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NI 43-101 Technical Report
Preliminary Economic Assessment
Dewey-Burdock Uranium ISR Project
South Dakota, USA

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1.0 EXECUTIVE SUMMARY

1.1 Background

Woodard & Curran (W&C) and Roughstock Mining Services (Roughstock) were retained by Azarga Uranium Corp. (Azarga) and their wholly owned subsidiary Powertech USA Inc. (Powertech), to prepare this independent Preliminary Economic Assessment (PEA) for the Dewey-Burdock ISR Project (Project) to be located in Custer and Fall River Counties in South Dakota, USA. The project location is shown on Figure 1.1. This PEA has been prepared for Azarga Uranium Corp. and Powertech USA Inc. (collectively referred to as “Azarga”) in accordance with the guidelines set forth under National Instrument (NI) 43-101 and NI 43-101F1 for the submission of technical reports on mining properties.

A NI 43-101 Technical Report Resource Estimate, Dewey-Burdock Uranium ISR Project, South Dakota, USA was previously prepared by Roughstock Mining Service with effective November 12, 2018 (ref., Roughstock 2018). In this PEA, the entire resource estimate for the project was again reviewed. The purpose of this PEA is to update the mineral resource estimate and update the capital and operating cost estimates and economic analysis with the most recent market information and to account for a revised construction and operations schedule. The new schedule is discussed in Section 16.

The Dewey-Burdock Project is an advanced-stage uranium exploration project located in South Dakota and is solely controlled by Powertech USA, Inc. The Project is located in southwest South Dakota (Figure 1.1) and forms part of the northwestern extension of the Edgemont Uranium Mining District. The project is divided into two Resource Areas, Dewey and Burdock, as shown in Figure 1.2.

The project is within an area of low population density characterized by an agriculture-based economy with little other types of commercial and industrial activity. The project is expected to bring a significant economic benefit to the local area in terms of tax revenue, new jobs, and commercial activity supporting the project. Previously, a uranium mill was located at the town of Edgemont, and a renewal of uranium production is expected to be locally favorable form of economic development. Regionally, there are individual and other organizations that oppose the project, though typically not in the immediate Edgemont area.

The three most significant permits/licenses are (1) the Source and Byproduct Materials License, which was issued by the U.S. Nuclear Regulatory Agency NRC April of 2014; (2) the Large Scale Mine Permit (LSMP), to be issued by the South Dakota Department of Environment (DENR); and (3) UIC Class III and V permits (ISR injection and deep disposal, respectively), which draft permits were issued from the U.S. Environmental Protection Agency Region 8 (EPA) initially in March 2017 and reissued in August 2019. Permit requirements and status are discussed in Sections 4 and 20. Public interest in the project has extended regulatory efforts and logistics for accommodating public involvement, but at the time of this report, the NRC license has been issued, the State of South Dakota LSMP has been recommended for approval by DENR, and draft UIC Class III and Class V permits have been issued by EPA.

Figure 1.1: Project Location

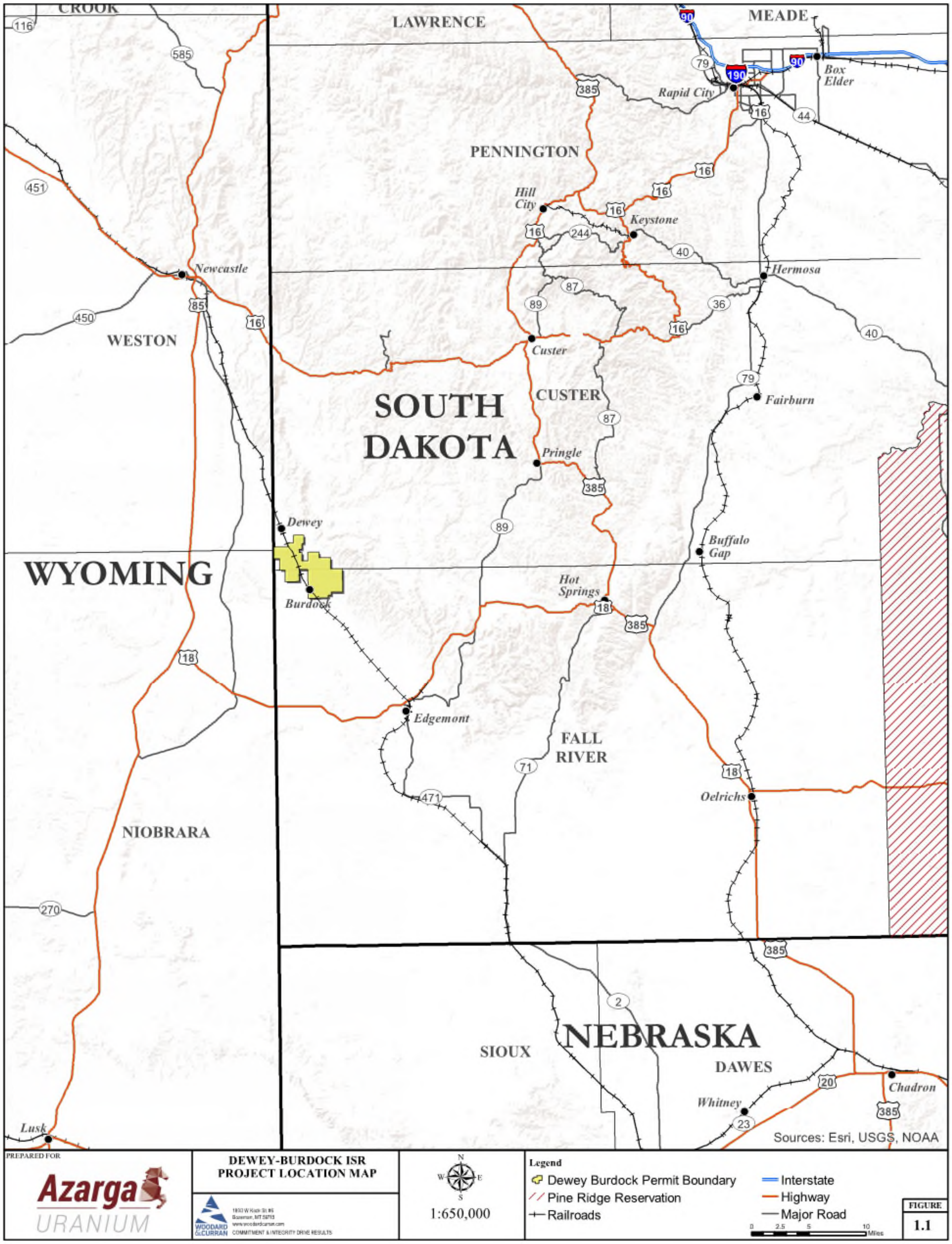
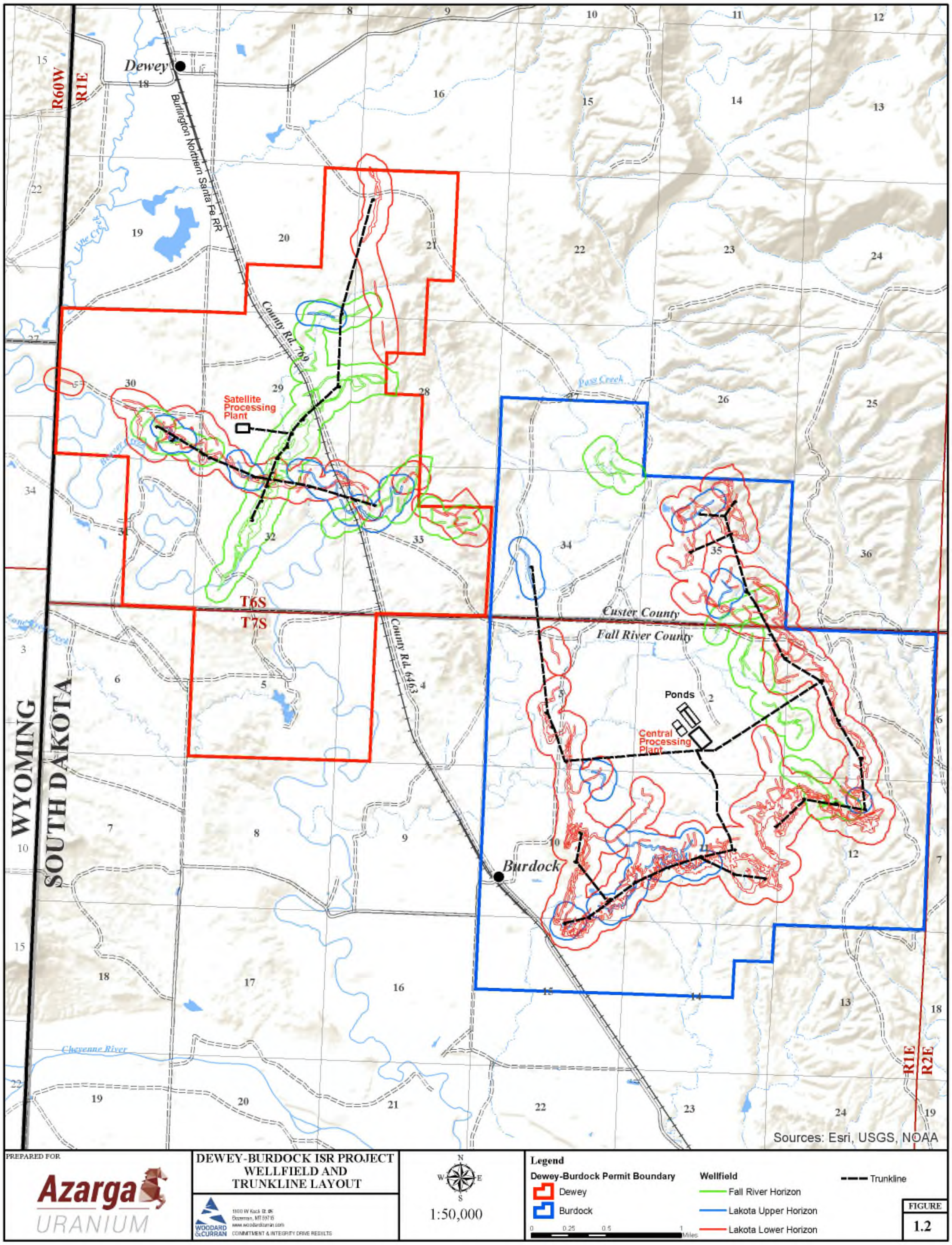


Figure 1.2: Project Site Map



1.2 Resources

Cautionary statement: This Preliminary Economic Assessment is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

As further discussed in Section 14, the deposits within the project area contain Measured ISR resources of 5,419,779 tons at an average grade of 0.132% U_3O_8, Indicated ISR resources of 1,968,443 tons at a grade of 0.072% U_3O_8 for a total M&I ISR resource of 17.12M pounds U_3O_8 at a 0.2 GT cutoff, and Inferred resource of 654,546 tons at a grade of 0.055% U_3O_8 for a total of 712,624 pounds U_3O_8 at a 0.2 GT cutoff. See Table 1.1 for a summary of the mineral resource estimate.

As discussed in Section 13, laboratory dissolution results ranged from 71 to 97%, indicating the deposit is amenable to ISR mining methods. In addition, recoverability for operating uranium ISR operations has been reported as high as 85% of the estimated resources under pattern. ISR PEAs for similar projects have predicted a range of recoverability from 67 to 80% as discussed in Section 17. The average recovery head grade assumed over the life of the Project in this PEA is 60 parts per million (ppm), as discussed in Sections 13 and 17.

Table 1.1: 2019 Mineral Resource Estimate Summary (Effective date-December 3, 2019)

ISR Resources	Measured	Indicated	M & I	Inferred
Pounds	14,285,988	2,836,159	17,122,147	712,624
Tons	5,419,779	1,968,443	7,388,222	645,546
Avg. GT	0.733	0.413	0.655	0.324
Avg. Grade (% U_3O_8)	0.132%	0.072%	0.116%	0.055%
Avg. Thickness (ft)	5.56	5.74	5.65	5.87

Note: Resource pounds and grades of U_3O_8 were calculated by individual grade-thickness contours. Tonnages were estimated using average thickness of resource zones multiplied by the total area of those zones.

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For the purpose of this PEA, it is the Qualified Person, Matthew Yovich's opinion that Azarga's assumed uranium recovery of 80% of the estimated resource is a reasonable estimate. Therefore, the overall potential yellowcake production is estimated to be 14.3 million pounds, as shown in Table 1.2 below. The recovery value of 80% is an estimate based on industry experience and Azarga personnel experience at the Smith Ranch Uranium ISR mine located in Wyoming. See Section 17 for additional discussion relative to the basis for the recovery value used in the PEA.

It is also projected that 100% of the resource will be placed under a mining pattern. This may require license/permit amendments where these resources extend beyond the current permit boundary. In addition, the resource recovery assumes an average 0.5% recovery will be realized during restoration which is included in the total estimated recovery of 80% of the mineral resource not including any plant losses.

Table 1.2: 2019 Estimated Recovery of Mineral Resource (Effective date – December 3, 2019)

	Estimated Measured Resources	Estimated Indicated Resources	Estimated M&I Resources	Estimated Inferred Resources
Pounds	14,285,988	2,836,159	17,122,147	712,624
Estimated Recoverability	80%	80%	80%	80%
Estimated Total Recovery	11,428,790	2,268,927	13,697,717	570,099

This* Preliminary Economic Assessment *is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. The estimated mineral recovery used in this Preliminary Economic Assessment is based on site-specific laboratory recovery data as well as Azarga personnel and industry experience at similar facilities. There can be no assurance that recovery at this level will be achieved.

The Dewey-Burdock uranium mineralization is comprised of "roll-front" type uranium mineralization hosted in several sandstone stratigraphic horizons that are hydrogeologically isolated and therefore amenable to ISR technology. Uranium deposits in the Dewey-Burdock Project are sandstone, roll-front type. This type of deposit is usually "C"-shaped in cross section, with the down gradient center of the "C" having the greatest thickness and highest tenor. These "roll fronts" are typically a few tens of feet wide and often can be thousands of feet long. Uranium minerals are deposited at the interface of oxidizing solutions and reducing solutions. As the uranium minerals precipitate, they coat sand grains and partially fill the interstices between grains. Thickness of the deposits is generally a factor of the thickness of the sandstone host unit. Mineralization may be 5 to 12 ft thick within the roll front while being 1 to 2 ft thick in the trailing tail portions. Deposit configuration determines the geometry of the well field and is a major economic factor in ISR mining.

The Dewey-Burdock mineralization is located at depths of 184 to 927 ft below surface at Dewey and surface to 782 ft below surface at Burdock, as several stacked horizons, which are sinuous and narrow but extend over several miles along trend of mineralization. The deposits are planned for ISR mining by development of individual well fields for each mineralized horizon. A well field will be developed as a series of injection and recovery wells, with a pattern to fit the mineralized horizon, typically a five spot well pattern on 50 to 150 ft drillhole spacing.

Historic exploration drilling for the project area was extensive and is discussed in Section 6. In 2007 and 2008, Azarga conducted confirmatory exploration drilling of 91 holes including 20 monitoring wells. In addition, Azarga installed water wells for water quality testing and for hydro-stratigraphic unit testing. This work confirmed and replicated the historic drill data and provided some in-fill definition of uranium roll fronts. In addition, the hydrogeologic investigations defined the pre-mining water quality and determined the capacity for the uranium-bearing hydro-stratigraphic units to allow for circulation of ISR recovery fluid, and confinement of the fluids to the hydro-stratigraphic unit.

1.3 Project

The Burdock Resource Area consists of 19 well fields where mineral extraction will occur. The central processing plant (CPP) facility for the Project will be located at the Burdock Resource Area along with five ponds as shown in Figure 1.2. A satellite facility will be constructed in the Dewey Resource Area. The Dewey Resource Area consists of 32 well fields where mineral extraction will occur. A discussion of the materials required for the well field and for the plants is provided in Sections 16 and 17, respectively.

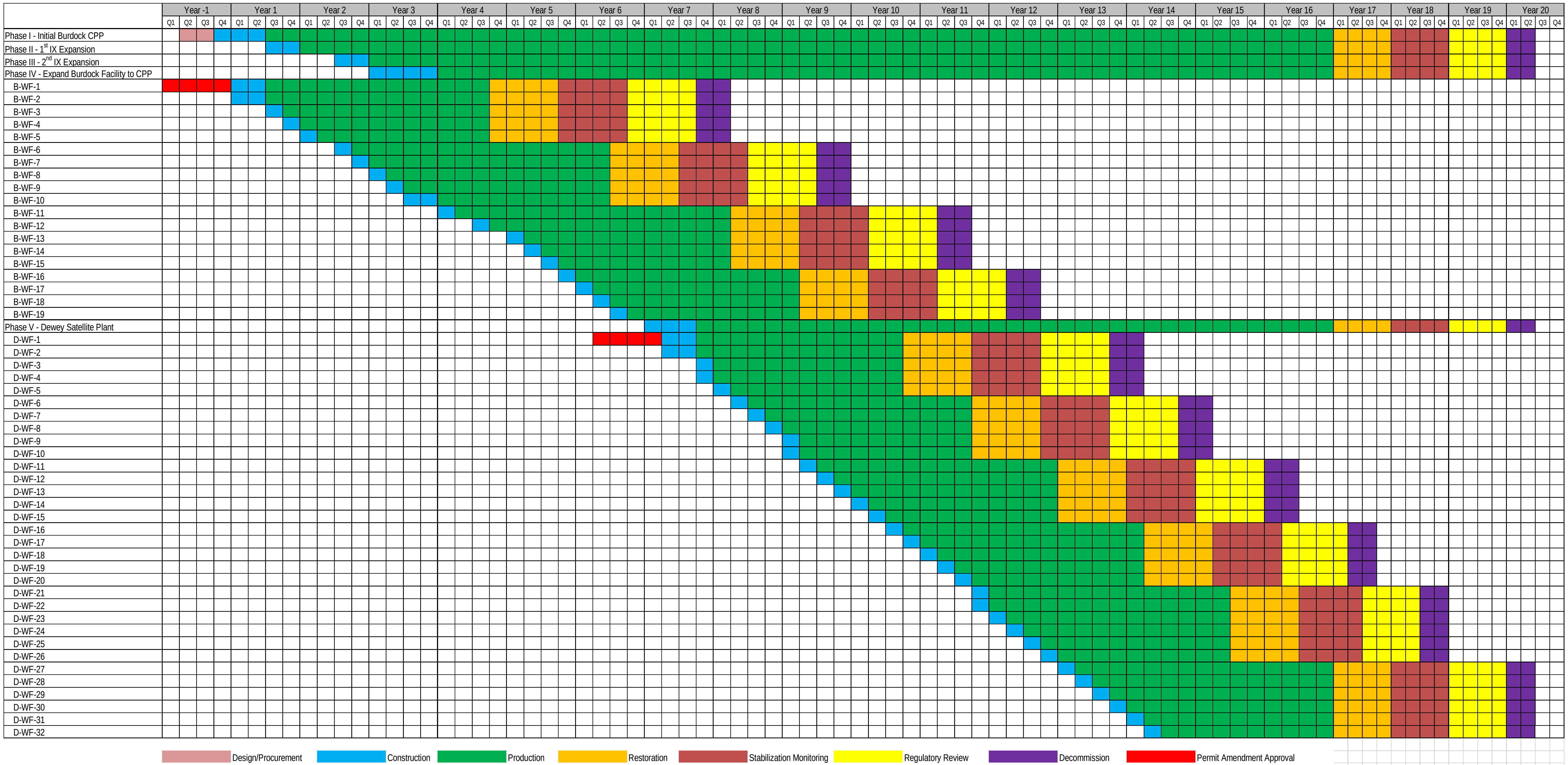
As discussed in Section 18, the Project area is well supported by nearby towns and services. Major power lines are located near the Project and can be accessed and upgraded for electrical service for the mining operation. A major rail line (Burlington Northern-Santa Fe) cuts diagonally across the project area. A major railroad siding is located at Edgemont and can be used for shipment of materials and equipment for development of the producing facilities.

