccorp.com

Legend

- Ludeman Project Boundary
- Satellite Facility
- Excluded Area
- 25 Mile Review Boundary
- Two Mile Review Boundary

VRM Class

- Class 2
- Class 3
- Class 4

- Interstate
- Highway
- Major Road
- Local Road

1:400,000

0 2.5 5 10 Miles

N W E S

DRAWN BY: EGS
CHECKED BY: CAT
APPROVED BY: RMD

Visual Resource Management Classifications

Source: U.S. Bureau of Land Management

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	EGS	5/8/13	9
1	For Submittal	RMD	6/20/13	
2				

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_Visual_Resources_Mgmt.mxd

RAI VIS-1 (C) Response

Uranium One has provided a table that details the number of acres for each VRM class within the Ludeman Project, the two-mile buffer zone, and a 25-mile radius. This table was produced by GIS analysis and is located within Figure 13 shown above.

RAI VIS-2

Please describe the lighting impacts for the Proposed Action during each Project phase for every Satellite of the Ludeman Project.

A. *Please provide information on the proposed lighting fixture(s), bulb type, and light shielding at each Satellite.*
B. *Please provide information on the locations of lights and hours of use at each Satellite.*

More information is required to assess the environmental impacts of night-time lighting of the Ludeman Project area (i.e., the potential for light pollution) on the public views from the Negley Subdivision, other residential locations in the vicinity, local highways and roads, and the North Platte River. This specific information is necessary for the NRC to evaluate the magnitude of potential visual-resource impacts.

RAI VIS-2 (A) (B) Response

Uranium One has provided additional detail to better facilitate the NRC's evaluation of potential visual-resource impacts. The following text has been added to ER Section 5 (Mitigation):

"Exterior lighting will be necessary to safely operate the proposed project; however through planning and mitigation, there is low potential to create visual impacts from lighting as a result of the proposed project during any project phase. To further reduce potential visual impacts Uranium One may use shielded, downward facing low intensity light fixtures where appropriate (considering safety measures) to minimize indirect effects from lighting at its facilities. In addition, the natural conditions provided by topography, landforms and vegetation further reduce potential impacts. Lighting at the satellite facility may occur from dusk to dawn and be primarily located near walkways and building entrances, again with the lighting specifics being designed during final site engineering to meet occupational safety standards. Lighting at header houses or other similar infrastructures will be situational and more likely occur on an as needed basis."

Socioeconomics

RAI SOC-1

Please clarify the time interval of ER Table 7-1, which summarizes the estimated employment effects of the Ludeman Project. Does it refer to calendar years or fiscal years?

Information on employment related to the Ludeman Project is necessary for NRC's assessment of socioeconomic impacts.

RAI SOC-1 Response

Uranium One has updated the cost benefit analysis based on the proposed project modifications and updated schedule. The IMPLAN software used in the analysis employs calendar years for time interval purposes.

RAI SOC-2

Please confirm whether the subtotal rows on Figure 7-3 and Figure 7-4 of the ER should read "payroll" or "non-payroll."

It appears that there is an inconsistency between the figure titles, which indicate payroll data, and the subtotal rows, which indicate non-payroll data. This clarification is necessary for the NRC to accurately evaluate the socioeconomic impacts.

RAI SOC-2 Response

Uranium One has updated the cost benefit analysis based on the proposed project operational modifications and updated schedule. The figure title inconsistencies have also been addressed and subtotal rows are labeled appropriately.

RAI SOC-3

Please provide the basis for the State and local tax revenue estimates presented in Table 7-2 of the ER and provide estimates of these revenues for each Satellite.

A. *Please provide the input data and rates used in the calculations of State and local tax revenues described in Section 7.3.3 of the ER.*
B. *Please confirm that the "Enterprise Tax Revenues" listed in Table 7-2 of the ER refer to the corporate-dividend tax revenues as referenced in the text, or explain the difference between the two tax revenues and provide values for each.*
C. *Please provide a more complete explanation regarding to whom these tax revenues accrue, specifically how much tax revenue would accrue to the State of Wyoming and to the local jurisdictions in the area, such as Converse County and Natrona County. Please provide this information for each Satellite area.*

All of this information is necessary to verify the data presented in Table 7-2 and for the NRC to assess accurately the socioeconomic impacts of the Ludeman Project.

RAI SOC-3 (A) Response

The input data for state and local tax revenues is as described in Section 7.3.1 "IMPLAN Input Data." For each year of the project, the inputs were different for construction/decommission and for operations. The inputs and methodology were determined in consultation with IMPLAN founder Doug Olson specifically for application to uranium operations.

For construction/decommission the inputs were dollar costs of payroll and non-payroll (e.g., cost of contractors, equipment, etc.). As explained in Section 7.3.1, 44 percent of the total costs of construction (payroll and non-payroll costs) was applied to sector 36 (IMPLAN's identifier for "construction") and 30 percent of the total was applied to sector 205 (IMPLAN's identifier for "construction machinery"). Refer to Figures 7-2 and 7-3 for the dollar costs of payroll and non-payroll associated with construction and decommission. In sum, a total of 76 percent of the total payroll and non-payroll costs were the inputs to the model (44% applied to construction and 30% applied to construction machinery). The balance of 26 percent is assumed to be "leakage" from the state of Wyoming—costs going to goods produced elsewhere, such as vehicles produced in other parts of the United States.

For operations, the number of direct employees was used as the input to the IMPLAN model. Refer to Table 7.4 "Estimated Number of Payroll Positions for Construction, Operations, and Decommission (Direct payroll of the proposed project). Note that the last three rows have a typo – the totals are actual direct payroll employees, but the title of each row indicates it is "non-payroll."

The inputs were loaded into the IMPLAN system for each year of the project, by category – operations (direct staff) or construction/decommission (non-payroll dollar costs). Once the input information was in the system, a query was made to arrive at the estimated taxes. Queries were made for each year of the project by type—operations or construction/decommission. An example of a query result is attached. It shows the tax effect of construction in year 2013 (labeled incorrectly at the top of form as 2012c).

The rates used to determine the dollar amounts of state and local taxes are based on data collected for each state by the IMPLAN program managers.