The Project is proposed to be developed with a gradual phased approach. The Burdock CPP Facility will be constructed to initially accept a flow rate of up to 1,000 gallons per minute (gpm) lixiviant. Capacity will be gradually expanded to accept a flow rate of 4,000 gpm of lixiviant. Resin will be transferred from IX vessels to resin trailers to be transported and processed at an off-site processing facility for the first few years. Once the flow rate capacity reaches 4,000 gpm, the Burdock CPP Facility will be expanded to include processing capabilities for up to 1.0-mlbs-pa of U_3O_8. Once the Burdock Resource Area has been economically depleted, the IX vessels will be removed from the CPP Facility and transported to Dewey, where a satellite facility will be constructed to mine the Dewey Resource Area. The proposed phases are as follows:

- Phase I – Construction of two header houses and the Burdock CPP Facility with one IX train (estimated 1,000 gpm average flow rate, 1,100 gpm maximum flow capacity) and capability to transfer resin to a transport vehicle for off-site toll processing.
- Phase II – Construction of an additional two header houses and expansion of the Burdock CPP Facility to two IX trains (estimated 2,000 gpm average flow rate, 2,200 gpm maximum flow capacity).
- Phase III – Construction and operation of sufficient header houses to support expansion of the Burdock CPP Facility to four IX trains (estimated 4,000 gpm average flow rate, 4,400 gpm maximum flow capacity)
- Phase IV – Construction and operation of sufficient header houses to support expansion of Burdock CPP Facility to maintain four IX trains (estimated 4,000 gpm average flow rate, 4,400 gpm maximum flow capacity) and on-site uranium processing capabilities up to approximately one million pounds per year.
- Phase V – Construction of the Dewey Satellite Facility and transfer of IX vessels from the Burdock CPP Facility to the Dewey Facility.

Figure 1.3 provides the operating and production schedule for the Project as currently defined. Production will generally occur at each well field consecutively and the Project production will occur over a period of approximately 16 years. Groundwater restoration and decommissioning (including site reclamation) will also be implemented concurrently with production and will continue approximately four years beyond the production period. The overall mine life is approximately 21 years from initiation of construction activities to completion of groundwater restoration and decommissioning.

Figure 1.3: Life of Mine Schedule



Notes:

1) Well field completion is based on completed wells required to meet production in a given year. Thus, the well fields are built on an 'as-needed' basis and may not require a full year of construction activities.
2) Phase I construction activities also account for pre-construction design activities.
3) All wellfield license amendments are to be completed during the permit amendment period.

1.4 Economic Analysis

Cautionary statement: This* Preliminary Economic Assessment *is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

The economic analyses presented herein provide the results of the analyses for pre-U.S. federal income tax and estimated post U.S. federal income tax. The only difference between the two scenarios is the value of the estimated U.S. federal income tax. All other sales, property, use, severance and conservations taxes as well as royalties are included in both scenarios. Both economic analyses presented herein assume no escalation, no debt, no debt interest and no capital repayment. There is no State of South Dakota corporate income tax.

As described in Section 21 and summarized in Table 1.3, the estimated initial capital costs for the first two years of the Project life (Years -1 and 1) are approximately $31.7 million with sustaining capital costs of approximately $157.7 million spread over the next 17 years (Years 2 through 18) of operation.

Direct cash operating costs are approximately $10.46 per pound of U_3O_8 produced excluding royalties and severance and conservation taxes. U.S. federal income tax is estimated to be $3.39 per pound. The total capital and operating costs average approximately $28.88 per pound (pre-U.S. federal income tax) and $32.27 per pound (post-U.S. federal income tax) U_3O_8 produced. Both the capital and operating costs are current as of the end of 2019. The predicted level of accuracy of the cost estimate is +/- 25%.

An average uranium price of $55 per pound of U_3O_8 based on an average of recent market forecasts by various professional entities was determined to be an acceptable price for the PEA, see Table 19.1. Azarga has no contracts in place for sale of product from the project. Contracts for yellowcake transportation, handling and sales will be developed prior to commencement of commercial production.

The estimated payback is in Quarter 4 of Year 2 with the commencement of design/procurement activities in Quarter 2 of Year -1 and construction beginning Quarter 4 of Year -1. The Project is estimated to generate net earnings over the life of the project of $372.7 million (pre-U.S. federal income tax) and $324.4 million (post U.S. federal income tax). It is estimated that the project has an internal rate of return (IRR) of 55% and a NPV of $171.3 million (pre-U.S. federal income tax) and an IRR of 50% and a NPV of $147.5 million (post-U.S. federal income tax) applying an 8% discount rate, see Table 1.3 below.

Table 1.3: Summary of Economics

Summary of Economics[1]			
	Pre-U.S. Federal income tax at $55/lb	**Post-U.S. Federal income tax at $55/lb**	**Units**
Initial CAPEX	$31,672	$31,672	(US$000s)
Sustaining CAPEX	$157,682	$157,682	(US$000s)
Direct Cash OPEX	$10.46	$10.46	$/lb U_3O_8
U.S. Federal Income Tax	$0.00	$3.39	$/lb U_3O_8
Total Cost per Pound U_3O_8	$28.88	$32.27	$/lb U_3O_8
Estimated U_3O_8 Production	14,268	14.268	Mlb U_3O_8
Net Earnings	$372,738	$324,352	(US$000s)
$IRR_{8\%}$	55%	50%	-
$NPV_{8\%}$	$171,251	$147,485	(US$000s)
Sensitivity to price is provided in Section 22.4			

[1] **Cautionary statement: This Preliminary Economic Assessment is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.**

It should be noted that the favorable economic indicators presented above are due to a combination of the following:

1. Investment costs were incurred prior to this PEA for Project exploration and permitting,
2. The Project will be implemented in phases starting as an IX facility rather than a full processing plant along with initial development of high grade, consolidated well fields (defers significant capital costs),
3. Contractors will be utilized for all plant and well field construction to reduce labor costs associated with phased project development, and
4. Favorable head grade and recovery rate are anticipated.

A summary of the Project economics for pre- and post- U.S. federal income tax is presented below.

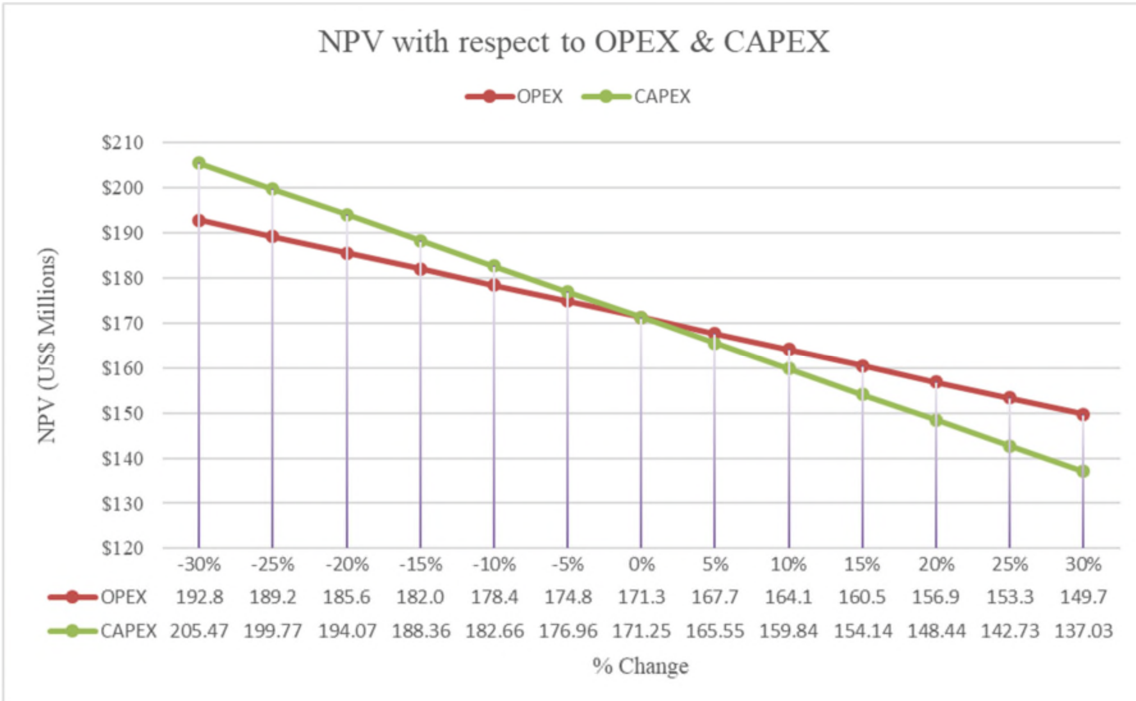
Table 1.4: Cash Flow Summary

Cash Flow Line Items	Units	Total or Average	$ per Pound
Uranium Production as U_3O_8	Lbs 000s	14,268	-
Uranium Price for U_3O_8	US$/lb	$55.00	-
Uranium Gross Revenue	**US$000s**	**$784,740**	-
Less: Surface & Mineral Royalties	US$000s	$38,060	$2.67
Taxable Revenue	**US$000s**	**$746,680**	-
Less: Severance & Conservation Tax	US$000s	$35,393	$2.48
Less: Property Tax	US$000s	$7,201	$0.50
Net Gross Sales	**US$000s**	**$704,086**	-
Less: Plant & Well Field Operating Costs	US$000s	$108,084	$7.58
Less: Product Transaction Costs	US$000s	$11,889	$0.83
Less: Administrative Support Costs	US$000s	$5,362	$0.38
Less: D&D and Restoration Costs	US$000s	$16,659	$1.17
Net Operating Cash Flow	**US$000s**	**$562,093**	-
Less: Pre-Construction Capital Costs	US$000s	$1,025	$0.07
Less: Plant Development Costs	US$000s	$52,140	$3.65
Less: Well Feld Development Costs	US$000s	$136,190	$9.55
Net Before-Tax Cash Flow	**US$000s**	**$372,738**	-
Less: Federal Tax	US$000s	$48,386	$3.39
After Tax Cash Flow	**US$000s**	**$324,352**	-

The sensitivity to changes in capital and operating costs and the price of uranium, have been calculated from the pre-U.S. federal income tax cash flow statements and are presented below in Figures 1.4, 1.5 and 1.6. The sensitivity to changes in head grade and uranium recovery are also discussed below. **Post-U.S. federal income tax sensitivities are discussed in Section 22.4.**

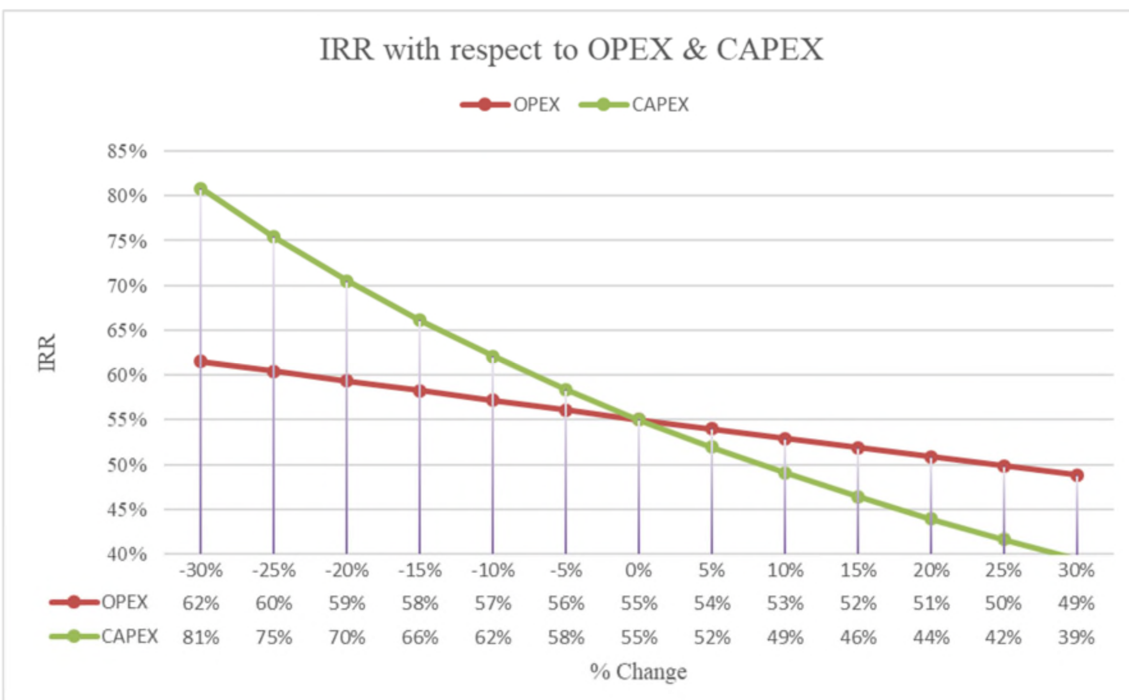
The Project pre-U.S. federal income tax NPV is also slightly sensitive to changes in either capital or operating costs as shown on Figure 1.4. A 5% variation in operating cost results in a $3.59 million variation in NPV and an impact to the IRR of approximately 1.06%. A 5% variation in capital cost results in a $5.70 million variation to the NPV and an impact to the IRR of approximately 3.45%.

Figure 1.4: NPV v. OPEX & CAPEX (Pre-U.S. Federal Income Tax)



Note: Based on sales price of $55.00 per pound and 8% discount rate.

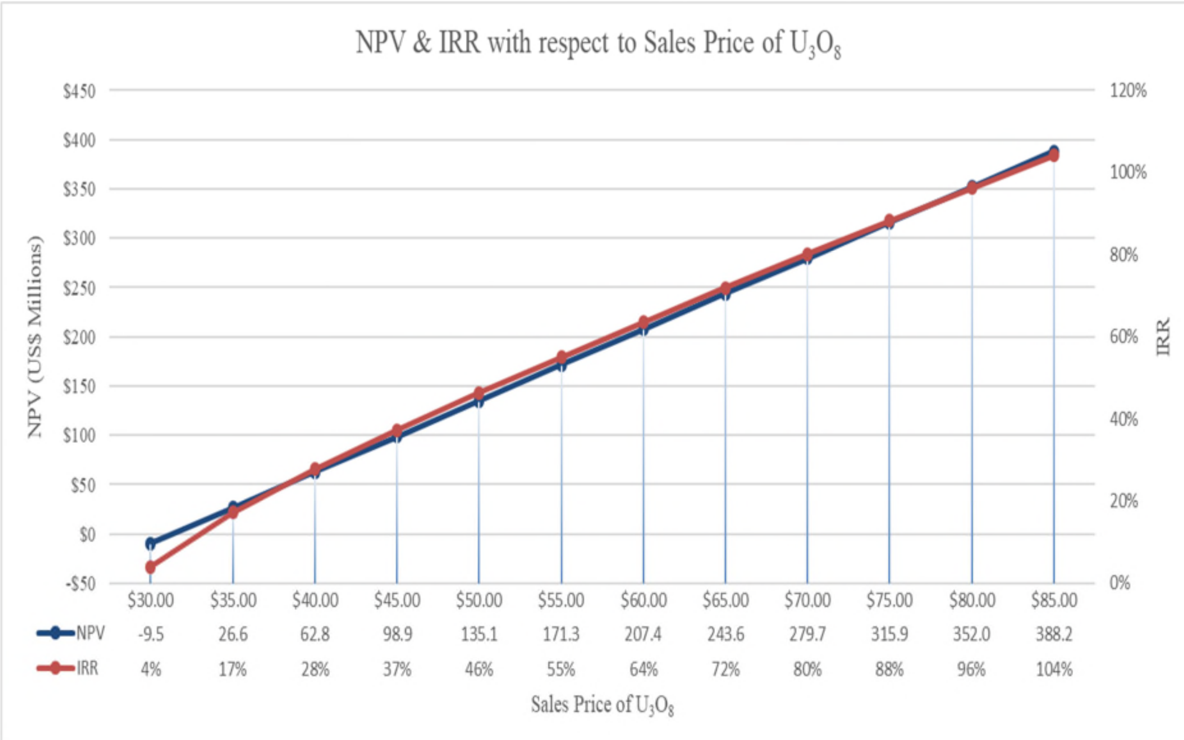
Figure 1.5: IRR v. OPEX & CAPEX (Pre-U.S. Federal Income Tax)



Note: Based on sales price of $55.00 per pound and 8% discount rate.

The Project economics are most sensitive to changes in the price of uranium, recovery and head grade. A one-dollar change in the price of uranium can have an impact to the NPV of approximately $7.23 million and an impact to the IRR of approximately 1.82%. See Figure 1.6.

Figure 1.6: NPV & IRR v. Uranium Sales Price (Pre-U.S. Federal Income Tax)



It should be noted that the economic results presented herein are very sensitive to head grade and recovery. Significant variations in the assumptions for head grade and recovery can have significant impacts to the economic results presented. However, there are too many variables associated with estimating the potential impact of head grade and recovery to the economics presented herein to develop a meaningful sensitivity analysis. The operational variables that influence head grade and recovery will be managed during operations to the extent practicable to minimize potential impacts.

The above analyses are based on an 8% discount rate and a constant price of $55.00 per pound of U_3O_8.

1.5 Risks

The Project is located in a region where ISR projects have been and are operated successfully. The ISR mining method has been proven effective in geologic formations near the Project in Wyoming and Nebraska as described herein. Six Wyoming ISR facilities are currently in operational (Smith Ranch, North Butte, Willow Creek, Lost Creek, Ross and Nichols Ranch) and one operational facility in Nebraska (Crow Butte). Some of these projects, though operational, are currently on a care and maintenance program.