RAI SOC-3 (B) Response

Enterprise Taxes are the same as corporate dividend taxes. The information in Table 7-2 was pulled from results of IMPLAN tax impact queries. As the attached example shows, the results are displayed in several columns. The third column to the left is labeled "Enterprises (Corporations) and the only value in the column is in the row titled "Dividends."

RAI SOC-3 (C) Response

There is no break-down of tax revenues accruing to counties or the state. That is because the study area for IMPLAN impact analysis was for the entire state of Wyoming (see detailed explanation below). As shown on the example of IMPLAN tax query results, there are two main categories of taxes: 1) Enterprises/Corporations and 2) Indirect Business Taxes. Enterprise/Corporation taxes would be paid directly to the state of Wyoming. The Indirect Business Taxes include all the direct, indirect, and induced effects of the project throughout Wyoming. So if a purchase is made in Cheyenne for the project, it would be included in the Indirect Business Tax estimate. Because property taxes are assessed in the county where the property is located, Converse County would have the majority of estimated property taxes, shown in the attached example to have a value of $73,477 in Year 2013 (referred to in the title of the attached example as "2012c).

As excerpt from section 7.3.1 (IMPLAN Input Data):

"Wyoming was selected as the study area for IMPLAN impact analysis for a number of reasons. Although the project is located in Converse County, using only the county as the economic study area would result in an understatement of the overall economic impact of the project. This is because Converse County, with an estimated population of slightly less than 13,000 is too small for economic impact analysis purposes. The proposed project operator will necessarily look outside of the county for some of the goods and services needed to construct and operate the facility. Using the state of Wyoming (with an estimated population of 523,000 and with several larger retail/business communities such as Casper, Gillette, and Cheyenne) provides a greater likelihood that more of the goods and services needed for the project will come from the economic study area."

Table 6: Tax Effect Query Results, 2013

		Employee Compensation	Proprietary Income	Household Expenditures	Enterprises (Corporations)	Indirect Business Taxes	Total
Enterprises (Corporations)	Transfers	-2,933					*-2,933*
	Total	*-2,933*	*0*	*0*	*0*	*0*	*-2,933*
Federal Government NonDefense	Corporate Profits Tax				77,370		*77,370*
	Indirect Bus Tax: Custom Duty					4,027	*4,027*
	Indirect Bus Tax: Excise Taxes					9,634	*9,634*
	Indirect Bus Tax: Fed NonTaxes					4,824	*4,824*
	Personal Tax: Estate and Gift Tax						*0*
	Personal Tax: Income Tax			453,847			*453,847*
	Personal Tax: NonTaxes (Fines- Fees						*0*
	Social Ins Tax- Employee Contribution	204,579	28,451				*233,030*
	Social Ins Tax- Employer Contribution	214,834					*214,834*
	Total	*419,414*	*28,451*	*453,847*	*77,370*	*18,485*	*997,567*
State/Local Govt NonEducation	Dividends				16,384		*16,384*
	Indirect Bus Tax: Motor Vehicle Lic					1,888	*1,888*
	Indirect Bus Tax: Other Taxes					3,469	*3,469*
	Indirect Bus Tax: Property Tax					73,477	*73,477*
	Indirect Bus Tax: S/L NonTaxes					19,420	*19,420*
	Indirect Bus Tax: Sales Tax					65,169	*65,169*
	Indirect Bus Tax: Severance Tax					71,525	*71,525*
	Personal Tax: Estate and Gift Tax						*0*
	Personal Tax: Income Tax						*0*
	Personal Tax: Motor Vehicle License			7,900			*7,900*
	Personal Tax: NonTaxes (Fines- Fees			2,333			*2,333*
	Personal Tax: Other Tax (Fish/Hunt)			16,548			*16,548*
	Personal Tax: Property Taxes			3,239			*3,239*
	Social Ins Tax- Employee Contribution	2,139					*2,139*
	Social Ins Tax- Employer Contribution	9,205					*9,205*
	Total	*11,344*	*0*	*30,020*	*16,384*	*234,948*	*292,696*
Total		*427,825*	*28,451*	*483,867*	*93,754*	*253,433*	*1,287,330*

Environmental Justice

RAI EJ-1

Please identify whether any minority or low-income populations, at the 'census-block-group level,' are located within a 4-mile-radius geographic area around the Ludeman Project site.

The NRC would like to ensure that there are no minority or low-income populations present within 4 miles of the Ludeman Project. The analysis in ER Section 3.10.4 used 2000 "census-block" data and a 50-mile geographic area as its bases in the environmental-justice assessment described in ER Sections 3.10.4.2.1 and 3.10.4.2.2. However, the NRC's 2004 Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040; August 24, 2004) indicates that the "census-block-group" level is to be used in environmental-justice analyses, not the census-block level. In addition, new data for the 2010 Census have become available (see EJ-2 below). Finally, because there do appear to be minority and/or low-income populations within 50 miles, as shown in ER Figures 3.10-3, 3.10-4, and 3.10-5, the NRC would like to determine whether any such populations are located within 4 miles of the Project. The resolution of the figures, however, is insufficient to determine whether any such census-block groups are located within the 4-mile-radius geographic area around the Ludeman Project. This information is needed for the NRC's environmental-justice analysis in its EA.

RAI EJ-1 Response

Utilizing the 2010 U.S. Census 'census-block-group level' data and the bureau's 2007-2011 American Community Survey data, an updated analysis of both the 50-mile and 4-mile geographic areas has been inserted into ER Sec. 3.10 to assist the NRC in ensuring that there are no minority or low-income populations within 4-miles of the proposed project. The following figures represent the updated environmental justice analysis and the text/values in ER Section 3.10 have been updated accordingly.