As with any pre-development mining property, there are risks and opportunity attached to the project that need further assessment as the project moves forward. The authors deem those risks, on the whole, as identifiable and manageable. Some of the risks are summarized below and are discussed in detail in Section 25.

- Risk associated with uranium recovery and processing,
- Risk associated with spills associated with transportation of loaded resin and packaged yellowcake uranium,
- Risk associated with contracting an off-site toll milling facility,
- Risk associated with delays in permitting,
- Risk associated with social and/or political issues, and
- Risk associated with the uranium market and sales contracts.

1.6 Recommendations

The Authors find that the development of the Project is potentially viable based on the assumptions contained herein. There is no certainty that the mineral recovery or the economics presented in this PEA will be realized. In order to realize the full potential benefits described in this PEA, the following activities are required, at a minimum.

- Complete all activities required to obtain all necessary licenses and permits required to operate an in-situ uranium mine in the State of South Dakota. Approximate cost $400,000.
- Obtain agreement with remote processing facility to process loaded resin prior to completion of the Project CPP. Minimal cost.
- Complete additional metallurgical testing to further verify and confirm the head grade and overall resource recovery used in this analysis prior to advancing the Project. Approximate cost $250,000.
- Additional Permit / License amendments and approvals necessary to realize all resources included in this PEA. Approximate potential cost up to $500,000.
- Cost benefit analysis to determine best available process to handle vanadium should levels be significant. Approximate cost $75,000.
- Finalize facility and well field engineering designs, including construction drawings and specifications. Approximate cost $950,000.
- Identify procurement process for long lead items and perform cost benefit analysis for any alternative equipment or materials. Cost included in design phase above.

2.0 INTRODUCTION

Woodard & Curran (W&C) and Roughstock Mining Services (Roughstock) were retained by Azarga Uranium Corp. (Azarga) and their wholly owned subsidiary Powertech USA Inc. (Powertech), to prepare this independent Preliminary Economic Assessment (PEA) for the Dewey-Burdock ISR Project (Project) to be located in Custer and Fall River Counties in South Dakota, USA. The project location is shown on Figure 1.1. This PEA has been prepared for Azarga Uranium Corp. and Powertech USA Inc. (collectively referred to as "Azarga") in accordance with the guidelines set forth under National Instrument (NI) 43-101 and NI 43-101F1 for the submission of technical reports on mining properties.

This report was written under the direction of Matthew Yovich, P.E. and Steve Cutler, P.G. (the "Author(s)"), both independent qualified persons for the purposes of NI 43-101.

Steve Cutler, P.G. (Q.P), Roughstock Mining Services:

- Primary Author
- Review and audit of geology
- Review and audit of resource estimates
- Responsible for sections 1, 7, 8, 9, 10, 11, 12, 13, 14, 15, 25, 26, and 27

Matthew Yovich, P.E. (Q.P), W&C

- Primary Author
- Review and finalization of PEA report
- Review and finalization of capital and operating cost estimates
- Review and finalization of Economic analysis.
- Responsible for sections 1, 2, 3, 4, 5, 6, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, and 27

The corporate address of Powertech is 5200 DTC Parkway, Suite 280, Greenwood Village Colorado, with a project field office located in Edgemont, South Dakota. Azarga Uranium Corp. (Azarga), is a publicly traded company listed on the Toronto Stock Exchange (TSX) under the symbol "AZZ".

The Dewey-Burdock project is an advanced-stage exploration project with established uranium resources and project conceptual designs for In Situ Recovery (ISR) of uranium. Azarga controls approximately 16,962 acres of mineral rights and 12,613 acres of surface rights that cover the project areas of uranium mineralization. The permit area, as shown on Figures 4.2, 4.3 and 4.4, is 10,580 acres.

2.1 Purpose of the Report

A NI 43-101 Technical Report Resource Estimate, Dewey-Burdock Uranium ISR Project, South Dakota, USA was previously prepared by Roughstock Mining Service with effective November 12, 2018 (ref., Roughstock 2018). The purpose of this PEA is to update the mineral resource estimate and update the capital and operating cost estimates and economic analysis with the most recent market information and to account for a revised construction and operations schedule. The new schedule is discussed in Section 16. The mineral resource estimate presented herein updates the 2018 NI 43-101 Technical Report Resource Estimate and is summarized in Table 2.1 below.

Table 2.1: Comparison of Resources from Previous 2018 Resource Estimate (November 12, 2018) to current PEA (Effective date-December 3, 2019)

	Previous [1]	Grade	Current PEA	Grade	% Change Pounds
Estimated Measured Resource (lb)	13,779,000	0.132%	14,285,988	0.132%	3.7%
Estimated Indicated Resource (lb)	3,160,000	0.068%	2,836,159	0.072%	-0.09%
Estimated M&I Resource (lb)	16,939,000	0.113%	17,122,147	0.116%	1.1%
Estimated Inferred Resource (lb)	818,000	0.056%	712,624	0.055%	-13%
[1] (ref., Roughstock 2018)					

As shown in Table 2.1, during the process of recalculation of the drillhole data used in the previous Resource Estimate, M&I resource was increased by approximately 1%.

2.2 Terms of Reference

Units of measurement unless otherwise indicated are feet (ft), miles, acres, pounds avoirdupois (lbs), and short tons (2,000 lbs). Uranium production is expressed as pounds U_3O_8, the standard market unit. Grades reported for historical resources and the mineral resources reported and used herein are percent equivalent U_3O_8 (eU_3O_8) by calibrated geophysical logging unit). ISR refers to "in situ recovery", sometimes also termed "in situ leach" leach or ISL. Unless otherwise indicated, all references to dollars ($) refer to the United States currency.

2.3 Sources of Information

This PEA was prepared by W&C and Roughstock and is based on information provided by Azarga, other professional consultants, and generally accepted uranium ISR practices. The cost estimates presented herein are based on well field data, process flow diagrams, tank and process equipment sizes and locations, building dimensions, personnel and capital equipment based on conceptual designs prepared by TREC, Inc (now W&C) and others and schedule and operations information provided by Azarga. The most current previously published Technical Report on Resources was developed by Roughstock (ref., Roughstock, 2018).

The capital cost and operating cost estimates were developed primarily from W&C cost data, historical information, and vendor quotes for similar ISR projects previously designed, constructed, or in production in the United States and are current as of mid-year 2019. Quantities, recovery and performance were assumed based on similar ISR projects. Unit costs were based on similar ISR facilities, vendor quotes, and W&C data. The income tax calculations were provided by Azarga. The authors of this PEA predict the accuracy of the estimates at approximately +/- 25%.

2.4 Site Visits

Steve Cutler, P.G. (Roughstock) conducted a Project site visit on August 6, 2019. The purposes of the visit was to observe the geography and geology of the Project site, verify work done at the site by Azarga, observe the potential locations of Project components, current site activities, and location of exploration activities and gain knowledge on existing site infrastructure.

3.0 RELIANCE ON OTHER EXPERTS

3.1 Source of Information Relied Upon

The Authors relied on the following information provided by Azarga:

- Property ownership information uploaded to a dataroom by John Mays, Chief Operating Officer of Azarga on October 21, 2019, containing details of the location of mineral and surface leases, property purchase agreements, and claims which is contained in sections 4.3 and 4.4 of the report. The Authors have not independently verified property title or mineral rights and relied on the property ownership information provided.

- The Authors have relied on U.S. federal income tax information/calculations provided by Blake Steele, CEO & President of Azarga via email on December 1, 2019 in respect of sections 22.3 and 25 of the report.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Project Location

The Dewey-Burdock Project is located in southwest South Dakota and forms part of the northwestern extension of the Edgemont Uranium Mining District. The project area is located in Townships 6 and 7 South Range 1 East of the Black Hills Prime Meridian. The county line dividing Custer and Fall River counties in South Dakota lies at the confluence of Townships 6 and 7 South (Figure 4.1).

4.2 Property Description

The project is divided into two Resource Areas, Dewey and Burdock, as shown in Figure 4.2. The Burdock Resource Area consists of approximately 93 surface acres and 19 well fields where mineral extraction will occur. The central processing facility for the Project will be located at the Burdock Resource Area along with four constructed impoundments or "ponds" as shown in Figure 4.2. A satellite facility will be constructed in the Dewey Resource Area. The Dewey Resource Area consists of approximately 73 surface acres and 32 well fields where mineral extraction will occur.

4.3 Mineral Titles

The Project includes federal claims, private mineral rights and private surface rights covering the entire area within the licensed project permit boundary as well as surrounding areas. Since 2005, Azarga has consolidated its land position by staking an additional 61 mining claims and acquiring surrounding property with resource potential. At the time of this report, Azarga controls approximately 16,962 acres of mineral rights in the project area (Figures 4.2, 4.3 and 4.4). The project permit area, as shown on Figures 4.2, 4.3 and 4.4, is 10,580 acres.

Access and mineral rights are currently held by a combination of 51 private surface use, access and mining leases agreements, two purchase agreements and 370 federal mineral claims in and surrounding the project area.

Azarga acquired leases from the various landowners with several levels of payments and obligations. In the portions of the project area where Azarga seeks to develop the uranium, both surface and minerals are leased or controlled by unpatented mineral claims. Furthermore, Azarga controls all surface and mineral rights within the project permit boundary. Most leases and purchase agreements for the Project are maintained through annual payments. Several leases are subject to an annual payment that is based on the uranium spot price at the time payment is due. Claims are held by annual payments to the Bureau of Land Management (BLM). Annualized surface and mineral payments for the Project including leases, claims and purchase agreements are approximately $278,700 at a uranium price of approximately $25 per pound at the time of this report.

4.4 Royalties, Agreements and Encumbrances

Azarga acquired leases from the various landowners with several levels of payments and obligations. In the portions of the project area where Azarga seeks to develop the uranium, both surface and minerals are leased or controlled by unpatented mineral claims. Furthermore, Azarga controls all surface and mineral rights within the project permit boundary. Azarga granted the mineral owners an overriding royalty payment out of sales of the product. The surface owners will be paid an overriding royalty as incentive to support the development of uranium under their lands. In addition, surface owners are paid an annual rental to cover the cost of surface damage and to additionally compensate for reduction of husbandry grazing during field operations.

Under the sale price assumption of \$55/lb/ U_3O_8, the net result of the royalty and rental payments results in a cumulative 4.85% surface and mineral royalty. Each royalty is assessed on gross proceeds.

4.5 Location of Mineralization

The uranium deposits in the Dewey-Burdock Project are classic roll front type deposits occurring in subsurface sandstone channels within the Lakota and Fall River formations of early-Cretaceous age (see stratigraphic column Figure 4.5). These fronts are known to extend throughout an area covering more than 16 square miles and having a total length of over 24mi. A map prepared by Silver King Mines (SKM) in 1985, and acquired by Azarga, indicates the regional oxidation-reduction boundaries (redox) that control the deposition of uranium mineralization. In addition to the densely (100ft spacing or less) drilled portions of the redox interfaces where SKM had estimated uranium resources, less densely drilled extensions of these boundaries total 114 miles.

4.6 Environmental Liabilities and Permitting

The Dewey-Burdock project is well advanced in terms of environmental permits and is positioned to receive the necessary licenses and permits for design and construction of an ISR facility in Year -1 with mining operations commencing in Year 1, see Figure 1.3.

4.6.1 Residual Environmental Liabilities

The eastern portion of the Burdock project area contains the remnants of uranium mining operations dating from the late 1950s and 1960s. Approximately 200,000 lbs of uranium was extracted via open pit and shallow underground mining methods from the outcropping Fall River Formation. Surface disturbance related to some of these operations, including open pit workings and waste rock piles have not been reclaimed. At this time, Azarga does not propose ISR operations in the Fall River formation within open pits or underground mines.

Present operational liabilities are limited to restoration of ground disturbed by drilling operations at the project site. Azarga conducts this work on an ongoing basis.

4.6.2 Required Permits and Status

South Dakota has a long history of underground and open pit mining. The South Dakota Department of Environment and Natural Resources administers recently tolled certain regulations related to in-situ uranium development due to duplicative requirements from federal agencies. However, the authority to mine in South Dakota still resides with DENR and South Dakota still requires several permits for the Project. There are a number of permits and licenses required by federal and state agencies. See Table 4.1 for a summary of the licenses and permits and their status. Section 20 also presents the required permits, and their current status for the Dewey-Burdock project along with additional discussion regarding environmental studies and community interaction.

Table 4.1: Permit Status

Permit, License, or Approval Name	Agency	Status
Uranium Exploration Permit	DENR	Submitted – July, 2006 Approved - January, 2007
Special, Exceptional, Critical, or Unique Lands Designation Permit	DENR	Submitted – August, 2008 Approved - February, 2009
UIC Class III Permit	EPA	Submitted – December, 2008 Draft Permit Received – March, 2017 Updated Draft Permit Received – August, 2019 Approval pending
Source and Byproduct Materials License	NRC	Submitted - August, 2009 Approved - April, 2014
Plan of Operations (POO)	BLM	Submitted - October, 2009 Approval pending
UIC Class V Permit	EPA	Submitted – March, 2010 Draft Permit Received – March, 2017 Updated Draft Permit Received – August, 2019 Approval pending
Groundwater Discharge Plan (GDP)	DENR/WMB	Submitted - March, 2012 DENR Recommended Approval – December, 2012 Approval pending
Water Rights Permit (WR)	DENR/WMB	Submitted - June, 2012 DENR Recommended Approval – November, 2012 Approval pending
Large Scale Mine Permit (LSM)	DENR/BME	Submitted - September, 2012 DENR Recommended Approval – April, 2013 Approval pending
Minor Permits		
Air Permit	DENR	Deemed Unnecessary - February, 2013
Avian Management Plan -	GFP/US FWS	Submitted - September, 2013
Non-Purposeful Eagle Take Permit	USFWS	Submitted - January, 2014
NPDES Construction Permit	DENR	To Be Submitted
NPDES Industrial Stormwater Permit	DENR	To Be Submitted
Septic System Permit	DENR	To Be Submitted
EPA Subpart W Pond Construction Permit	EPA	To Be Submitted
County Building Permits	Custer and Fall River counties	To Be Submitted

4.7 Other Significant Factors and Risks

There are no other known factors or risks that would limit Azarga's ability to access the Dewey-Burdock properties to conduct exploration and/or ISR mining and recovery operations on the property that have not already been addressed elsewhere in this report.