JOHNSON
CAMPBELL
WESTON
NATRONA
CONVERSE
NIOBRARA
PLATTE
CARBON
ALBANY
GOSHEN

Kaycee
Wright
Midwest
Edgerton
Antelope Hills
Homa Hills
Bar Nunn
Hartrandt
Vista West
Mountain View
Red Butte
Bessemer Bend
Casper
Casper Mountain
Brookhurst
Meadow Acres
Rolling Hills
Glenrock
Douglas
Esterbrook
Lost Springs
Lance Creek
Manville
Glendo
Hartville
Guernsey
Westview Circle
Lakeview North
Wheatland
Chugcreek
Y-O Ranch

196 50 116 87 192 450 387 59 272 256 254 20 95 270 252 253 90 93 25 96 91 94 18 271 319 317 26 320 160 311 310 316 312 315 220 251 77 487 291 34

Legend

- Ludeman Project Boundary
- Ludeman Project Area - 4 mile buffer (buffer measured from perimeter)
- Ludeman Project Area - 50 mile radius

Municipal Population (2010)

- 0 - 10000
- 10001 - 55316

- Interstate
- Highway
- Major Road
- Local Road

0 5 10 20 Miles

This map (or data product) is for assessment and planning purposes only. It is not intended to be used for description, conveyance, authoritative definition of legal boundary, or property title. This is not a survey product.

PREPARED FOR
uranium one
investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.treccorp.com

N W E S

1:625,000

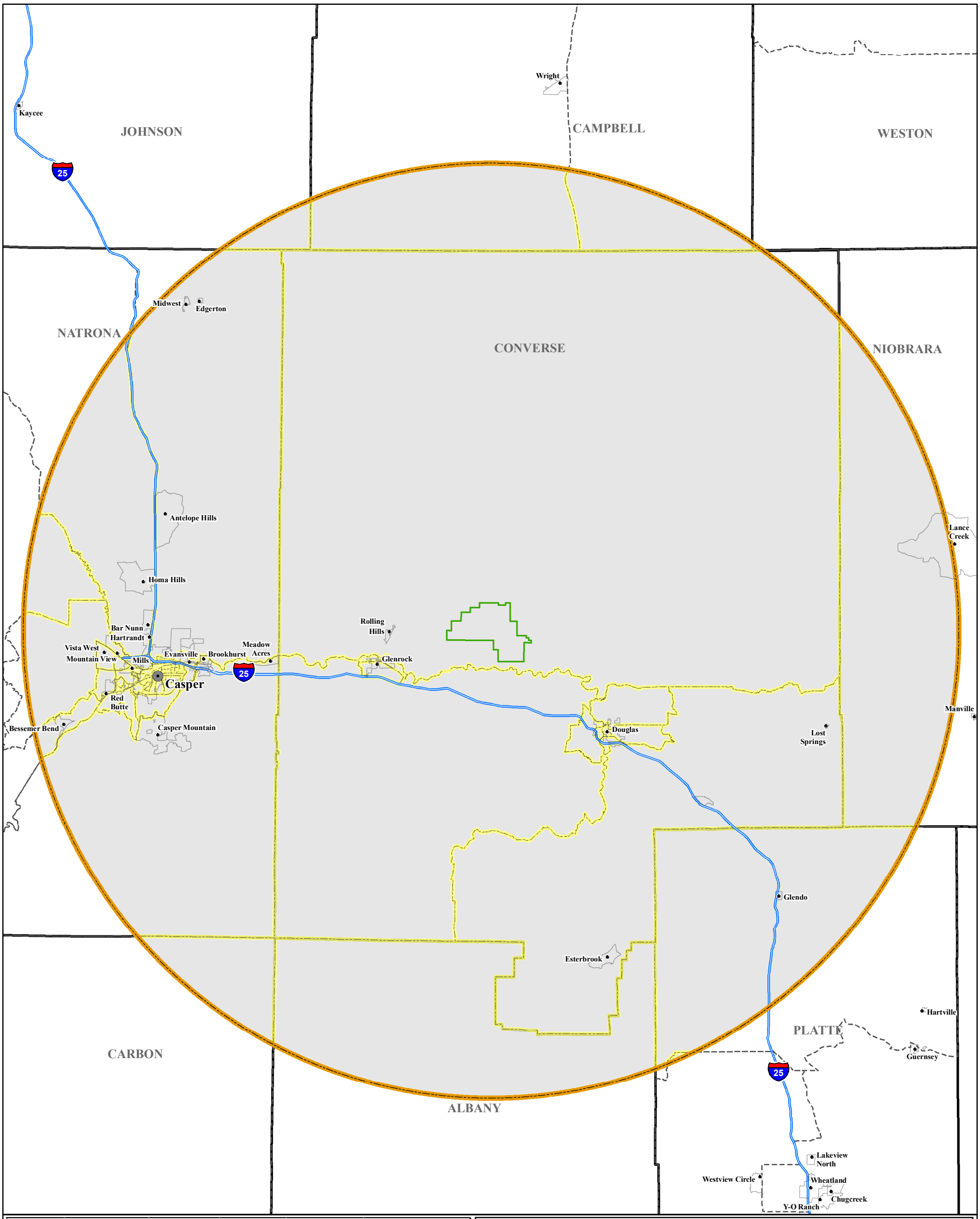
DRAWN BY: EGS
CHECKED BY: CAT
APPROVED BY: RMD

Environmental Justice Study Area for the Proposed Project

Source: US Census Bureau, 2010 Census 'Place' data

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	EGS	6/14/13	10
1	For Submittal	RMD	6/20/13	

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_EJ_StudyArea.mxd



NATIVE AMERICAN or ALASKA NATIVE					
	# of Block Groups analyzed	Range of population % (Min. - Max.)	Population is **Under 20%** of Total Population	Population is **20%-49%** of Total Population	Population is **50% or Greater** of Total Population
50 mile Radius	68	.1% - 4.8%	68 block groups	0 block groups	0 block groups

HISPANIC OR LATINO					
	# of Block Groups analyzed	Range of population % (Min. - Max.)	Population is **Under 20%** of Total Population	Population is **20%-49%** of Total Population	Population is **50% or Greater** of Total Population
50 mile Radius	68	1.6% - 19.7%	68 block groups	0 block groups	0 block groups

LOW-INCOME LEVEL					
	# of Block Groups analyzed	Range of population % (Min. - Max.)	Population is **Under 20%** of Total Population	Population is **20%-49%** of Total Population	Population is **50% or Greater** of Total Population
50 mile Radius	68	0 - 40.9%	68 block groups	6 block groups	0 block groups

NOTE: These values reflect the range of population percentages resulting from analysis of 68 unique block groups. Minority or low-income population percentages were calculated as a percent of the total population for each block group.

Legend

- Ludeman Project Boundary
- Project Area 50 mile radius
- Block Group or Block Group portion selected for analysis
- 2010 Census Block Group Boundary

Municipal Population (2010)

- 0 - 10,000
- 10,001 - 55,316
- Municipal Boundary

Interstate

0 2.5 5 10 15 20 Miles

This map (or data product) is for assessment and planning purposes only. It is not intended to be used for description, conveyance, authoritative definition of legal boundary, or property title. This is not a survey product.

PREPARED FOR: uranium one — investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.treccorp.com

N W E S

1:625,000

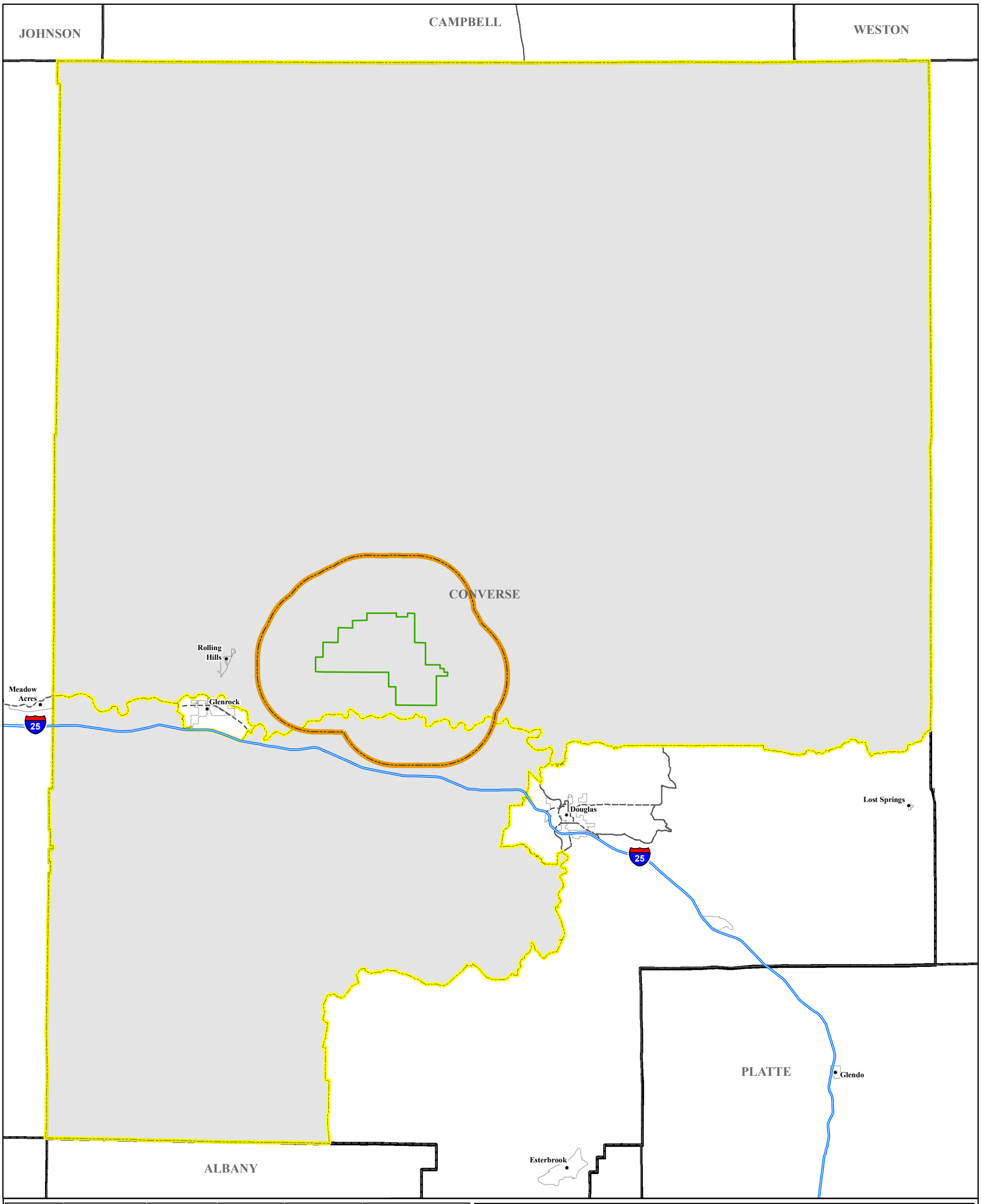
DRAWN BY: EGS
CHECKED BY: CAT
APPROVED BY: RMD

Block Groups included in Project Area 50 Mile Radius (Based on 2010 Census Block Group data)

Source: US Census Bureau 2010 Census Block Group data, Summary File 1 & American Community Survey

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	EGS	5/17/13	11
1	For Submittal	RMD	6/20/13	

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_EJ_BlkGrp_50mi.mxd



NATIVE AMERICAN or ALASKA NATIVE					
	# of Block Groups analyzed	Range of population % (Min. - Max.)	Population is **Under 20%** of Total Population	Population is **20%-49%** of Total Population	Population is **50% or Greater** of Total Population
4 mile Radius * (buffered from project boundary perimeter)	2	.68% - .84%	2 block groups	0 block groups	0 block groups
HISPANIC OR LATINO					
	# of Block Groups analyzed	Range of population % (Min. - Max.)	Population is **Under 20%** of Total Population	Population is **20%-49%** of Total Population	Population is **50% or Greater** of Total Population
4 mile Radius * (buffered from project boundary perimeter)	2	4.9% - 5.6%	2 block groups	0 block groups	0 block groups
LOW-INCOME LEVEL					
	# of Block Groups analyzed	Range of population % (Min. - Max.)	Population is **Under 20%** of Total Population	Population is **20%-49%** of Total Population	Population is **50% or Greater** of Total Population
4 mile Radius * (buffered from project boundary perimeter)	2	4.0% - 4.25%	2 block groups	0 block groups	0 block groups

NOTE: These values reflect the range of population percentages resulting from analysis of 68 unique block groups. Minority or low-income population percentages were calculated as a percent of the total population for each block group.

Legend

- Ludeman Project Boundary
- Ludeman Project Area - 4 mile buffer (buffer measured from perimeter)
- Block Group or or Block Group portion selected for analysis
- 2010 Census Block Group Boundary

Municipal Population (2010)

- 0 - 10,000
- 10,001 - 55,316
- Municipal Boundary

- Interstate

0 2.5 5 10 Miles

This map (or data product) is for assessment and planning purposes only. It is not intended to be used for description, conveyance, authoritative definition of legal boundary, or property title. This is not a survey product.