Figure 4.1: Project Location Map

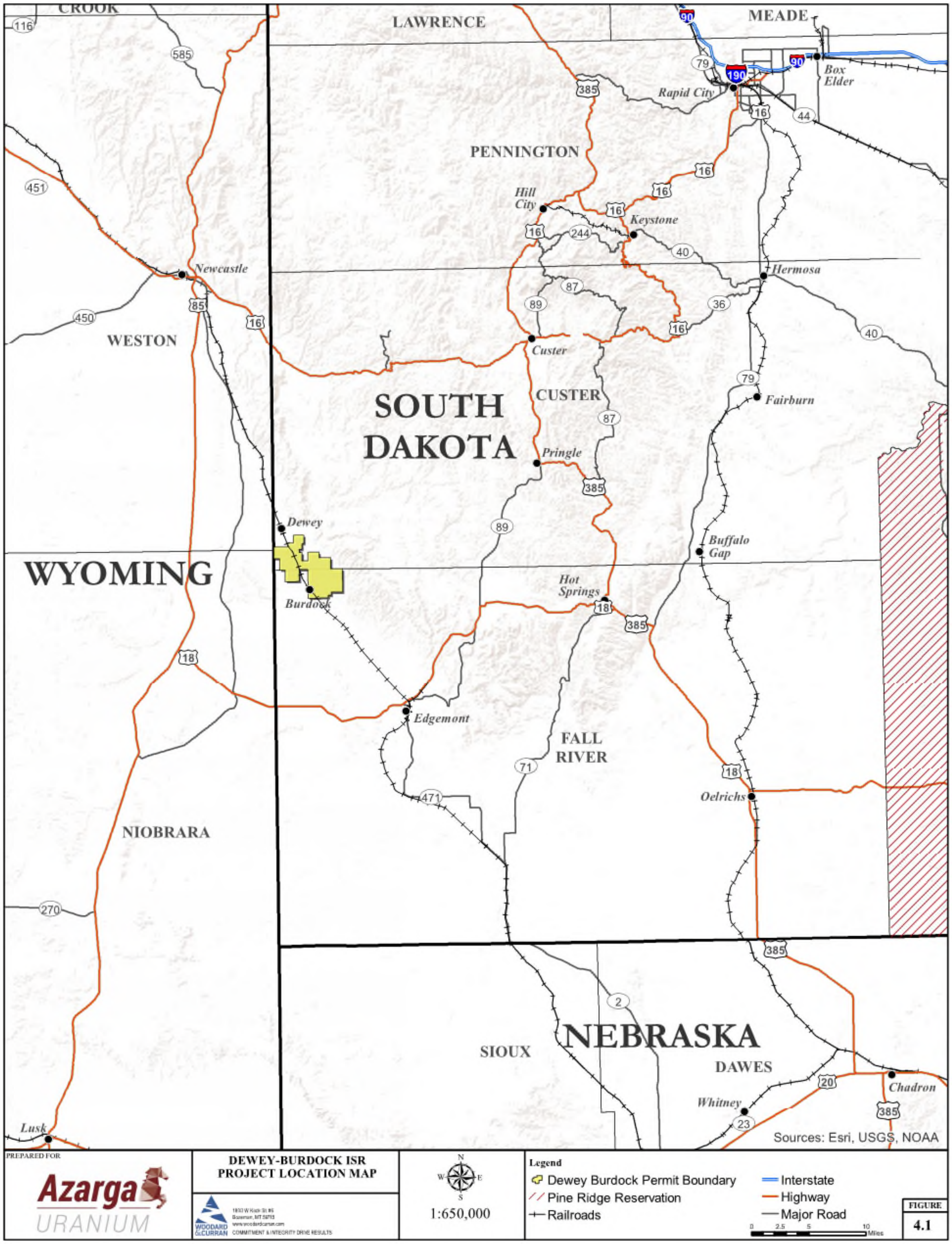


Figure 4.2: Project Site Map

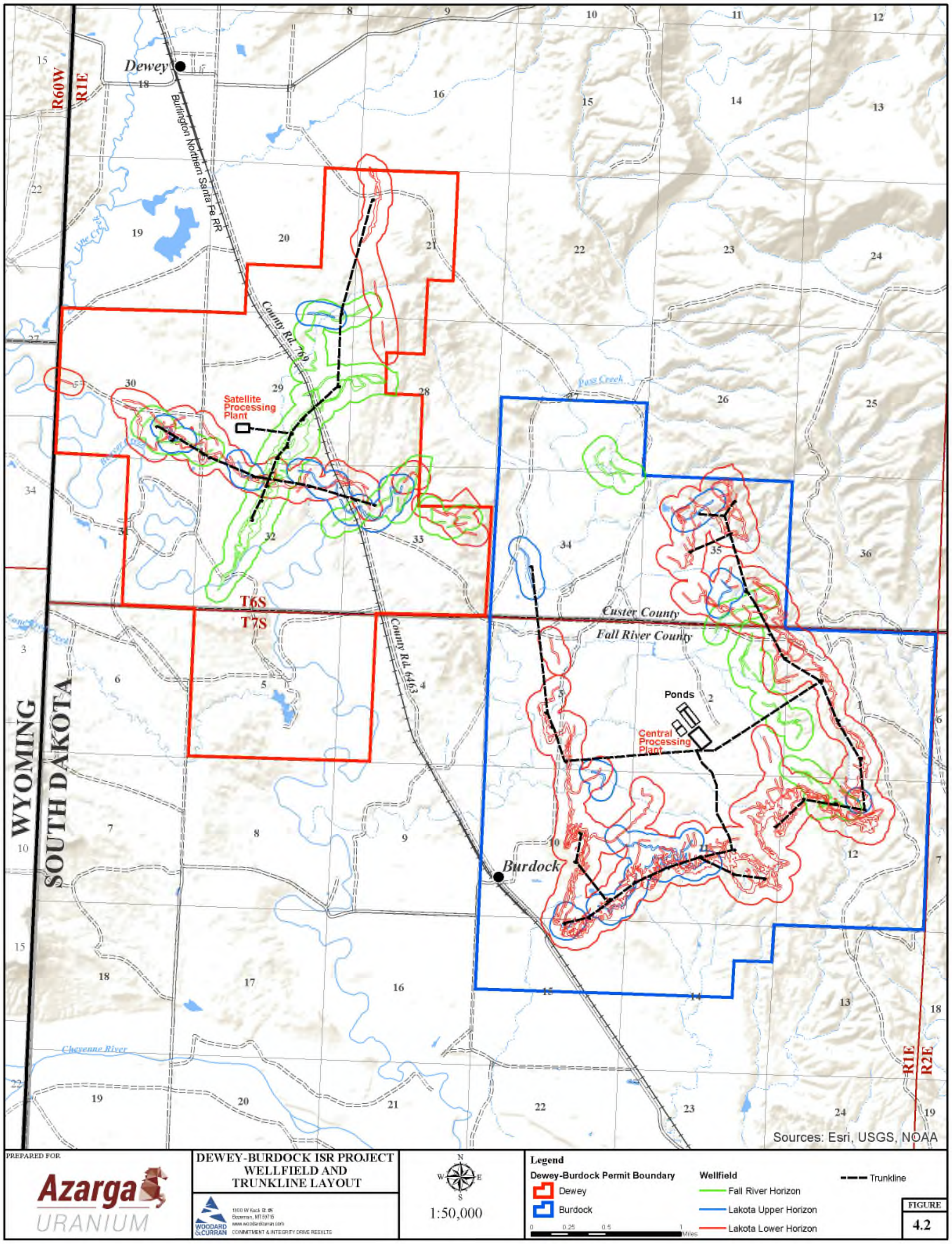


Figure 4.3: Surface Ownership Map

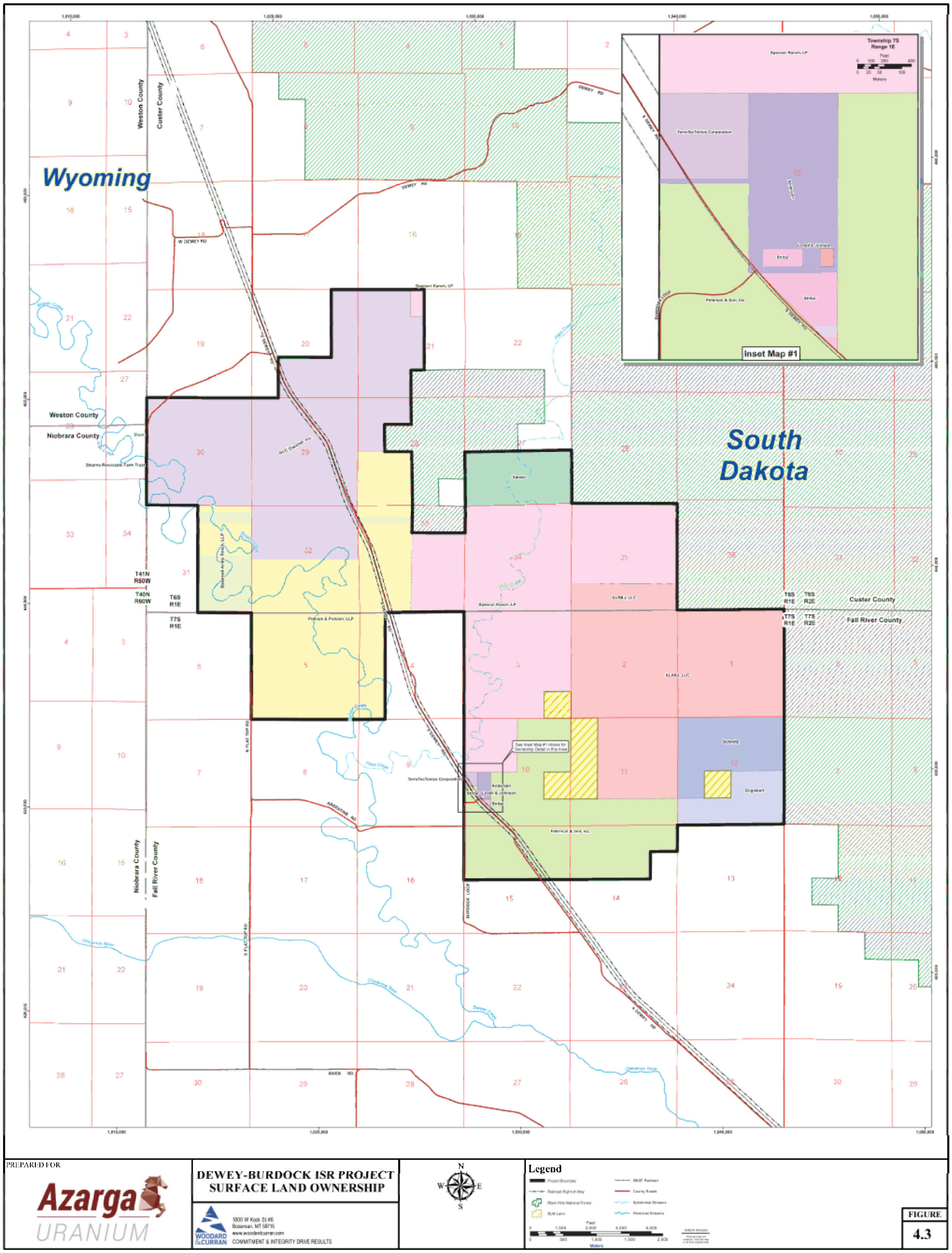


Figure 4.4: Mineral Ownership Map

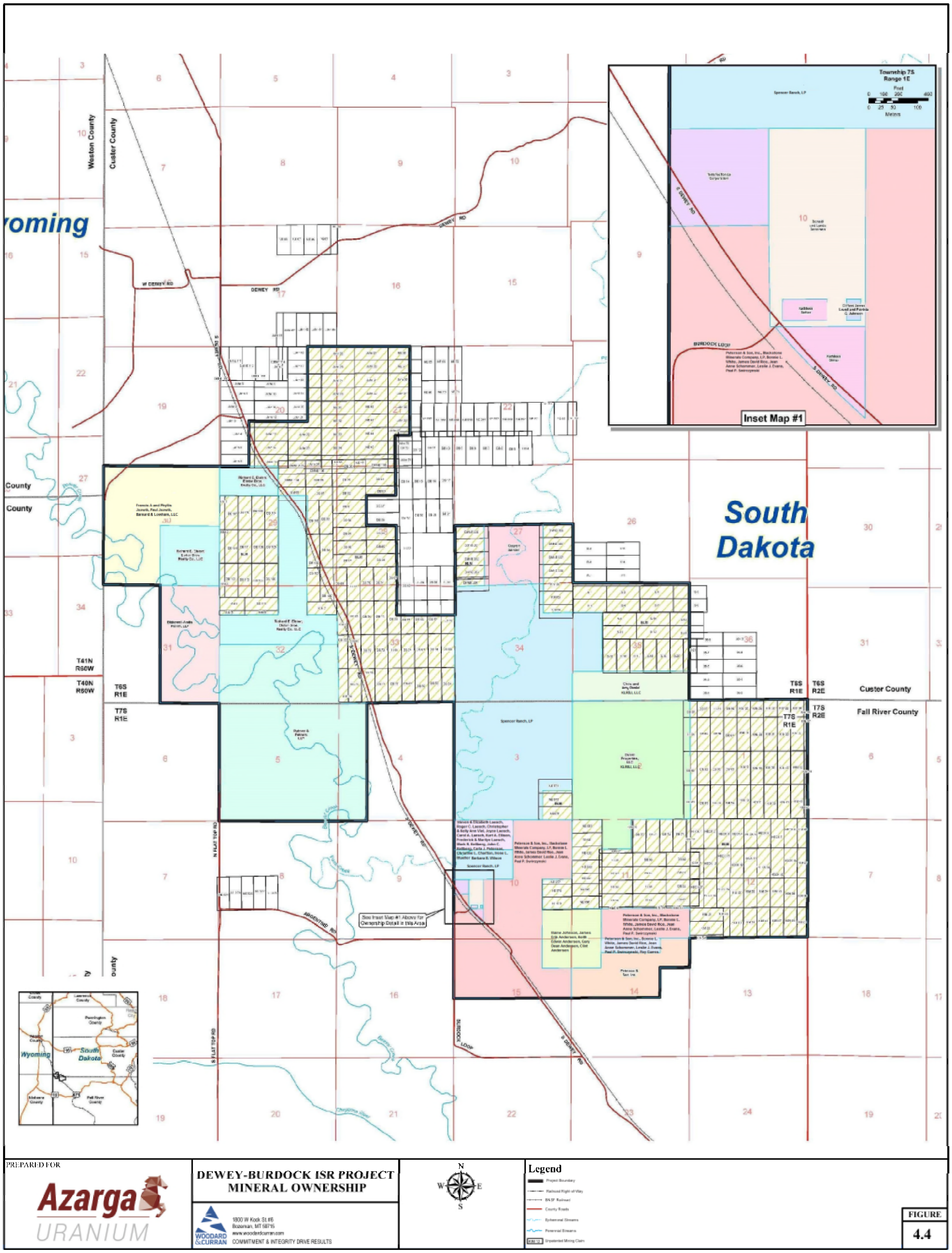


Figure 4.5: Stratigraphic Column

Site Hydrostratigraphy

Crataceous	Upper	Graneros Group		Belle Fourche Shale
	Lower			Mowry Shale
				Skull Creek Shale
		Inyan Kara Aquifer		Fall River Aquifer
			Lakota Formation	Fuson Shale
				Chilson Aquifer
Jurassic				Morrison Formation
				Unkpapa Aquifer
				Sundance Aquifer
				Gypsum Spring Formation
Triassic				Spearfish Formation
Permian				Minnekahta Aquifer
				Opeche Shale
				Minnelusa Aquifer
Pennsylvanian				
Mississippian				Madison Aquifer
Devonian				Englewood Formation
Ordovician				Whitewood Formation
				Winnipeg Formation
Cambrian				Deadwood Aquifer

PREPARED FOR
DEWEY-BURDOCK ISR PROJECT
STRATIGRAPHIC COLUMN
FIGURE
4.5

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Access

The nearest population center to the Dewey-Burdock Project is Edgemont, South Dakota (population 900) located on US Highway 18, 14 miles east from the Wyoming-South Dakota state line. Fall River County Road 6463 extends northwestward from Edgemont to the abandoned community of Burdock located in the southern portion of the Dewey-Burdock project, about 16 miles from Edgemont. This road is a two lane, all weather gravel road. Fall River County Road 6463 continues north from Burdock to the Fall River-Custer county line where it becomes Custer County Road 769 and continues on to the hamlet of Dewey, a total distance of about 23 miles from Edgemont. This county road closely follows the tracks of the BNSF (Burlington Northern Santa Fe) railroad between Edgemont and Newcastle, Wyoming. Dewey is about 2mi from the northwest corner of the Dewey- Burdock project.

An unnamed unimproved public access road into the Black Hills National Forest intersects Fall River County Road 6463 4.3 miles southeast of Burdock and extends northward about 4mi, allowing access to the east side of the Dewey-Burdock project. About 0.9 miles northwest from Burdock, an unimproved public access road to the west from Fall River County Road 6463 allows access to the western portion of the Dewey-Burdock project. Private ranch roads intersecting Fall River County Road 6463 and Custer County Road 769 allow access to all other portions of the Dewey-Burdock Project.

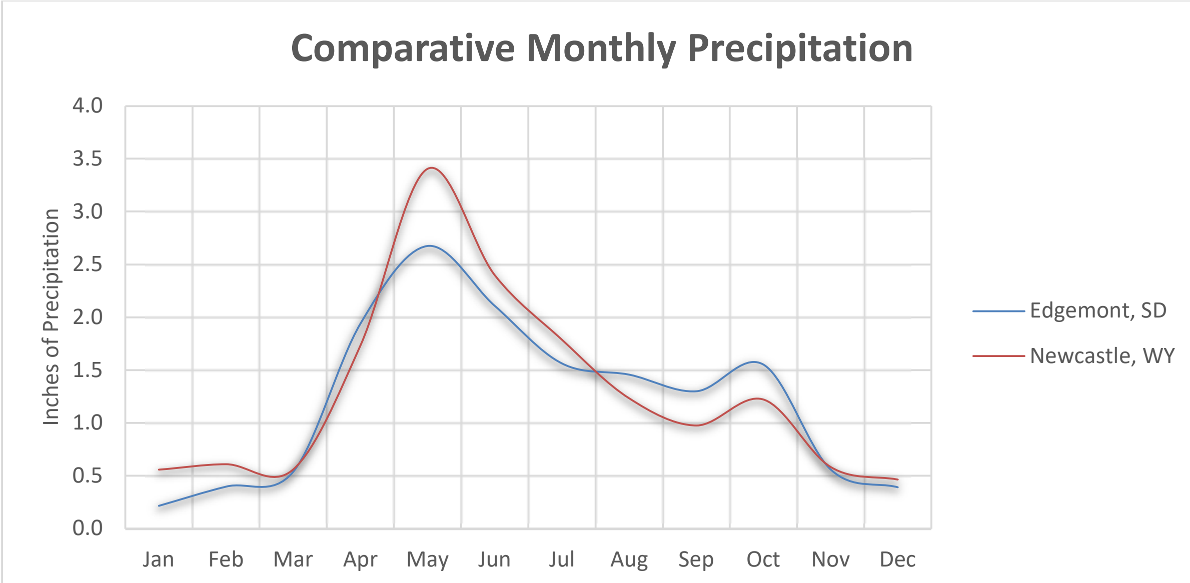
5.2 Climate and Vegetation

The Dewey-Burdock Project topography ranges from low-lying grass lands on the project's west side to dissected upwarped flanks of the Black Hills Uplift in the eastern portion of the Project. Low precipitation, high evaporation rates, low relative humidity and moderate mean temperatures with significant diurnal and seasonal variations characterize the area. The general climate of the project area is semi-arid continental or steppe with a dry winter season. The higher Black Hills to the northeast of the project seem to generally moderate temperature extremes especially during winter months. The local climate is not expected to have any adverse impacts to construction or operation of the Project. Similar projects have been constructed and operated for decades in the neighboring States of Nebraska and Wyoming. Blizzards and extreme cold during the winter months can cause temporary access restrictions but are typically short lived and have rarely been a significant impedance to operations on ISR facilities as evidenced at nearby locations in Nebraska and Wyoming.

The annual mean temperature in this area of South Dakota is 46°F. The mean low temperature of 20°F occurs in January. The mean high temperature of 74°F occurs in July. Dewey-Burdock averages 198 day/year of below freezing temperatures. Below freezing temperatures generally do not occur after mid-May or before late September.

The average precipitation in the Dewey-Burdock Project area is 15 inches. The wettest month is May when rainfall amounts to 3 inches and the driest months are January and December yielding 0.5 inch each month, usually as snow. The average annual snowfall is 37 inches. See Figure 5.1 below:

Figure 5.1: Average Monthly Precipitation (2009 – 2014)



Three major vegetation regions are noted within the Dewey-Burdock Project area: grassland, ponderosa pine and desert shrub. Grassland vegetation is dominated by buffalo grass, blue grama grass and western wheatgrass. Ponderosa pine occurs with Rocky Mountain juniper. Shrubs are composed of big sagebrush and black greasewood.

Cultivated crops are limited to and consist of flood irrigated hay land. Less than 5% of the project area includes cultivated farming. Most of the vegetation is given over to cattle. A minor portion of the project area covered by stands of ponderosa pine has been selectively logged for pulpwood. Timber is not a significant industry in the Dewey-Burdock Project.

5.3 Topography and Elevation

The Dewey-Burdock Project is located at the extreme southwest corner of the Black Hills Uplift. Terrain is thus, in part, undulating to moderately incised at the south and west portion of the project. The eastern and northern area is further into the Uplift and is cut by narrow canyons draining the higher hills. Significant drainages on the project are few, with only four or five canyons on the whole project area. These canyons are cut less than 1,000 ft in width between the ridges. Slopes may be gentle or steep depending upon the underlying rock type. Sandstones may form cliffs up to 30 to 45 ft in height that will extend for only hundreds of feet in length.

There is only about 300 ft of elevation change across the project area. The lower elevation of 3,600 ft above mean sea level is accurate around the south and west side of the project area. The highest elevation at near 3,900 ft above mean sea level is at the northeast portion of the area.

5.4 Infrastructure

The Dewey-Burdock area is well supported by nearby towns and services. Major power lines are located across the project and can be accessed for electrical service for the mining operation. A major rail line (Burlington Northern-Santa Fe) cuts diagonally across the project area. A major railroad siding occurs at Edgemont and could be used for shipment of materials and equipment for development of the producing facilities. Confined groundwater hydro-stratigraphic units containing the uranium are locally artesian to the surface or near surface. This characteristic is highly favorable for ISR and will aid in the dissolution of oxygen in the lixiviant that is utilized in the recovery process.

Nearby population centers indicate there will be no difficulty in finding housing for the relatively small staffing level that is typical of an ISR operation. Skills that are employed in ISR mining are typically found in regional population centers. The local communities of Edgemont, Custer and Hot Springs offer sources for labor, housing, offices and basic supplies.

All leases are designed to have maximum flexibility for emplacement of tanks, out buildings, storage area and pipelines. The topography is relatively low lying and undulating and is conducive for the development of ISR operations.

The project site has no current mining related facilities or buildings. The only site facilities related to mining include an Azarga installed weather monitoring station, radiological monitoring stations, and monitor wells (capped wellheads), all accessible by dirt access roads.