PREPARED FOR

uranium one™ investing in our energy

LUDEMAN PROJECT
CONVERSE COUNTY, WY

TREC, Inc.
Engineering & Environmental Management
900 Werner Court
Suite 150
Casper, WY 82601
Phone (307) 265-0696
Fax (307) 265-2498
www.treccorp.com

N W E S

1:400,000

DRAWN BY: EGS
CHECKED BY: CAT
APPROVED BY: RMD

Block Groups included in Project Area 4 Mile Radius (Based on 2010 Census Block Group data)

Source: US Census Bureau 2010 Census Block Group data, Summary File 1 & American Community Survey

REV #	DESCRIPTION	BY	DATE	FIGURE
0	Draft for Review	EGS	5/17/13	12
1	For Submittal	RMD	6/20/13	
2				

Path: O:\WY_Projects\8201-2013-102_Infrastructure\Project_MXD\Ludeman_EJ_BlkGrp_4mi.mxd

RAI EJ-2

Please confirm that the best-available data were used in the ER's environmental-justice analysis.

A. *Please indicate if, and how, the conclusions of the environmental-justice analysis have changed as a result of the 2010 Census and its published census-block-group, best-available data (i.e., not the census-block level).*
B. *Please provide a table of the 2010 Census data used in the re-evaluated environmental-justice analysis arranged by census-block group.*

The economic downturn, which began in 2008 and thus would not be reflected in the 2000 Census data, as well as changes in the energy sector in Wyoming may have affected the characteristics of minority and low-income populations present in Wyoming. A review of the newer 2010 Census data is therefore necessary to ensure that the best-available data are used in the environmental-justice analysis. Also, as suggested in the NRC's 2004 environmental-justice guidance cited above, the environmental-justice analysis should be performed at the census-block-group level. This information will be used in the NRC's EA to provide a basis for the conclusions of the environmental-justice analysis.

RAI EJ-2 (A) Response

Similar to the analysis using 2000 Census block data, analysis using 2010 census block group data also yields results indicating minority or low-income populations are not significant. None of the results of the updated analysis meet the criteria necessary to expand upon the discussions on Environmental Justice in Sec. 3.10.

RAI EJ-2 (B) Response

The 2010 "block group" tables requested are included within the new figures as shown in the response to RAI EJ-1.

Historic and Cultural Resources

Uranium One together with Ethnoscience Inc. reviewed the historic and cultural resource RAIs and developed responses that should provide the NRC with sufficient information for the completion of the determination of potential impacts to historical and cultural properties by the proposed activities. Due to the sensitive nature of the information provided, the RAI responses are found in the confidential Appendix C of this ER RAI response package. Confidential information is submitted under 10 CFR 2.390. Disclosure is limited under the National Preservation Act, Section 304 (16 U.S.C. 470w-3(a))

Waste Management

RAI Waste-1

Please provide additional information regarding the management and disposal of solid wastes contaminated with byproduct material. In particular, please list each individual solid waste stream that would be contaminated with byproduct material and provide the total estimated quantities of these wastes that would be generated during the four Project phases at each of the proposed Satellites.

Section 4.13.1.4 of the ER, Solid 11e.(2) Byproduct Material Disposal, states that 100 to 200 shipments (of byproduct waste) per year would be expected during facility decommissioning. If the total byproduct-waste volume during facility decommissioning and site restoration were to be estimated at 4,000 cubic yards (yd3) (ER page 4-63), and each shipment would be approximately 20 yd3 (ER page 4-63), then a minimum of 200 shipments would be disposed of at the Shirley Basin Facility. Please discuss the precision of the total estimated volume and the number of expected shipments, as the low estimate of 100 shipments is 50 percent of that calculated from the volume shown on page 4-63 of the ER. In order to assess the environmental impacts of the management of these wastes (i.e., solid byproduct wastes), a sound estimate of the total volume is critical.

RAI Waste-1 Response

Section 4.13 of the ER states that "up to" 4,000 yd^3 of solid 11e.(2) byproduct may be produced during decommissioning. This amount is indicative of a maximum estimated amount but could in fact be much less, even as much as the 50% less as the NRC observed above. The variance in this value is primarily dependent upon the final disposition of the building structure. Upon decommissioning the building structure / foundation will be evaluated and either disposed of as 11e.(2) material or released for unrestricted use. This accounts for the range of materials potentially generated, with values given allowing for a sound estimate of the maximum volumes.

RAI Waste-2

Please provide additional information regarding the total capacity for solid byproduct waste of the Pathfinder Mine Corporation's Shirley Basin Facility.

A. *Please clarify whether or not there is a limit on the volume of ISR-facility-generated byproduct waste that Uranium One could ship from the Ludeman Project to the Shirley Basin Facility. If there is a limit on the volume of solid byproduct waste that Uranium One could ship to the Shirley Basin Facility from the Ludeman Project, please provide a quantitative value for the limit (e.g., number of yd3).*
B. *Please identify at least one alternative waste-disposal facility that Uranium One would use if the Shirley Basin Facility "stops accepting byproduct wastes," as noted on page 4-65 of the ER.*

The bulleted text in Section 4.13.1.4 of the ER, under the heading of "Solid 11e.(2) Byproduct Material Management Potential Impacts," includes the sentence "[t]here is a disposal limit of 10,000 cubic yards of byproduct material from generators other than ISR facilities." It is unclear whether the Applicant is indicating that, as an ISR-facility waste generator, it would have no limit on the volume it could ship to the Shirley Basin Facility.

In addition, the discussion in Section 4.13.1.4 of the ER notes that "[w]hile there is potentially sufficient capacity to accept all of the solid 11e.(2) byproduct material from the Proposed Action at the Shirley Basin Facility, Uranium One might be required to find an alternate disposal facility…" Uranium One should identify another byproduct waste disposal facility, in the event it cannot use the Shirley Basin Facility. This information is necessary for the NRC to assess the environmental impacts of waste management at the Ludeman Project.

RAI Waste-2 (A) Response

Uranium One is not currently aware of limitations on the volume of solid 11e.(2) byproducts that may be shipped to the Shirley Basin waste-disposal facility by licensed ISR facilities. Uranium One understands that the NRC would like to ensure that sufficient planning occurs to facilitate the proper disposal of 11e.(2) byproducts. As a company with ample operations experience and current licensing guidance at our disposal, Uranium One is well positioned to provide assurance that byproducts will be handled

appropriately. Additionally, NRC License Number SUA-1341 Section 9: Administrative Conditions, 9.7 states:

"The licensee shall dispose of Atomic Energy Act, as amended (AEA), Section 11e.(2) byproduct material, including evaporation pond residues, from the Irigary and Christiansen Ranch Satellite facilities at a site licensed by the NRC or an NRC Agreement State to receive AEA 11e.(2) byproduct material. The licensee shall identify the disposal facility to the NRC in writing. The licensee's approved waste disposal agreement must be maintained onsite. In the event the agreement expires or is terminated, the licensee shall notify the NRC in writing, in accordance with license condition 9.2, within 7 days after the expiration of termination. A new agreement shall be submitted for NRC approval within 90 days after expiration or termination, or the licensee will be prohibited from further lixiviant injection. If the licensee is not able to secure this agreement, then the licensee must increase the surety to include disposal at a commercial AEA 11e.(2) disposal facility."

As the Proposed Ludeman Project license amendment application falls under the auspices of License SUA-1341 it would be reasonable to infer the conditions would be applicable to the administrative conditions of this project. This condition provides for assurance that Section 11e.(2) byproduct materials shall be properly disposed of at a licensed 11e.(2) disposal facility.

RAI Waste-2 (B) Response

Alternate solid 11e.(2) byproduct disposal facilities have been identified in RAI Waste-4.

RAI Waste-3

Please provide additional information regarding Uranium One's management of non-radioactive solid waste streams.

A. *Please provide the estimated volume of non-radioactive solid waste stream that would be generated per unit time during the four Project phases at every proposed Satellite area.*
B. *Please confirm Uranium One's intent to dispose of non-radioactive, non-hazardous solid waste at the Glenrock Area Solid Waste Disposal Facility.*
C. *Please identify the hazardous-waste disposal facility to which Uranium One proposes to ship the Ludeman Project's hazardous waste (other than used oil and batteries).*

Sections 4.13.1.5.1 and 4.13.1.5.2 in the ER discuss the disposal facilities to which the Ludeman Project's non-radioactive, non-hazardous solid wastes could potentially be shipped for disposal. The Glenrock Area Solid Waste Disposal Facility is noted as the nearest facility however, Section 3.12.2.1 states that "[t]he nearest solid waste disposal facility … is a landfill in Gillette [Wyoming]." The text does not explicitly state at which facility Uranium One intends to dispose of its non-radioactive, non-hazardous solid waste. The ER also does not identify the hazardous-waste disposal facility(ies) to which Ludeman hazardous wastes would be shipped and disposed. In order to evaluate the impacts of waste management at the Ludeman Project, waste-disposal facilities should be explicitly identified for both non-radioactive, non-hazardous solid waste and non-radioactive, liquid and solid hazardous wastes. This information is necessary for the NRC to evaluate effectively the environmental impacts of waste management at the Ludeman Project.

RAI Waste-3 (A) Response

To assist the NRC in their evaluation of potential impacts related to waste-management Uranium One is providing waste stream estimations. The anticipated volumes of liquid byproduct generated from the proposed project are shown in the table below and have been added to ER Section 4 of the application.

Table 6: Anticipated Byproduct Material Management Systems and Quantities

Stream	Source	Storage Location	Disposal Method(s)	Estimated Quantity
11e.(2) Byproduct Material				
Liquid 11e.(2) Byproduct Material (Brine, permeate and other process)	Production and restoration RO circuits, Satellite Plant, well work over, spent eluant, process drains, filter backwash, wash down water and decontamination showers	Waste water tanks or lined storage ponds	Deep disposal wells and/or temporary storage in the lined surge/evaporation ponds	C: 0 gpm; O: 90 gpm; O&R: 118 gpm; R: 100 gpm D: <10 gpm
Solid 11e.(2) Byproduct Material	Filtrate and spent filter media; scale and sludge from equipment maintenance, contaminated soil, damaged ion exchange resin, contaminated solids from injection/recovery wells, contaminated PPE and contaminated materials and equipment from decommissioning	Designated and restricted solid 11e.(2) byproduct storage area within the satellite area	Shipment to NRC or agreement state licensed disposal facility	C: 0 C; O: 100 yd3/yr R: 100 yd3/yr D: 4,000 yd3
Non-11e.(2) Waste Material				
Other Waste Material	Drilling fluids and drill cuttings	Mud pits	On-site disposal in mud pits	C (per well): drilling fluid; 6,000 gal drill cuttings: 15 $yd^{3;}$ O, R, D: 0 gal 0 yd3
Solid Waste	Construction debris, decontaminated materials and equipment, and general office trash	Designed waste receptacles	Shipment to municipal landfill	C: 40 yd^3/wk O: 30 yd3/wk R: 20 yd3/wk D: 2,000 yd3
Hazardous Waste	Used oil, oily rags, used batteries, expired laboratory reagents, fluorescent light bulbs, solvent, cleaners and degreasers	Designated hazardous material storage area	Shipment to WDEQ/SHWD licensed recycling or disposal facility	<220 lb/mo (<100 kg/mo); (C, O, R, D)
Domestic Sewage	Restrooms	Septic tank(s) near Satellite Plant	On-site septic water disposal or treatment system plus holding tanks/portable toilets during construction and decommissioning	C: 400 gpd O: 600 gpd R: 300 gpd D: 400 gpd

Abbreviations: C - Construction O - Operation R - Groundwater restoration D – Decommissioning

RAI Waste-3 (B) Response

Uranium One intends to dispose of solid non-hazardous wastes at the Glenrock Area Solid Waste Disposal Facility, this minor discrepancy in text has been edited appropriately.

The text in reference to RAI Waste-3 part B now reads:

"The nearest solid waste disposal facility, which is a landfill in Glenrock is approximately 12 road miles west."