5.5 Sufficiency of Surface Rights

Azarga’s land rights is composed of mining claims on BLM land, and private surface and minerals. The access to these lands, as stated in Section 4 – Mineral Titles is controlled by surface rights held by Azarga, or by public access on federal lands. There are no significant limitations to surface access and usage rights that might affect Azarga’s ability to drill and conduct ISR mining and uranium recovery operations on the Dewey-Burdock properties. As this Project is an ISR operation, waste rock and tailings will not be generated. Thus, there is no requirement for mine waste disposal and no requirement for acquiring surface rights for on-site disposal. All 11 e.(2) designated waste will be disposed of at an off-site licensed facility, all non 11 e.(2) waste will be disposed of at a local licensed landfill and liquid wastes will be disposed of via deep disposal well (See Sections 17.5 and 20.5).

6.0 HISTORY

6.1 Ownership

The surface and minerals rights of properties within the Dewey-Burdock Project may not be owned by the same entity. In years past, when the surface real estate was sold, the owner retained ownership of the minerals. Other properties were homesteaded under the 1916 Homestead Act and the mineral rights were reserved by the U.S. Government. Uranium minerals were discovered in the vicinity of the Dewey-Burdock Project area as early as 1952 and were soon developed by open pit, adit, or decline shallow underground methods. Production came from small mining companies leasing the mineral rights from either the surface/mineral owner or the surface/mining claim owner. By the late 1950's, these surface uranium deposits came under the control of Susquehanna Western Corp. (SW) who had purchased the process mill located in Edgemont. SW mined out most of the known, shallow uranium deposits before closure of the mill in 1972.

During the uranium boom of the 1970s, several companies returned to the Dewey-Burdock area, acquired leases and began further exploration for deeper deposits. During this period, exploration groups such as Wyoming Mineral (Westinghouse), Homestake Mining Co., Federal Resources and SW discovered much larger, roll-front type uranium mineralization. In 1978, TVA bought out SW's interest in the Edgemont Uranium Mining District, including the closed processing mill in Edgemont. TVA made the Dewey-Burdock area its main exploration target and developed reserves adequate to warrant an underground shaft mine at both the Burdock site and the Dewey site. TVA's plans included a new uranium mill to be located near Burdock.

These plans ended when the price of uranium dropped in the early 1980's. Eventually, TVA dropped their leases and mining claims in the area and the original land/claim owners took over their old mining claims or retained their mineral rights. In 1994, Energy Fuels Nuclear (EFN) acquired the properties covering the uranium roll-front mineralized resource bodies within the Dewey-Burdock Project. By 2000, EFN relinquished their land position in the Dewey-Burdock project.

In 2005, Denver Uranium Company, LLC (DU) acquired leases of federal claims, private mineral rights covering 11,180 acres and private surface rights covering 11,520 acres in the Dewey-Burdock area. This acreage position consisted of contiguous blocks of both surface and mineral rights covering the majority of the discovered and delineated uranium in this district. The basic terms of the lease are a five-year initial term, renewable two times every five years.

On February 21, 2006, Azarga and DU entered into a binding Agreement of Purchase and Sale. Pursuant to the terms of the agreement, Azarga agreed to purchase the assets of DU in exchange for the issuance of eight million common shares of Azarga and the assumption of the liabilities of DU, including a bridge loan, but excluding liabilities related to tax and to DU's officers and members. Further to its initiative to consolidate the Dewey-Burdock uranium resource, Azarga also entered into a binding property purchase agreement with Energy Metals Corp. (EMC) on November 18, 2005 whereby Azarga acquired a 100% interest in 119 mineral claims covering approximately 2,300 acres in the Dewey-Burdock area. EMC retained a production royalty based upon the price of uranium. Azarga issued 1 million shares and 1.25 million share purchase warrants as consideration for the mineral claims.

Since that time, Azarga consolidated its land position by staking an additional 61 mining claims and acquiring surrounding property with resource potential.

In December 2008, Azarga purchased a large block of properties in South Dakota and Wyoming from Bayswater Uranium Corporation (Bayswater). There were 37 mining claims (740 acres) located adjacent to Azarga properties within the Dewey-Burdock Project.

In January 2009, Azarga entered into an agreement with Neutron Energy Inc. (NEI) to exchange some of Azarga's non-core properties in New Mexico and Wyoming for acreage located within and adjacent to Azarga's Dewey-Burdock Project in South Dakota. The acreage acquired from NEI by Azarga consists of approximately 6,000 acres of prospective claims and leases.

At the time of this report, Azarga controls approximately 16,962 acres of mineral rights and 12,613 acres of surface rights in the project area (Figure 4.3).

6.2 Past Exploration and Development

Exploration in the vicinity of the Dewey-Burdock area began in 1952 following discovery of uranium minerals in Craven Canyon in the Edgemont District. Early efforts by the US Atomic Energy Commission and the USGS determined the Lakota and Fall River formations were potential uranium host formations.

Early rancher/prospectors made the first uranium discovery in outcrops of the Fall River formation on the Dewey-Burdock Project. The prospectors leased their holdings to local uranium mining companies first drilled shallow exploration holes with wagon drills and hand-held Geiger probes. Sufficient uranium was discovered to warrant mine development by adit and shallow decline. Susquehanna Western Corp. drilled the first deep holes (600 ft) to discover unoxidized uranium roll front ore deposits in the Lakota formation.

After acquisition of the Dewey-Burdock Project by TVA in 1978, its contractor, SKM, evaluated previous exploration efforts and began its own exploration program. Exploration and development drilling continued on the Dewey-Burdock Project until 1986. TVA then allowed its leases to expire. By that time, over 4,000 exploration holes to depths of 500 to 800ft were drilled on the project. The majority of this drilling was done with rotary drills using 4.5 to 5.3in drill bits and drilling mud recovery fluids. Cutting samples were collected at 10ft intervals and were recorded in geologic sample logs.

The completed open hole was probed for uranium intersection by down hole instruments to log the hole for gamma, self-potential (SP) and resistivity. Because of caving ground and swelling clays, some holes were logged through the drill stem, which limited the borehole log to gamma response. TVA studied logging holes both open hole and behind pipe in the same hole to estimate a factor to evaluate uranium content when the hole was logged only behind pipe.

TVA completed at least 64 core hole tests on the Burdock portion of the project to calculate equilibrium of gamma response for uranium equivalent measurement versus actual chemical assay. The records do not specify the laboratory used but the results show that the mineralized trends are in equilibrium and that gamma logging will give an accurate measurement of the in-place uranium content.

TVA completed an extensive development drilling program as well as a hydrologic study and in 1981 completed an underground mine feasibility study on the uranium deposits within the Dewey-Burdock Project. Later studies considered a processing mill to be built on the Burdock deposit that would also process Dewey ores as well as other ores to be mined in the Edgemont District.

All TVA efforts between 1982 and 1986 were expended on exploration drilling assessment work required to hold their lode mining claims. This effort ended in 1988 when the claims and leases were allowed to expire.

In 1992, EFN acquired leases and drillhole information on the Dewey-Burdock Project. Their intention was to mine the uranium deposits by ISR methods. EFN retained RBS&A as an independent consultant to evaluate available data and to identify the location, host formation and uranium resource that might be exploited by ISR methods. EFN did no additional exploration or development drilling on the project. In 2000, International Uranium Corporation, the successor to EFN, dropped their holdings in the Dewey-Burdock Project.

6.3 Historic Mineral Resource Estimates

None.

6.4 Historic Production

Uranium was first produced in the Dewey-Burdock Project probably as early as 1954 by a local group known as Triangle Mining Co., a subsidiary of Edgemont Mining Co. Early commercial production consisted of a single, shallow open pit. This same group reportedly drove an adit from both sides of an exposed ridge mining a narrow orebody. This mining was within the Burdock portion of the Dewey-Burdock Project area.

SWI acquired the same area in about 1960 and discovered by shallow drilling sufficient resources in the Fall River formation to warrant open pit mining in five or six pits less than 100ft deep. SWI controlled the mill in Edgemont, which allowed some tolerances in mining low-grade ores that other mining companies could not afford. SWI also had a milling contract with Homestake Mining Co. to buy ore from the Hauber Mine in northeast Wyoming. As long as SWI had the Hauber ore to run through their Edgemont mill they could afford to mine low-grade ores from the Burdock surface mines. When the Hauber Mine was mined out and Homestake ceased ore shipments to Edgemont, SWI closed their mining operations at Burdock and elsewhere in the Black Hills. No actual production records are known from the Burdock mines, which are located in the east portion of the current project area, but production is estimated to have been approximately 200,000 lbs. No subsequent operator in the Dewey-Burdock area produced uranium.

7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The Black Hills Uplift is a Laramide Age structure forming a northwest trending dome about 125 miles long x 60 miles wide located in southwestern South Dakota and northeastern Wyoming. The uplift has deformed all rocks in age from Cambrian to latest Cretaceous. Subsequent erosion has exposed these rock units dipping outward in successive elliptical outcrops surrounding the central Precambrian granite core. Differential weathering has resulted in present day topography of concentric ellipsoids of valleys under softer rocks and ridges held up by more competent units.

The uranium host units in the Dewey-Burdock area are the marginal marine Lakota and Fall River sandstone units within the Inyan Kara Group of earliest Cretaceous Age. These sandstones are equivalent to the Cloverly formation in western Wyoming, the Lakota formation in western Minnesota, and the Dakota formation in the Colorado Plateau. The entire Inyan Kara Group consists of basal fluvial sediments grading into near marine sandstones, silts and clays deposited along the ancestral Black Hills Uplift. The sandstones are fairly continuous along the western flank of the Uplift. The Inyan Kara Group unconformably overlies the Jurassic Morrison formation, here a flood plain deposit and terrestrial clay unit. Overlying the Inyan Kara are later early Cretaceous marine shales composed of the Skull Creek, Mowry, and Belle Fourche formations (referred to as the Graneros Group). Post uplift, the entire truncated set of formations was unconformably overlain by the Tertiary White River formation. The White River consisted of several thousand feet of volcanic ash laden sediments that have since been eroded.

The Inyan Kara is typical of units formed as first incursion of a transgressive sea. The basal fluvial units' grade into marine units as the ocean inundates a stable land surface. The basal units of the Lakota rest in scours cut into the underlying Morrison shale and display the depositional nature associated with mega-channel systems crossing a broad, flat coastal plain. Between channel sands are thin deposits of overbank and flood plain silts and clays.

Crevasse splays are common and abruptly terminate into inter-channel clays. The upper-most unit of the Lakota formation is a widespread clay unit generally easily identified on electric logs by a characteristic "shoulder" on the resistivity curve. This unit is known as the Fuson member. The basal unit of the Fall River formation is a widespread, fairly thick channel sand deposited in a middle deltaic environment that is evidenced by low-grade coals in its upper portion. Younger Fall River sand units are progressively thinner, less widespread; contain more silt and contain considerably more carbon, denoting a lower deltaic environment of deposition. There is little or no evidence of scouring of the contact between Fall River and the overlying marine Skull Creek. Inundation must have been rapid since within less than 20ft of sedimentation, rock character goes from middle deltaic, marginal marine to deep marine environment with no evidence of beach deposits or offshore bar systems.

The overall structure of the Black Hills Uplift is fairly simple in that the structure is domal and rock units dip outward away from the central core. Regionally across the Black Hills, subsequent and attendant local doming caused by local intrusions disrupts the general dip of the units. Tensional stress creates fault zones with considerable displacement from one side of the zone to the other. This is often a distance of three or four miles. The Dewey fault zone, a few miles to the north is a zone of major displacement. The faulting drops the uranium host units several hundred feet and truncates the oxidation reduction contact that formed the Dewey-Burdock mineralization. However, detailed geologic and hydrogeologic investigations indicate no evidence of faulting within the project permit area.

7.2 Local and Project Geology

The Lakota formation in the Dewey-Burdock Project area was deposited by a northward flowing stream system. Sediments consist of point bar and transverse bar deposition. The stream channel systems are typical of meandering fluvial deposition. Sand units fine upward and numerous cut-and- fill sandstones are indicative of channel migration depositing silt and clay upon older sand and additional channel sands overlay older silts and clays. Uranium minerals were deposited in several stratigraphically different sands within the Lakota. Because uranium deposits have formed in separate stratigraphic units, these units were identified and named for their stratigraphic position.

Similar channel deposition occurred during Fall River time, but the channel sands are noticeably thinner with marine sediments immediately superimposed on the fluvial sands. The knowledge of detailed stratigraphy is critical in ISR mining due to the importance of solution contact with the uranium mineralization. Where uranium is located in low permeability horizons, solution mining is not as efficient as it would be in more uniform sandstones with relatively equal permeability. During the evaluation of uranium resources made by RBS&A, the sands of the Lakota Formation were divided into nine sandstone units, generally about 20 ft thick and usually separated by a consistent claystones or shales. The major sand unit in the basal Fall River Formation was divided into three sand subunits, each of which are mineralized and contain roll fronts on the Dewey portion of the area. All of the Fall River uranium mineralization on the Burdock portion of the Project is at or above the water table and is not considered in the economic model prepared in this report. Mining of these resources is presumed to require other mining methods rather than ISR such as open pit or underground mining.

The lithologic units of the Lakota and Fall River Formations now dip gently, about 3° to the southwest off the flank of the Black Hills Uplift. This structure controls present groundwater migration. Since the uranium roll front orebodies below the water table are dynamic, their deposition and tenor are factored by groundwater migration. No faults were observed during the correlation of exploration drillholes in the project area. Fault systems have been mapped away from the Project and only the major sandstone channel systems affect local groundwater migration and thus uranium deposition.

7.3 Significant Mineralized Zones

7.3.1 Mineralized Zones

Previous reports by TVA indicate that uranium minerals in the Dewey-Burdock Project are all of +4 valence state and thus considered to be deposited from epigenetic solutions. Permeability often has an effect on the mineralized resource body locations. More permeable portions of mineralized resource zone of the sand frequently contain larger portions of the deposit particularly along oxidation/reduction boundaries. Zones of lower permeability are often characterized by generally thinner and less continuous deposits in comparison. Alteration, depicting the oxidation-reduction contact can occur in several channel units and may be several miles in length. Uranium deposition in significant deposits occurs discontinuously along the oxidation/reduction boundary with individual deposits ranging from several hundred-to a few thousand feet in length. Width of concentration is dependent upon lithology and position within the channel. Widths are seldom less than 50 ft and are often over 100 ft. Thickness of high concentration uranium mineralization varies from 1 or 2 ft in limbs, to 5 or 12 ft in the rolls. Tenor of uranium mineralization may vary from nil to a few percent at any point within the orebody.

7.3.2 Relevant Geologic Controls

The primary mineralized resource control of uranium mineralization in the Dewey-Burdock project is the presence of permeable sandstone within a major sand channel system that is also a groundwater hydro-stratigraphic unit. Such conditions exist in both the Lakota and Fall River formations. A source rock for uranium in juxtaposition to the hydro-stratigraphic unit is necessary to provide mineral to the system. As described above, the uranium-rich White River formation originally overlay the subcropping sandstone units of the Lakota and Fall River formations. The last control is the need for a source of reductant to precipitate dissolved uranium from groundwater solutions. RBS&A observed that such reductant is available from deeper hydrocarbon deposits discovered down dip only a few miles west of the Dewey-Burdock Project as well as hydrocarbon occurrences in deeper formations just east of the Project area. Previous writers as early as 1952 postulated the source of reductant to be carbon and carbonaceous material that does occur in varying quantities throughout the Inyan Kara group sedimentary rocks, including the Fall River and Lakota formations.

7.4 Hydrogeological Setting

CIM adopted Best Practice Guidelines for the Estimation of Mineral Resources and Mineral Reserves on November 23, 2003 (ref.,CIM Council, 2003) ; within which are recommended guidelines with respect to uranium. To support the use of ISR methods, hydrogeologic data are required to show:

- Permeability of the mineralized horizon;
- Hydrologic confinement of the mineralized horizon; and
- Ability to return groundwater within the mined area to its original baseline quality and usage.

Azarga completed significant work to characterize the groundwater system at the Dewey-Burdock project to demonstrate favorable hydrogeologic conditions for ISR methods, as well as mine planning and permitting purposes. Work completed by Azarga and their consultants includes monitor and pumping well construction, hydro-stratigraphic unit testing, groundwater sampling, and completion of regional and well field scale groundwater models.

7.4.1 Project Hydrogeology

Within the Dewey-Burdock project area the uppermost hydro-stratigraphic unit and the production hydro-stratigraphic unit are both the Inyan Kara, the underlying hydro-stratigraphic unit is the Unkpapa Formation (or Sundance if the Unkpapa is not present). There is no overlying hydro-stratigraphic unit within the project area other than minor localized alluvial hydro-stratigraphic units.

The information presented is based upon the results of work completed by Azarga and their consultants, as well as TVA. Azarga completed groundwater sampling, piezometric surface mapping, and individual hydro-stratigraphic unit tests within both the Dewey project area and the Burdock project area in 2007-2009, in addition to resource drilling activities that collected core samples for measurement of hydrogeologic parameters. TVA completed three hydro-stratigraphic unit tests, one just north of the Dewey project area in 1982, and two within the Burdock project area in 1979 (ref., Powertech, 2013a and 2013b).

7.4.2 Hydraulic Properties of the Inyan Kara

The following section discusses the results of hydro-stratigraphic unit tests and geotechnical testing completed in the project area to estimate the hydraulic properties of the production hydro-stratigraphic unit and confining units, as well as water level data and confining pressures for the individual project areas.

Dewey

Two hydro-stratigraphic unit test programs were completed within or just outside of the Dewey project area: Tennessee Valley Authority (TVA) in 1982 (ref., Powertech, 2013a) and Azarga in 2008 (ref., Powertech, 2013c).

The 1982 test completed by TVA consisted of pumping in the Lakota Formation for 11 days at an average rate of 495 gpm from a screened interval 75 ft in length. The results of the hydro-stratigraphic unit test yielded the following data:

- Transmissivity of the Lakota averaged 590 ft^2/day; and
- Storativity of the Lakota was approximately 0.0001 (dimensionless).

TVA recorded a hydraulic response in the Fall River through the intervening Fuson Member late in the hydro-stratigraphic unit test (3,000 to 10,000 minutes). TVA calculated the vertical hydraulic conductivity of the Fuson Member to be 0.0002 ft/day using the Neuman-Witherspoon ratio method (ref., Neuman and Witherspoon, 1972).

TVA observed a barrier boundary, or a decrease in transmissivity due to lithologic changes with distance from the site, or both. A possible geologic feature corresponding to a barrier was noted to be the Dewey Fault Zone, located approximately 1.5 miles north of the test site, where the Lakota and Fall River Formations are structurally offset.

The 2008 test completed by Azarga consisted of pumping in the Fall River Formation for 74 hours at an average rate of 30.2 gpm from a screened interval 15 ft in length. The results of the hydro-stratigraphic unit test yielded the following data:

- Ten determinations of transmissivity ranged from 180 to 330 ft^2/day, with the median value of 255 ft^2/day; and
- Five determinations of storativity ranged from 0.000023 to 0.0002 with a median value of 0.000046.

Azarga recorded a delayed response in the upper Fall River Formation which indicates lateral and vertical anisotropy due to interbedded shales in the formation. No flow was observed through the Fuson Member between the Fall River and the underlying Lakota hydro-stratigraphic units.

In addition to the 2008 hydro-stratigraphic unit test, Azarga collected and submitted Fall River sandstone core samples, equivalent to that tested by the hydro-stratigraphic unit test, for laboratory measurements of horizontal and vertical hydraulic conductivity with the following results:

- Measured horizontal hydraulic conductivity was 6.1 ft/day; and
- Horizontal to vertical hydraulic conductivity ratio of 4.5:1.

Laboratory measurements of horizontal and vertical hydraulic conductivity on core from the confining units overlying (above the Fall River hydro-stratigraphic unit) and underlying (between the Fall River and Lakota hydro-stratigraphic units) the hydro-stratigraphic unit test area include:

- Skull Creek shale: average vertical hydraulic conductivity of 0.000015 ft/day; and
- Fuson shale: average vertical hydraulic conductivity of 0.000018 ft/day.

Water level data collected by Azarga from a vertical well nest at the Dewey project area indicate that the Unkpapa, Lakota, and Fall River hydro-stratigraphic units are confined and are locally hydraulically isolated. Generalized water level data for the Lower Fall River Sandstone that hosts uranium mineralization in the Dewey project area are detailed in Table 7.1.

Table 7.1: Dewey Production Area Water Level Data

Hydro-Stratigraphic Unit	Top Elevation (ft)	Bottom Elevation (ft)	Static Water Elevation (ft)	Available Drawdown (ft)
Lower Fall River	3,151	3,011	3,642	491

Burdock

Three hydro-stratigraphic unit tests were completed within the Burdock project area: two completed by TVA in 1979 (ref., Powertech, 2013b), and a third completed by Azarga in 2008 (ref., Powertech, 2013c).

The 1979 tests completed by TVA consisted of pumping in the Lakota Formation for 73 hours at an average rate of 200 gpm and pumping in the Fall River for 49 hours at an average rate of 8.5 gpm. A single pumping well was utilized for these tests, with a pneumatic packer separating the screened intervals within the Lakota and Fall River. The screen length in the Lakota was approximately 75 ft, and in the Fall River 55 ft. The results of the hydro-stratigraphic unit tests yielded the following data:

- Interpreted transmissivity of the Lakota was based on analysis of late time data and inferred decreasing transmissivity with distance from the test site due to changes in lithology; overall transmissivity averaged approximately 190 ft^2/day and storativity was 0.00018. The maximum transmissivity determined from early time was approximately 310 ft^2/day;
- Transmissivity of the Fall River averaged approximately 54 ft^2/day and storativity of 0.000014;
- Communication was observed between the Fall River and Lakota Formations through the intervening Fuson shale; and leaky behavior was observed in the Fall River Formation; and
- The vertical hydraulic conductivity of the Fuson shale determined with the Neuman-Witherspoon ratio method (ref., Neuman and Witherspoon, 1972) was estimated to be 0.001 to 0.0001 ft/day.

The 2008 test completed by Azarga consisted of pumping in the Lakota Formation for 72 hours at an average rate of 30.2 gpm from a screened interval 10 ft in length. The results of the hydro-stratigraphic unit test yielded the following data:

- Nine determinations of transmissivity ranged from 120 to 223 ft^2/day with a median value of 150 ft^2/day; and
- Four storativity determinations ranged from 0.000068 to 0.00019 with a median value of 0.00012.

In addition to the 2008 pump test, Azarga collected and submitted Lakota sandstone core samples, representative of the formations tested during the hydro-stratigraphic unit test, for laboratory measurements of horizontal and vertical hydraulic conductivity with the following results:

- Measured horizontal hydraulic conductivity ranged from 5.9 to 9.1 ft/day, and a mean value of 7.4 ft/day; and
- Horizontal to vertical hydraulic conductivity ratio of 2.47:1.

Laboratory measurements of horizontal and vertical hydraulic conductivity on core from the confining units overlying (above the Lakota hydro-stratigraphic unit) and underlying (below the Lakota hydro-stratigraphic unit) the hydro-stratigraphic unit test area include:

- Fuson shale: average vertical hydraulic conductivity of 0.00027 ft/day; and
- Morrison shale: average vertical hydraulic conductivity of 0.00006 ft/day.

Water level data collected by Azarga from vertical well nest at the Burdock project area indicate that the Unkpapa, Lakota, and Fall River hydro-stratigraphic units are confined and are locally hydraulically isolated. Generalized water level data for the Lower Lakota Sandstone that hosts uranium mineralization in the Burdock project area are detailed in Table 7.2.

Table 7.2: Burdock Production Area Water Level Data

Hydro-Stratigraphic Unit	Top Elevation (ft)	Bottom Elevation (ft)	Static Water Elevation (ft)	Available Drawdown (ft)
Lower Lakota	3,290	3,245	3,660	370

The data collected by Azarga, and previous operator TVA, is sufficient to characterize the hydrogeologic regimes of the production hydro-stratigraphic units at the Dewey-Burdock Project. Table 7.3 summarizes groundwater flow parameters determined for the project.

Table 7.3: Hydro-stratigraphic unit Property Summary for the Dewey-Burdock Project

Geologic Unit	Pump Transmissivity (ft^2/day)		Horizontal Hydraulic Conductivity* (ft/day)	Vertical Hydraulic Conductivity* (ft/day)	
	TVA	Azarga	Azarga	TVA	Azarga
Dewey					
Skull Creek	-	-	-	-	1.5×10^{-5}
Fall River	-	255 (15' Screen)	6.1	-	-
Fuson	-	-	-	2.0×10^{-4}	1.8×10^{-5}
Lakota	590 (75' Screen)	-	-	-	-
Morrison	-	-	-	-	-
Burdock					
Skull Creek	-	-	-	-	-
Fall River	54 (55' Screen)	-	-	-	-
Fuson	-	-	-	10^{-3} to 10^{-4}	2.7×10^{-4}
Lakota	190 (75' Screen)	150 (10' Screen)	7.4	-	-
Morrison	-	-	-	-	6.0×10^{-5}

*Core Material

7.4.3 Hydrogeologic Considerations for ISR Mining Performance

The primary hydro-stratigraphic unit parameter to consider in the design of an ISR well field is hydraulic conductivity/transmissivity of the mineral deposit. This parameter influences hydro-stratigraphic unit drawdown, and build up, due to pumping and injection, as well as groundwater velocity and residence time for the ISR mining lixiviant. The second important hydro-stratigraphic unit parameter for ISR well field design is the amount of hydraulic head above an upper confining unit (or available drawdown). A greater hydraulic head allows for higher concentrations of dissolved oxygen within the lixiviant, more aggressive pumping and injection, and reduced risk for gas lock in the producing formation.

The well field plan for the Dewey-Burdock project utilizes 5-spot well patterns (four injection wells, and one central recovery well), 100 ft well spacing (square side length), and an average mining thickness (screen length) ranging from 3.9 ft to 6.0 ft and averaging 4.9 ft. The anticipated average pumping rate for the recovery wells is 20 gpm.

Analysis of the Fall River and Lakota hydro-stratigraphic units suggests that a range of ISR well pumping rates is suitable within each hydro-stratigraphic unit's potential. The combination of local artesian conditions (relatively high hydraulic head above an upper confining unit and available drawdown) in the Fall River and hydro-stratigraphic unit transmissivity provide favorable conditions for ISR mining techniques. The existing hydro-stratigraphic unit parameters will allow significant dissolved oxygen to be introduced into the groundwater for uranium oxidation and extraction.

The current mining plan calls for each well field to be operated for approximately 6 to 36 months. Utilizing a recovery well pump rate of 20 gpm, and assuming homogeneous flow within any given pattern, a 48,000 ft^3 mining block will have over 180 pore volumes circulated through the operational period. This number is significantly higher than the 30 pore volumes utilized to obtain the 71% to 97% indicated leach efficiencies during bottle roll testing (ref., Roughstock, 2018), suggesting that the operational period of each well field should be sufficient to overcome unbalanced flow within any given well pattern.

7.4.4 *Hydrogeologic* Considerations for ISR Mining Impact to Groundwater System

In February 2012, Petrotek Engineering Corporation of Littleton, Colorado completed a three-dimensional numerical model to evaluate the response of the Fall River and Chilson hydro-stratigraphic units to operation of the Dewey-Burdock ISR project (ref., Powertech, 2013d). The model was developed using site-specific data regarding top and bottom hydro-stratigraphic unit elevations, saturated thicknesses, potentiometric surfaces, hydraulic gradients, hydraulic conductivities, specific yields, storativities, and porosities. The model was calibrated to existing conditions and to three pumping tests.

Once calibrated, the model was used to simulate the complete operational cycle of the Dewey-Burdock ISR project, from production through post-restoration recovery. Simulations were run using production rates of 4,000 and 8,000 gpm, a restoration rate of up to 500 gpm, and net bleeds ranging from 0.5 to 1.0%. Modeling results indicate the following:

- Simulated production at rates of 4,000 and 8,000 gpm with 0.5 to 1.0 % bleeds for a period of 8.5 years did not result in hydro-stratigraphic unit dewatering;
- The maximum drawdown simulated outside the project area was less than 12 ft;
- Restoration using reverse osmosis at a rate of up to 500 gpm per wellfield with a 1.0% bleed was simulated to be sustainable throughout a restoration cycle of 6 pore volumes;
- Groundwater sweep simulated at rates to remove one pore volume every 6 to 18 months per wellfield did not result in localized dewatering of the hydro-stratigraphic unit;
- Wellfield interference was shown to be manageable for the simulated production, restoration and net bleed rates through sequencing of wellfields to maximize distances between concurrently operating units;
- Model simulations indicate limited drawdown will occur within the Fall River as a result of ISR operations within the Chilson; and

- Simulated water levels were shown to recover to near pre-operational elevations within one year of ISR cessation.

7.4.5 Groundwater Chemistry

NRC ISR licensing regulations and guidance specify that site characterization pre-mining groundwater chemistry data be collected from the production hydro-stratigraphic unit, underlying hydro-stratigraphic unit, overlying hydro-stratigraphic unit, and the uppermost hydro-stratigraphic unit. Within the Dewey-Burdock project area, the uppermost hydro-stratigraphic unit and the production hydro-stratigraphic unit are both the Inyan Kara, the underlying hydro-stratigraphic unit is the Unkpapa Formation. There is no overlying hydro-stratigraphic unit within the project area other than minor localized alluvial hydro-stratigraphic units.

Across the Black Hills region, the groundwater of the Inyan Kara ranges from soft to very hard and fresh to slightly saline. Compared to other regional hydro-stratigraphic units, the Inyan Kara has relatively high concentrations of sulfate, sodium, and magnesium. These concentrations, along with chloride, are generally higher in the southern Black Hills. The exact source of the sulfate is uncertain but could be the result of oxidation of sulfide minerals such as pyrite within the Inyan Kara (ref., RESPEC 2008a).

Chemical composition and pH within the Inyan Kara vary based upon distance from the outcrop. Previous studies indicate the groundwater pH increases down dip, as well as a change from calcium sulfate type water near outcrop to sodium sulfate type down gradient.

The Inyan Kara is a principal uranium-bearing rock unit in the southwestern Black Hills. As such, the hydro-stratigraphic unit typically has measurable amounts of dissolved uranium, radium-226, radon-222, and other byproducts of radioactive decay. In addition to the radionuclides, high concentrations of sulfate and dissolved solids deter use of the Inyan Kara as a source of drinking water (ref., RESPEC 2008b).

Groundwater chemistry data for the Fall River Formation and Lakota Formation of the Inyan Kara are shown in Table 7.4. Minimum, maximum, and mean concentrations are based upon background data collected for the Dewey-Burdock NRC source and byproduct materials license. In general, the water of the Inyan Kara within the project area is characterized by high concentrations of dissolved solids, sulfate, and radionuclides. Mean concentrations of sulfate, dissolved solids, manganese, and radionuclides (gross alpha, Radon-222) exceed drinking water quality standards (EPA maximum contaminant levels (MCL), secondary MCLs, and proposed MCLs) in over half of the samples collected.

The present poor water quality of the Inyan Kara within the Dewey-Burdock project area, naturally containing both radionuclide and TDS concentrations above EPA drinking water standards, suggests that reclamation of the production hydro-stratigraphic unit to background or alternate concentration limits will be required.

Table 7.4: Groundwater Chemistry for the Fall River and Chilson Formations

Analyte	Units	Fall River Hydro ID Means			Chilson Hydro ID Means		
		Min	Max	Mean[1]	Min	Max	Mean[1]
Physical Properties							
pH, Laboratory	s.u.	7.10	8.45	7.92	7.10	8.05	7.64
Solids, Total Dissolved (TDS)	mg/L	773.85	2250.00	1275.01	708.33	2358.33	1263.38
Major Ions							
Bicarbonate as HCO3	mg/L	142.92	239.67	195.92	86.75	318.25	206.27
Calcium, Dissolved	mg/L	30.10	368.00	110.93	34.74	385.50	145.84
Carbonate as CO3	mg/L	<5	7.85	2.95	<5	3.125	2.54
Chloride	mg/L	9.50	47.00	15.62	5.00	17.50	10.06
Magnesium, Dissolved	mg/L	10.51	133.75	38.56	11.80	124.14	51.34
Potassium, Dissolved	mg/L	7.08	15.98	11.20	7.18	21.65	13.57
Sodium, Dissolved	mg/L	86.60	502.50	236.23	47.42	283.00	168.00
Sulfate	mg/L	425.38	1442.50	743.25	388.77	1509.17	733.54
Metals, Total							
Arsenic	mg/L	0.00075	0.00379	0.00205	0.001	0.02	0.005
Chromium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/L	<0.01	<0.01	<0.01	<0.01	0.0425	0.008
Iron	mg/L	0.04167	4.76417	0.82336	0.08	15.30	3.33
Lead	mg/L	<0.001	0.002	0.001	<0.001	0.026	0.0032
Manganese	mg/L	0.03000	2.48500	0.32747	0.04	1.74	0.36
Mercury	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/L	<0.01	0.03	0.04	<0.01	0.075	0.05
Selenium	mg/L	<0.001	0.001	0.001	<0.001	0.0019	0.001
Strontium	mg/L	0.65	6.20	2.18	0.70	7.45	3.04
Uranium	mg/L	<0.0003	0.11	0.01	<0.0003	0.02	0.0046
Zinc	mg/L	<0.01	0.01	0.01	<0.01	0.13	0.03
Radionuclides							
Gross Alpha, Dissolved	pCi/L	5.58	1504.69	272.70	3.56	4990.71	418.43
Radium 226, Dissolved	pCi/L	1.18	388.17	67.71	1.15	1289.29	103.18
Radon 222, Total	pCi/L	276.83	278029.73	27107.39	196.67	180750.00	21158.38

Note 1: ½ x reporting limit used to calculate mean where non-detect results occurred

Analyte concentration exceeds standard for:

(red)	Federal MCL
(green)	Secondary Standard
(yellow)	Proposed MCL

(ref., Powertech, 2013e)

7.4.6 Assessment of Dewey-Burdock Project Hydrogeology

The data confidence level is typical of a uranium ISR project at this stage in development. Prior to the development of each individual well field, Azarga will complete specific testing including coring and hydro-stratigraphic unit testing that will increase confidence and understanding.

8.0 DEPOSIT TYPE

Uranium deposits in the Dewey-Burdock Project are sandstone, roll front type. This type of deposit is usually "C" shaped in cross-section, with the down gradient center of the "C" having the greatest thickness and highest tenor. The "tails" of the "C" are usually much thinner and essentially trail the "roll front" being within the top and bottom of the sandstone unit that is slightly less permeable.

These "roll fronts" are typically a few tens of feet wide and often can be thousands of feet long. Uranium minerals are deposited at the interface of oxidizing solutions and reducing solutions. As the uranium minerals precipitate, they coat sand grains and partially fill the interstices between grains. As long as oxidizing groundwater movement is constant, minerals will be solubilized at the interior portion of the "C" shape and precipitated in the exterior portion of the "C" shape, increasing the tenor of the orebody by multiple migration and accretion. Thickness of the orebody is generally a factor of the thickness of the sandstone host unit. Mineralization may be 5 to 12 ft thick within the roll front while being 1 to 2 ft thick in the trailing tail portions. Deposit configuration determines the location of well field drillholes and is a major economic factor in ISR mining.

The uranium deposits in the southern Black Hills region are characteristic of the Rocky Mountain and Intermontane Basin uranium province, United States (ref., Finch, 1996). The uranium province is essentially defined by the extent of the Laramide uplifts and basins.

Roll-front sandstone uranium deposits formed in the continental fluvial basins developed between uplifts. These uranium deposits were formed by oxidizing uranium-bearing groundwater that entered the host sandstone from the edges of the basins. Two possible sources of the uranium were (1) uraniferous Precambrian granite that provided sediment for the host sandstone and (2) overlying Tertiary age (Oligocene) volcanic ash sediments. Major uranium deposits occur as sandstone deposits in Cretaceous and Tertiary age basin sediments. Cluster size and grades for the sandstone deposits range from 500 to 20,000t U_3O_8, at typical grades of 0.04 to 0.23% U_3O_8.

The tectono-stratigraphic setting for roll-front uranium ores is in arkosic and fluvial sandstone formations deposited in small basins. Host rocks are continental fluvial and near-shore sandstone. The principal ages of the host rocks are Early Cretaceous (144–97Ma), Eocene (52–36Ma), and Oligocene (36–24Ma), with epochs of mineralization at 70Ma, 35–26Ma, and 3Ma.