RAI Waste-3 (C) Response

The following statements provided in this response and incorporated into ER Section 4 address the concerns in RAI Waste-3 (C) above and further assist the NRC in evaluating potential waste management impacts:

"Uranium One intends to use the Glenrock Area Solid Waste Disposal Facility for solid non-hazardous and some hazardous wastes. Any hazardous wastes not accepted by the Glenrock Area Solid Waste Disposal Facility will be transported to the City of Casper Special Waste and Diversion Facility.

Uranium One expects the Ludeman Project to be classified as a conditionally exempt small quantity generator (CESQG) by WDEQ/SHWD. As such the proposed project will generate less than 220 pounds (100kg) of hazardous waste and less than 2.2 pounds (one kg) of acute hazardous waste in any calendar month. As such the Casper Special Waste and Diversion Facility accepts by fee commercially produced hazardous wastes on a weekly basis, this service is anticipated to be used as necessary for non-radioactive hazardous waste disposal."

RAI Waste-4

Please describe the measures that Uranium One would implement to mitigate the impacts of managing solid byproduct waste.

The discussion of Uranium One's management of solid byproduct wastes in Section 5.13.8 of the ER should be expanded to include measures that would be implemented to mitigate the impacts of managing these wastes. The NRC requires this information for its environmental impact analysis.

RAI Waste-4 Response

Uranium One will implement a magnitude of mitigation measures to minimize potential impacts of the proposed project. Regarding solid byproduct management, the following language has been added to ER Section 5 to better define these specific mitigations:

"Solid 11e.(2) byproduct material will be generated during all project phases except construction. The 11e.(2) byproduct material will be transported off-site by an appropriately licensed transporter to a disposal facility licensed by NRC or an agreement state. Uranium One (via SUA-1341) currently has an agreement with Pathfinder Mine Corporation Shirley Basin Facility to receive shipments of solid 11e.(2) materials from the operating Willow Creek Project. Prior to operations Uranium One commits to have a signed agreement with the Pathfinder facility or another NRC licensed facility to receive the solid 11e.(2) byproduct materials generated as a result of the proposed Ludeman Project.

Other potential disposal facilities include the following:

- Denison Mines Corporation, White Mesa Uranium Mill, Blanding, Utah; and
- Energy Solutions LLC, Clive Disposal Site, Clive, Utah.

The primary method of mitigating any potential impacts from disposal of 11e.(2) byproduct material will include:

- Minimize the amount of this material through process design, decontamination, and volume reduction during decommissioning;
- Filter media for the production and restoration circuits will be selected based on filtration efficiency and on minimizing byproduct material;

- Equipment and building surfaces will be decontaminated and reclassified as non-hazardous material for unrestricted release.

Solid non-11e.(2) waste materials will include construction debris, office trash, and decontaminated material and equipment. It will be generated during all project phases, including construction, operation, groundwater restoration, and decommissioning. Most of the solid byproduct material will be generated during decommissioning.

Non-hazardous solid waste material will be disposed off-site in a municipal landfill permitted by WDEQ/SHWD. The nearest municipal landfill is the Glenrock landfill approximately 12 miles west of the proposed project area. Any hazardous wastes not accepted by the Glenrock Area Solid Waste Disposal Facility will be transported to the City of Casper Special Waste and Diversion Facility. Prior to operations Uranium One will ensure this facility or others nearby have the capacity to receive this anticipated waste material.

The primary method of minimizing any potential impacts from solid waste disposal will be to minimize the amount of waste material produced by recycling and decontaminating materials and process equipment, and by using a chipper or grinder during decommissioning. Recyclable materials that will be taken to an approved municipal landfill include newspaper, magazines, phone books, cardboard, aluminum and steel cans, and plastic.

Small amounts of hazardous material are expected to be generated during all project phases in similar quantities (ER Section 4.13). In order to maintain classification as a Conditionally Exempt Small Quantity Generator (CESQG) by WDEQ/SHWD, the project will be required to generate less than 220 pounds (100 kg) of hazardous material, and less than 2.2 pounds (one kg) of acute hazardous material in any calendar month and store less than 2,200 pounds (1,000 kg) of hazardous material at any one time.

Hazardous material will be transported to an off-site facility that is licensed by WDEQ/SHWD or a nearby State to manage hazardous byproducts. The Glenrock Landfill, located 12 miles west of the proposed project area, accepts used oil and batteries for recycling and certain other hazardous materials on a case by case basis.

Uranium One will mitigate any potential impacts from hazardous waste management by minimizing the quantity of hazardous materials generated. This will be done by generally servicing vehicles and equipment at off-site facilities and by limiting laboratory reagent orders to quantities that can be consumed within the reagent shelf lives. The quantity of hazardous waste generated and stored in the proposed project area will be kept small enough to comply with CESQG requirements."

RAI Waste-5

Please provide the projected volumes of brine, excess permeate, and other liquid byproduct wastes that would be generated and disposed of during the four Project phases at each of the proposed Satellite areas.

Section 4.13.1 of the ER describes the generation of byproduct liquid waste that would be managed in the surface impoundments and disposed of by deep-well injection. The waste disposed of by deep-well injection would include brine, excess permeate, and other byproduct liquid wastes generated at the Satellite areas and well "work-over" operations in the wellfields. The volumes of all liquid byproduct waste streams are needed for the NRC to assess the impacts of proposed waste management and disposal at the Ludeman Project. This information will support the NRC's assessment of waste-management impacts.

RAI Waste-5 Response

As discussed in RAI FD-4, figures depicting the water balance during all phases of the project have been added to Section 3 of the TR and are included as Figures 6 through 9 in this document. In addition, the anticipated volume of liquid byproduct generated from the proposed project was discussed in RAI-Waste 3 (A). The information provided by Uranium One in these two aforementioned RAI responses should adequately support the NRC's assessment of potential waste-management impacts.

RAI Waste-6

Please provide the expected chemical composition of excess permeate.

Section 4.13.1.1 of the ER describes the injection of excess permeate into wellfields for recovery or restoration. Assessment of any related impacts to water quality from excursions into the aquifers adjacent to the exempt aquifer will require an understanding of the chemical composition of the excess permeate. This information will support the assessment of waste-management impacts.