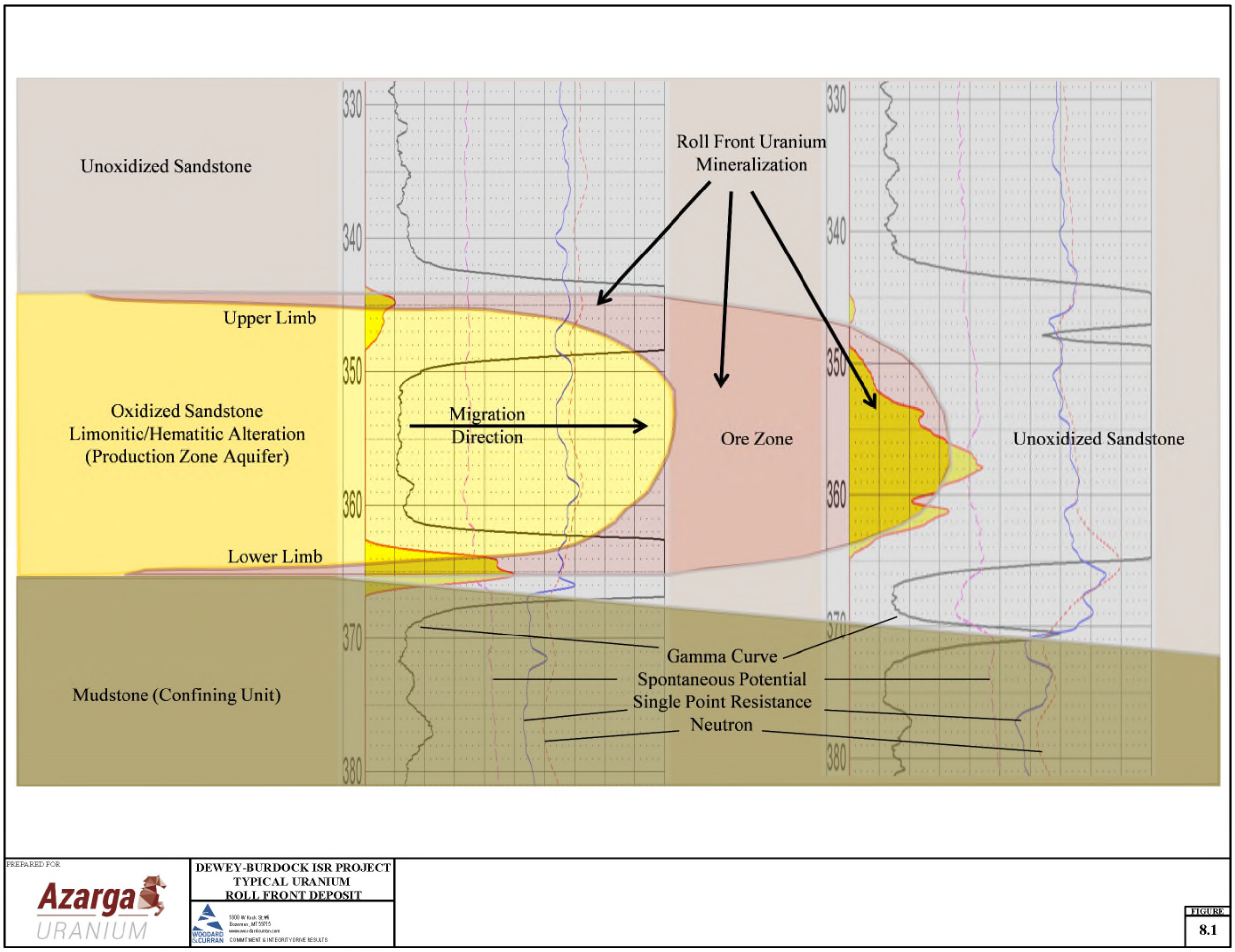
Ore mineralogy consists of uraninite, pitchblende and coffinite with associated vanadium in some deposits. Typical alteration in the roll-front sandstone deposit includes oxidation of iron minerals up- dip from the front and reduction of iron minerals down-dip along advancing redox interface boundaries (Figure 8.1).

Probable sources of uranium in the sandstone deposits are Oligocene volcanic ash and/or Precambrian granite (2,900–2,600 Ma). Mineralizing solutions in the sandstone are oxygen-bearing groundwater. Uranium mineralization of the sandstone deposits began with inception of Laramide uplift (approximately 70 Ma) and peaked in Oligocene.

Size and shape of individual deposits can vary from small pod-like replacement bodies to elongate lobes of mineralization along the regional redox boundary.

Historical drillhole data (electric and lithology logs), along with Azarga's confirmatory drilling results confirm that the mineralization at Dewey-Burdock is a roll front type uranium deposit. This is determined by the position of the uranium mineralization within sandstone units in the subsurface, the configuration of the mineralization and the spatial relationship between the mineralization and the oxidation/reduction boundary within the host sandstone units.

Figure 8.1: Typical Roll Front Deposit



9.0 EXPLORATION

Historical exploration drilling for the project area was extensive and is discussed in Section 6 (History). In January 2007, Azarga received an exploration permit for its Dewey-Burdock project from the South Dakota DENR. The purpose of this drilling was to examine the geologic setting of the Inyan Kara Group sandstones in the subsurface, to confirm the uranium mineralogy within these sands, to collect core samples on which assay, metallurgical and leach testing could be performed. In addition, the drilling program was to install groundwater wells for groundwater quality samples, and for two 72-hour pump tests to estimate the permeability and flow rates for the host formations. Drilling associated with this permit began in May 2007, continued through April 2008 and will be discussed in the following section.

Azarga received their second exploration permit in November 2008. The purpose of this 30-hole permit was to investigate the uranium potential of known host sandstones, below planned production facilities, to ensure that no surface construction would take place over uranium resources. As of the date of this report, no drilling has taken place under this permit.

No additional mineral detection exploration surveys or investigations, other than drilling, were conducted on the Dewey-Burdock project.

In Qualified Person, Mr. Steve Cutler's opinion is that the historical drilling, for which Azarga has most, but not all the drillhole geophysical logs, was typically drilled and logged in a manner that would produce acceptable data for resource estimation purposes today. In addition, Azarga's confirmatory drilling has verified historically determined geology, mineralization, and shapes of the defined roll fronts. The exploration methods used historically and by Azarga are appropriate for the style of mineralization and provide industry standard results that are applicable to current methods of resource estimation.

10.0 DRILLING

From May 2007 to April 2008, Azarga completed 91 drillholes on the Dewey- Burdock Project for a total footage of 55,302 ft. The depths of these holes ranged from 185 to 761ft-below-surface. While geologic information was collected from all drillholes, they were used for multiple purposes. Selective coring took place in ten holes and 12 holes were completed as water wells. With the exception of the holes converted to wells, all other drillholes were plugged and abandoned in accordance with State of South Dakota regulations. This involved filling the drillhole, from the bottom upward, with a sodium bentonite plugging gel. The viscosity of this plugging gel was measured to be, at a minimum, 20 seconds higher than the viscosity of the bottom-hole drilling fluid. After a 24-hour settling period, this method of hole sealing emplaces a solid plug in the abandoned hole that has a high degree of elasticity. This type of plug conforms to any irregularity within the drillhole and is considered to provide a more effective seal than a rigid cement plug. Once the plugging gel has been allowed to settle (24-hour period), filling the remainder of the hole with bentonite chips to the surface completes the sealing procedure. If artesian water flow was encountered in the drillhole, it was filled from the bottom upward with portland cement. A representative of the South Dakota DENR was on site to observe all hole plugging activities.

10.1 Mud Rotary Drilling

Exploratory drilling was performed using a truck-mounted, rotary drill rig using mud recovery fluids. This style of drilling is consistent with historical drilling programs from the 1970s and 1980s. A 6.5in hole was drilled and rotary cutting samples were collected at 5ft intervals. The on-site geologist prepared a description of these cuttings and compiled a lithology log for each drillhole. This rotary drilling was used to confirm several critical issues regarding uranium resources at the Dewey- Burdock project.

Wide-spaced exploration holes were drilled across the project area to examine the geologic setting and the nature of the host sands within the Fall River and Lakota Formations. This drilling showed that the depositional environments and lithologies of the Fall River and Lakota sands were found to be consistent with descriptions presented by previous operators on the project site. It also confirmed the presence of multiple, stacked mineralized sand units in the area. Electric logs and lithology logs from each drillhole were used in these evaluations.

Most importantly, the observation that geochemical oxidation cells within the host sands in the subsurface were directly related to uranium mineralization, establishes well-known geologic controls to uranium resources on this project. Encountering mineralized trends associated with “oxidized” and “reduced” sands within multiple sand units, provides reliable guides to the identification of resource potential in relatively unexplored areas, as well as to demonstrating continuity within known Resource Areas.

Fences of drillholes were completed in areas away from known resources but within areas of identified oxidation-reduction boundaries in the subsurface. Due to the narrow average width of the higher-grade uranium mineralization along these trends, between four and six close-spaced drillholes are required in each fence. A total 56 holes were drilled in 15 fences. In the completion of this drilling program, seven fences encountered mineralization in excess of 0.05% eU_3O_8. The remaining eight fences will require additional drilling to delineate the higher-grade mineralization.

This drilling demonstrated that the originally hypothesized roll-front deposit model is appropriately applied to this project. While high-grade uranium mineralization was not encountered in all fences due to the sparse nature of reconnaissance drilling, the concentration and configuration of mineralization was sufficiently encouraging to warrant additional close-spaced drilling in the fences that did not encounter high-grade mineralization.

One factor potentially effecting the drilling results was that in attempt to match confirmation drilling with historic drillhole locations, there is potential for some survey errors between past non-GPS survey methods which may not have been done with the accuracy and repeatability of present GPS survey methods. There were no other drilling, sampling, or core recovery factors that would be perceived to potentially materially impact the reliability of accuracy of these results.

10.2 Core Drilling

Ten core holes were included in the 91 drillholes completed. Rotary drilling was used to reach core point, at which time, a 10 ft-long, 4 in diameter core barrel (with core bit) was lowered into the drillhole. A total of 407 ft of 3 inch core was recovered from the mineralized sands in four separate Resource Areas. The coring was planned to intercept various parts of these uranium roll front deposits and to obtain samples of mineralized sandstone for chemical analyses and for metallurgical testing. Six holes were cored in the Fall River Formation and four holes were cored in the Lakota Formation. Table 10.1 and Table 10.2 present a listing of the uranium values in these core holes, as determined by down-hole radiometric logging for the Fall River and Lakota Formations, respectively.

Table 10.1: Results of Fall River Formation Core Holes

Core Hole Number	Depth (ft)	Total Mineralized Intercept	GT	Highest 1/2 ft Interval
DB 07-29-1C	579.5	12.5' of 0.150% eU_3O_8	1.88	0.944% eU_3O_8
DB 07-32-1C	589.5	5.0' of 0.208% eU_3O_8	1.04	0.774% eU_3O_8
DB 07-32-2C	582.5	16.0' of 0.159% eU_3O_8	2.54	0.902% eU_3O_8
DB 07-32-3C	No mineralized sand recovered			
DB 07-32-4C	559.0	13.0' of 0.367% eU_3O_8	4.77	1.331% eU_3O_8
DB 08-32-9C	585.5	10.5' of 0.045% eU_3O_8	0.47	0.076% eU_3O_8

Table 10.2: Results of Lakota Formation Core Holes

Core Hole Number	Depth (ft)	Total Mineralized Intercept	GT	Highest 1/2 ft Interval
DB 07-11-4C	432.5	6.0' of 0.037% eU_3O_8	0.22	0.056% eU_3O_8
DB 07-11-11C	429.5	7.0' of 0.056% eU_3O_8	0.40	0.061% eU_3O_8
DB 07-11-14C	415.0	9.0' of 0.052% eU_3O_8	0.47	0.126% eU_3O_8
DB 07-11-16C	409.0	3.5' of 0.031% eU_3O_8	0.17	0.041% eU_3O_8

Overall core recovery, despite poor hole conditions in DB 07-32-3C, was greater than 90% on this coring program.

Laboratory analyses were performed on selected core samples to determine the physical parameters for permeability and porosity of the mineralized sands, as well as overlying and underlying clays. These analyses on seven core samples of mineralized sandstones showed favorable high, horizontal permeabilities - ranging from 449 to 3207 millidarcies. These horizontal permeabilities within the mineralized zones allow for favorable solution flow rates for ISR production. Analyses on confining units, above and below the sands, showed very low, vertical permeabilities - ranging from 0.007 to 0.697 millidarcies. Low vertical permeabilities in the confining units help to isolate solutions within the mineralized sand during ISR mining and restoration operations.

There were no drilling, sampling, or core recovery factors that would be perceived to potentially materially impact the reliability or accuracy of these results.

10.3 Groundwater Wells

During the 2007 and 2008 drilling campaign, Azarga converted 12 of the 91 rotary holes to groundwater wells in both Fall River and Lakota sands. These wells were used along with previously existing wells for the collection of groundwater quality samples and in pump tests to determine the hydrologic characteristics of the mineralized sands. Results of the pump tests demonstrated a sustained pumping rate of 25 to 30 gpm and showed that groundwater flow characteristics within the mineralized sands were sufficient to support ISR mining operations. All data relating to groundwater quality and hydrology are available for public review in the recent permit applications submitted to the NRC and the State of South Dakota.

10.4 Results

Qualified Person, Steve Cutler concludes that the drilling practices were conducted in accordance with industry-standard procedures. The drilling conducted by Azarga confirms historical drilling in terms of thickness and grade of uranium mineralization and provides confirmatory geological controls to that mineralization – conformation of the redox roll-front model.

Core drilling provided the verification of the mineralization as being largely in equilibrium for those deposits that are below the current water table. Water wells provide the means for groundwater characterization, and preliminary information to support potential ISR production.

11.0 SAMPLE PREPARATION, ANALYSIS AND SECURITY

11.1 Sample Methods

11.1.1 Electrical Logs

A geophysical logging truck, manufactured by Geoinstruments Logging, was used for the borehole logging. This unit produces continuous, down-hole electric logs, consisting of resistivity, self-potential and gamma ray curves. This suite of logs is ideal for defining lithologic units in the subsurface. The resistivity and self-potential curves provide qualitative measurements of water conductivities and indicate permeability, which are used to identify sandstones, clays and other lithologic units in the subsurface. These geophysical techniques enable geologists to interpret and correlate geologic units and perform detailed subsurface geologic mapping.

The gamma ray curves are extremely important as they provide an indirect measurement of uranium in the subsurface. Uranium in nature primarily consists of the isotope Uranium-238, which is not a major gamma emitter. However, many of the daughter products of uranium are gamma emitters and when the uranium is in equilibrium with its daughter products, gamma logging is a reliable technique for calculating in-place uranium resources.

These electric logs were run on all 91 drillholes completed across the Dewey-Burdock project site. They are similar in nature to TVA's historic drillhole logs for the project.

11.1.2 Drill Cuttings

Mud rotary drilling relies upon drilling fluids to prevent the drill bit from overheating and to evacuate drill cuttings from the hole. Drill cuttings (samples) are collected at five-foot intervals by the drill rig hands at the time of drilling. The samples are displayed on the ground in order to illustrate the lithology of the material being drilled and so that depth can be estimated. After the hole is completed, a geologist will record the cuttings piles into a geologist's lithology log of the hole. This log will describe the entire hole, but detailed attention will be directed toward prospective sands and any alteration (oxidation or reduction) associated with these sands. Chemical assaying of drillhole cuttings is not practical since dilution is so great by the mud column in the drillhole and sample selection is not completely accurate to depth.

11.1.3 Core Samples

Core samples allow accurate chemical analyses and metallurgical testing, as well as testing of physical parameters of mineralized sands and confining units. The mud rotary drill rig had the capability to selectively core portions of any drillhole, using a 10 ft barrel.

A portable core table was set up at the drilling site. Core was taken directly from the inner core barrel and laid out on the table. The core was measured to estimate the percentage of core recovery, then washed, photographed and logged by the site geologist. The core was then wrapped in plastic, in order to maintain moisture content and prevent oxidation, and cut to fit into core boxes for later sample preparation. Overall core recovery was approximately 90%.

11.2 Review

Gamma logs historically were the standard "sampling" tool by which to determine in-situ uranium grades. Current uranium exploration methods use a combination of gamma logging and core samples, as Azarga has, to determine in situ uranium grades, and the nature and extent of uranium equilibrium/disequilibrium. The methods employed by Azarga are appropriate for the mineralization at Dewey-Burdock and are standard industry methods for uranium exploration and resource development.

11.3 Laboratory Analysis

Analyses of core samples are included in this report. The down-hole electric log was used in conjunction with the geologist's log of the core to select intervals for testing. Azarga selected 6in intervals of whole core (3 in diameter) for physical parameter testing (permeability, porosity, density). Mineralized sands selected for chemical analyses were cut into ½ ft intervals and then split in half. One of the splits was used for chemical analyses and the other split was set aside for metallurgical testing. Azarga geologic staff performed the sample identification and selection process. Chain-of-custody (COC), sample tags were filled out for each sample and samples were packed into ice chests for transportation to the analytical laboratory.

Azarga sent samples to Energy Laboratories, Inc.'s (ELI's) Casper, WY facility for analyses. Upon receipt at the laboratory, the COC forms were completed and maintained, with the lab staff taking responsibility for the samples. The first step in the sample preparation process involved drying and crushing the selected samples. The pulp is then subject to an EPA 3050 strong acid extraction technique. Digestion fluids were then run through an Inductively Coupled Argon Plasma Mass Spectrometry (ICP-MS) according to strict EPA analytical procedures. Multi-element chemical analyses included values for uranium (chemical), vanadium, selenium, molybdenum, iron, calcium and organic carbon. Whole rock geochemistry provides valuable information for the design of ISR well field operations.

11.3.1 Sample Preparation and Assaying Methods

ELI is certified through the National Environmental Laboratory Accreditation Program (NELAP). NELAP establishes and promotes mutually acceptable performance standards for the operation of environmental laboratories. The standards address analytical testing, with State and Federal agencies serve as accrediting authorities with coordination facilitated by the EPA to assure uniformity. Maintaining high quality control measures is a prerequisite for obtaining NELAP certification. As an example, nearly 30% of the individual samples run through ICP-MS are control or blank samples to assure accurate analyses. In the Authors' opinion, ELI has demonstrated professional and consistent procedures in the areas of sample preparation and sample security, resulting in reliable analytical results.

11.3.2 Gamma Logging

The basic analysis that supports the uranium grade reported in most uranium deposits is the down- hole gamma log created by the down-hole radiometric probe. The down-hole gamma log data are gathered as digital data on approximately 1.0 inch intervals as the radiometric probe is inserted or extracted from a drillhole.

The down-hole radiometric probe measures total gamma radiation from all natural sources, including potassium (K) and thorium (Th) in addition to uranium (U) from uranium-bearing minerals. In most uranium deposits, K and Th provide a minimal component to the total radioactivity, measured by the instrument as counts per second (CPS). At the Dewey-Burdock Project, the uranium content is high enough that the component of natural radiation that is contributed by K from feldspars in sandstone and minor Th minerals is expected to be negligible. The conversion of CPS to equivalent uranium concentrations is therefore considered a reasonable representation of the in-situ uranium grade. Thus, determined equivalent uranium analyses are typically expressed as ppm eU_3O_8 ("e" for equivalent) and should not be confused with U_3O_8 determination by standard XRF or ICP analytical procedures (commonly referred to as chemical uranium determinations). Radiometric probing (gamma logs) and the conversion to eU_3O_8 data have been industry-standard practices used for in- situ uranium determinations since the 1960's. The conversion process can involve one or more data corrections; therefore, the process is described here.