RAI Waste-6 Response

To assist the NRC in assessing potential waste-management impacts Uranium One has developed additional information for review. Permeate from the RO systems will be a high quality effluent as identified in the table below which summarizes the anticipated permeate water quality:

Table 7: Anticipated Permeate Water Quality

Parameter	Unit	Typical Value	Minimum Value	Maximum Value
EC	µS/cm	300	180	400
TDS	mg/L	200	100	250
pH	s.u.	8	6	6.5
Alkalinity as CaCO3	mg/L	100	50	200
Sulfate	mg/L	15	10	20
Bicarbonate	mg/L	150	50	200
Chloride	mg/L	15	5	25
Calcium	mg/L	0	0	1
Sodium	mg/L	50	20	100
Manganese	mg/L	0	0	0.1
Selenium	mg/L	0	0	0.1
Arsenic	mg/L	0	0	0.1
Uranium	mg/L	0	0	0.1
Radium	pCi/L	30	5	100

RAI Waste-7

Please provide additional information on the mud pits associated with Uranium One's drilling of exploration and delineation holes and its installation of production, injection, and monitoring wells.

A. *Please describe the dimensions of the mud pits and the methodology that would be used by Uranium One to excavate and close the pits.*
B. *Please provide estimates of the volumes of drill cuttings, other liquid wastes, and ground water that would be managed in the mud pits.*

Mud pits associated with well drilling are noted as an impact to land use in Section 5.1 of the ER and as a source of radon-222 in Section 4.1 of the TR. In addition, the EA will consider the mud pits in its waste-management-impact analysis. Although restoration of the mud pits is discussed in Sections 1.8.1.2 and 5.1 of the ER, no information is provided on the design of the pits or on the volume of drill cuttings, other liquid wastes, and ground water that could be discharged to the pits. Information on the dimensions and other features of the pits, as well as the materials that would be contained in the pits, is necessary to assess waste-management impacts.

RAI Waste-7(A) Response

Mud pits associated with drilling activities are not under the regulatory review of the NRC; however, Uranium One has added the following language regarding mud pit excavation and reclamation to TR Section 6 in the "Topsoil Handling and Replacement" section:

"During mud pit excavation associated with well construction, exploration drilling and delineation drilling activities, topsoil will be separated from subsoil with a backhoe. A typical mud pit is approximately 7' x 20' or 10,800 ft^2. When use of the mud pit is complete, all subsoil will be replaced and topsoil will be reapplied. Mud pits only remain open a short time, usually less than 30 days. Similarly, during pipeline construction, topsoil will be stored separately from subsoil and will be replaced on top of the subsoil after the pipeline ditch is backfilled."

RAI Waste-7(B) Response

To assist the NRC's waste-management impacts assessment the following language regarding mud pit waste management has been added to TR Section 7:

"During the construction of the wellfield infrastructure there is potential for drill cuttings and liquid wastes such as drilling fluids. Based on information gathered during installation of the regional baseline monitor wells for the proposed project, a typical injection, recovery, or monitor well is expected to use between 3,000 and 30,000 gallons of water during drilling and well development and average around 6,000 gallons. Drilling fluids will be stored and disposed of on-site in mud pits, which will be constructed adjacent to the drilling site. The quantity of drilling fluids will be minimized by using the minimum quantity of water that is technically practicable for well drilling and development. Drill cuttings volumes will vary based on hole depth and size but typically amount to approximately 15 yd^3 per bore hole."

RAI Waste-8

Please provide additional information on the ground water discharged from wells during well development and groundwater sample collection.

A. *Please specify the disposal method for the ground water that would be pumped and discharged during the development of injection, recovery, and monitoring wells and that would be purged before routine sample collection.*
B. *Please provide an estimate of the volume of ground water that would be pumped and discharged during the above activities.*

Information on the disposal of ground water pumped and discharged from injection, production, and monitoring wells as well as ground water pumped from monitoring wells to purge them before routine sampling is necessary to assess waste-management impacts. Uranium One's pumping of ground water to develop wells is described in Section 1.8.1.3 of the ER and Section 3.1.3.3 of the TR. The purging of ground water from monitoring wells before sample collection is discussed in Section 6.2.2 of the ER. No information is provided, however, on the discharge and disposal of the excess ground water. The disposal methods proposed by Uranium One for waste ground water will support the NRC's analysis of waste-management impacts.

RAI Waste-8 (A) (B) Response

To assist the NRC's analysis of waste-management impacts Uranium One has included the following language in TR Section 4:

"4.2.2.3 Other Liquid Waste

Groundwater may be discharged during drilling, sample collection and aquifer testing. The "native" groundwater to be discharged will not have been exposed to any uranium recovery processes or chemicals. The groundwater recovered during these activities may be stored and disposed of on-site in mud pits constructed adjacent to the drilling sites or discharged to the surface in a non-erosive manner. It is anticipated that other water generated during operations and decommissioning will be disposed of in a similar manner. A more detailed discussion on water management and disposal can be found in ER Section 4."

As discussed in RAI Waste-7 (B) above, a typical injection, recovery, or monitor well is expected to use between 3,000 and 30,000 gallons of water during drilling and well

development and average around 6,000 gallons. Drill cuttings volumes will vary based on hole depth and size but typically amount to approximately 15 yd^3 per bore hole.

RAI Waste-9

Please provide information on the ground water discharged from the aquifer tests that would be performed at each wellfield at each Satellite area.

A. *Please estimate the volume of ground water that would be discharged from the aquifer test that would be performed at each wellfield, as well as the assumptions required to produce the estimate.*
B. *Please specify the proposed disposal method for the ground water generated during each aquifer test.*

Section 7.5.3 of the TR notes that aquifer tests would be conducted on each wellfield to assess the hydraulic communication between the production zone and the overlying and underlying aquifers. Assessment of waste-management impacts must consider the volume and disposal of the ground water that would be discharged from these aquifer tests.

RAI Waste-9 (A) Response

Uranium One has past operational experience in the powder River Basin of Wyoming and estimates from similar aquifer tests that the volume of water discharged during the course of a typical aquifer test ranges from 60,000 to 80,000 gallons. This can range greatly however depending upon site specific conditions, but this is Uranium Ones estimate again based on experience with similar aquifer testing in the area.

RAI Waste-9 (B) Response

The disposal method for groundwater generated during aquifer test is under the authorization of a temporary WYPDES permit.