The typical gamma probe is about 2 inch in diameter and about 3 ft in length. The probe has a standard sodium iodide (NaI) crystal that is common to both hand-held and down-hole gamma scintillation counters. The logging system consists of the winch mechanism, which controls the movement of the probe in and out of the hole, and the digital data collection device, which interfaces with a portable computer and collects the radiometric data as CPS at defined intervals in the hole.

Raw data is typically plotted by WellCAD software to provide a graphic down-hole plot of CPS. The CPS radiometric data may need corrections prior to conversion to eU_3O_8 data. Those corrections account for water in the hole (water factor) which depresses the gamma response, the instrumentation lag time in counting (dead time factor), and corrections for reduced signatures when the readings are taken inside casing (casing factor). The water factor and casing factor account for the reduction in CPS that the probe reads while in water or inside casing, as the probes are typically calibrated for use in air-filled drillholes without casing. Water factor and casing factor corrections are made where necessary, but Azarga drillholes were logged primarily in open, mud-filled drillholes.

Conversion of CPS to percent-eU_3O_8 is done by calibration of the probe against a source of known uranium (and thorium) concentration. This was done for the Azarga gamma probe initially at the U.S. Department of Energy (DOE) uranium test pits in George West, Texas. Throughout Azarga's field projects the probe was then regularly calibrated at the DOE uranium test pits in Casper, Wyoming. The calibration calculation results in a "K-factor" specific to the probe; the K-factor is 6.12331-6 for Azarga's gamma probe. The following can be stated for thick (+60cm) radiometric sources detected by the gamma probe:

10,000CPS x K = 0.612% U_3O_8

The total CPS at the Dewey-Burdock Uranium Project is dominantly from uraninite/pitchblende uranium mineralization therefore, the conversion K factor is used to estimate uranium grade, as potassium and thorium are not relevant in this geological environment. The calibration constants are only applicable to source thickness in excess of 2.0 ft. When the calibration constant is applied to source thickness of less than 2.0 ft, thickness of mineralization will be over-stated and radiometric determined grades will be understated.

The industry standard approach to estimating grade for a graphical plot is referred to as the half-amplitude method and was used for this estimate. The half-amplitude method follows the formula:

GT = K x A

Where: GT is the grade-thickness product,

K is the probe calibration constant, and

A is the area under the curve (feet-CPS units).

The area under the curve is estimated by the summation of the 6in (grade-thickness) intervals between E1 and E2 plus the tail factor adjustment to the CPS reading of E1 and E2, according to the following formula:

$A = [\sum N + (1.38 \times (E1 + E2))]$

Where: A is the area under the curve,

N is the CPS per unit of thickness (6in), and

E1 and E2 are the half-amplitude picks on the curve.

This process is used in reverse for known grade to determine the K factor constant.

The procedure used at the Dewey-Burdock Project is to convert CPS per anomalous interval by means of the half-amplitude method; this results in an intercept thickness and eU_3O_8 grade. This process can be done in a spreadsheet with digital data, or by making picks off the analog plot of the graphical curve plot of down-hole CPS.

11.4 Results and QC Procedures

Geophysical logging during confirmatory drilling programs at Dewey-Burdock utilized multiple geophysical logging trucks. Century Geophysical provided initial logging services, and later logging was completed by the Geoinstruments logging unit. No discrepancies were seen in results between either service provider. Historical logs, and those completed by Azarga during confirmatory drilling, were interpreted on 0.5 ft intervals following standard industry practice.

No drillholes completed by Azarga were truly co-located with historical drillholes; however, several drilled within 10ft of historical drillholes displayed similar results for eU_3O_8 values.

11.5 Opinion on Adequacy

The Authors conclude that Azarga's sample preparation, methods of analysis, and sample and data security are acceptable industry standard procedures, and are applicable to the uranium deposits at the Dewey-Burdock Uranium project.

12.0 DATA VERIFICATION

The records of the Dewey-Burdock Project are substantial. In 1991, RBS&A conducted an evaluation of the resource deposits using copies of electric logs and various drillhole location and assay maps. In 1993, additional data became available that included reports by previous owners, additional assay data and even aerial photographs of the project. Diligent searches of university libraries and government records were made. Contacts were made to interview people who had been active on the project at different times. All of this data was evaluated during 1993 and 1994 and summarized in several reports presented to EFN, the owner and operator of the project at that time (ref., Smith, 1993 and 1994).

RBS&A had a long career in evaluating numerous uranium ore reserves throughout the United States and in Mexico. With this experience comes the knowledge to recognize reliable data. RBS&A stated that "knowing the parties involved in the project area and knowing several of the workers personally gives confidence to the veracity of the data obtained and reviewed to develop the estimate of uranium resources. The limitation of all these data is that their origin is so diverse. Different companies produced electric logs across a long period of time. Data is so abundant that it is difficult to accumulate all the data into one sensible document. Up to a point in time, these data were being used to establish an underground uranium mine. The present interest is to develop an ISR mine that requires slightly different parameters than does conventional mining." Azarga's Chief Geologist, Frank Lichnovsky, has also reviewed this extensive database and believes the information to be relevant and accurate.

12.1 Procedures

As previously described, TVA performed an equilibrium study on core samples from mineralized sandstones to demonstrate gamma response for uranium equivalent measurements versus actual chemical assays of the core. Figure 12.1 is the equilibrium plot from the original technical report showing the relationship between chemical and gamma responses from TVA's historic coring program. The results show that the mineralized trends are in equilibrium and that gamma logging will give an accurate measurement of the in-place uranium content.

Azarga's 10-hole coring program completed in 2007 and 2008 provided samples for a similar verification analysis of the uranium mineralization at Dewey-Burdock. Half-foot samples of mineralized sandstones were sent to Energy Labs, Inc. in Casper, WY for analyses. Each sample was assayed for UGamma and UChemical. As shown in the equilibrium plot in Figure 12.1, a trend line on the plot of these values for each core interval shows an excellent correlation between radiometric and chemical values. The trend lines (or the chemical uranium: gamma uranium ratios) for these two plots are very similar. This indicates that the confirmation drilling encountered the same chemical uranium mineralization in the subsurface and this chemical uranium is in equilibrium with its gamma response. For resource estimation purposes, conventional gamma ray logging will provide a valid representation of in-place uranium resources.

Figure 12.2 shows the location of Azarga's confirmation drilling within the Dewey portion of the project area. The drillholes on this map targeted the F11 mineralized trend and are a good example of how confirmation drilling (shown in blue text) verified the results of historic drilling and, in many cases, expanded known high-grade mineralization. This confirmation drilling successfully demonstrated geological and grade continuity within identified Resource Areas throughout the Dewey-Burdock project.

12.2 Data Confirmation

An overall assessment of the data used for the classification of resources into various categories is required by the CIM Definition Standards. This assessment showed that historical data gathering, and interpretation of the data was conducted by a well-respected, major uranium exploration company with high-quality uranium exploration staffs. It also showed that at key points, professional geologic consultants reviewed and verified the results of the historic explorations programs. Numerous academic reports have also been published on geologic settings and uranium mineralization of the Project. Current interpretive work has been completed under the direction of Azarga's senior geologic staff. Azarga's Chief Geologist, Len Eakin has 13 years of uranium experience, including well field development assignments in Wyoming and Nebraska ISR facilities. All these factors provide a high level of confidence in the geological information available on the mineral deposit and that historic drillhole data on the Dewey-Burdock Project is accurate and useable for continued evaluation of the project.

Qualified person, Steve Cutler, responsible for auditing Azarga's resources, visited the Dewey-Burdock site and office, and reviewed the data used in this resource evaluation. He examined geologic data and performed quality assurance checks of gamma logging data contained in resource databases/maps. Other audit techniques are also described in Section 14.5.

12.3 Quality Control Measures and Procedures

With respect to all data used in the verification analysis, Mr. Cutler inspected the drill sites during a site visit, reviewed analytical data (including geophysical logs, core data, and historic drilling records), received copies of the analytical data for detailed off-site review. Mr. Cutler also directed the interpretation of the project analytical data for the auditing of GT contours.

Review of the analytical data included comparison of geophysical logs to the database entries, and a review of the efforts of Azarga to compile and database from historical records. This includes review of gamma logging calibration records and comparison of gamma results with analytical core data.

12.4 Limitations

Data are available for over 7,500 locations that include the thickness, grade, and depth of mineralization from previous companies exploring the deposit. Azarga does not have the actual geophysical logs for approximately 24% of the exploratory drill holes.

Mr. Cutler visited the site to confirm the historic location of Azarga drillhole sites, water well, and monitor well above-ground casings. There are limitations in defining the historical drilling in that most, if not all, historical drillholes are no longer identifiable as to collar location. This is due in part because the holes were collared in soil/alluvium/shale, which would not visibly retain evidence of the drillhole collars unless the holes were abandoned with steel casing protruding from the ground surface. Additionally, Mr. Cutler could not review Azarga's entire collection of historic records and geophysical logs due to the vast quantity of this information, and is reliant in part for Azarga's efforts here, but Mr. Cutler did perform a sampling of this data sufficient to conclude the data and database to be reasonably reliable and accurate.

12.5 Data Adequacy

Qualified Person Mr. Cutler concludes that adequate work has been to done to verify the historical records and reviewed the project's analytical database to validate its accuracy. Mr. Cutler concludes that throughout the database and independently reviewed analytical data there are no known discrepancies in locations, depths, thicknesses, or grades that would render the project data questionable in any way. It is Mr. Cutler's opinion that adequate representation of the historical data for the Dewey-Burdock project has occurred for the database in full. Mr Cutler is of the opinion that the database is sufficiently reliable and accurate for the purpose of this 43-101 compliant resource estimation.

Figure 12.1: Equilibrium Plot

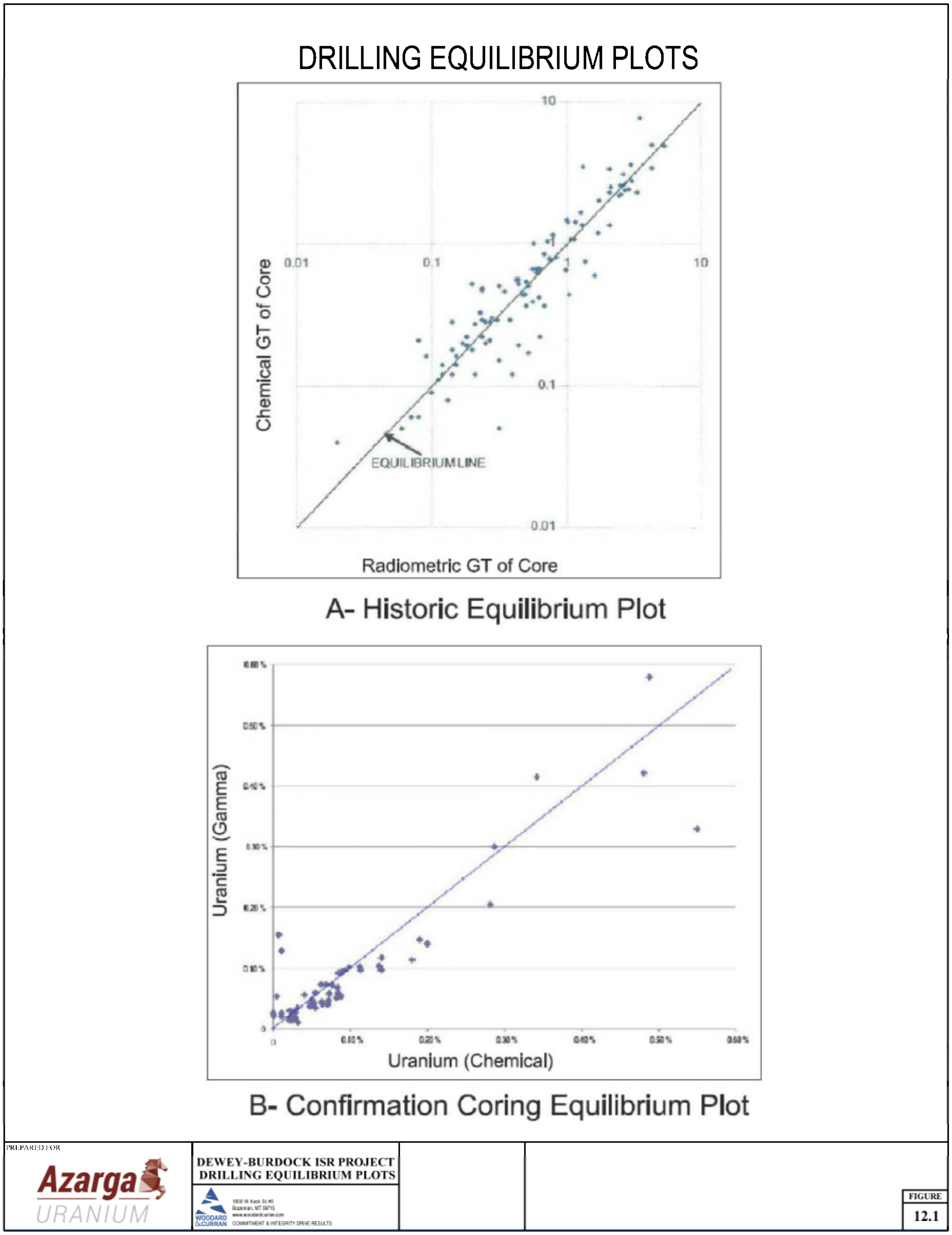
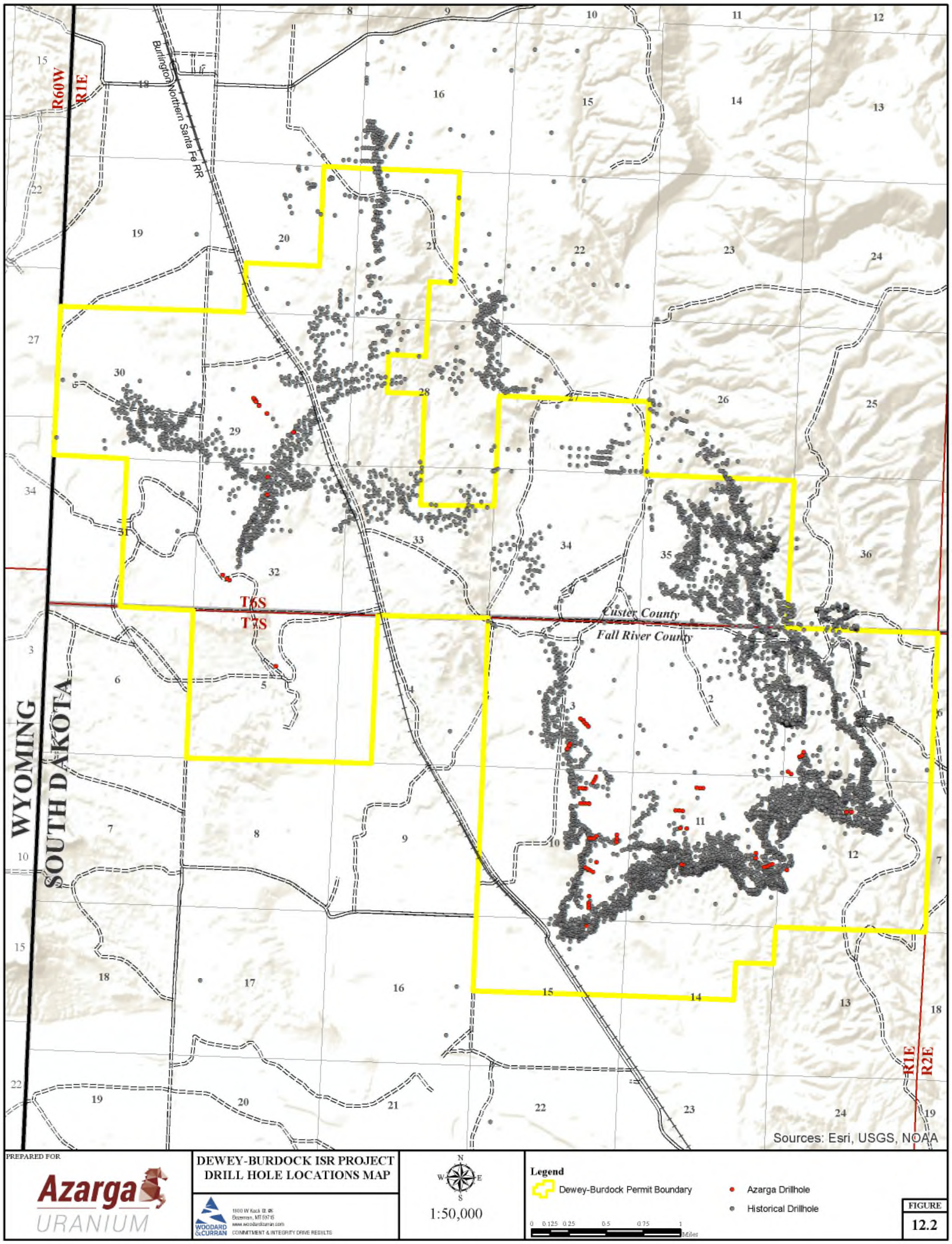


Figure 12.2: Drill Location Map



13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

The following evaluation was presented in the previous NI 43-101 of the Project (ref., Roughstock, 2018). The Authors have reviewed the evaluation for use in this PEA and are in agreement with it. The evaluation is in regards to combined bottle roll tests conducted by Energy Labs Inc. (ELI).

13.1 Procedures

Azarga conducted leach amenability studies on uranium core samples obtained in the previously described coring program. Azarga conducted the tests at ELI's Casper facility between July 27 and August 3, 2007. Leach amenability studies are intended to demonstrate that the uranium mineralization is capable of being leached using conventional ISR chemistry. The leach solution is prepared using sodium bicarbonate as the source of the carbonate complexing agent (formation of uranyldicarbonate (UDC) or uranyltricarbonate ion (UTC). Hydrogen peroxide is added as the uranium-oxidizing agent as the tests are conducted at ambient pressure. Sequential leach "bottle roll" tests were conducted on the four core intervals selected by Azarga personnel. The tests are not designed to approximate in-situ conditions (permeability, porosity, pressure) but are an indication of an ore's reaction rate and the potential uranium recovery.

13.2 Evaluation

The following evaluation was presented in the previous NI 43-101 for the Project (ref., Roughstock, 2018). The authors have reviewed the evaluation for use in this PEA and are in agreement with it. The evaluation is in regards to combined bottle roll tests conducted by Energy Labs Inc. (ELI).

13.2.1 Ambient Bottle Roll Tests

ELI reported that acid producing reactions were occurring during the initial leaching cycles and this is consistent with the core samples having been exposed to air during unsealed storage. This may have influenced uranium leaching kinetics and final uranium extraction, but two other aspects of the work deserve emphasis: (1) the coarsest grain size in two of the four leach residues had very high uranium assays; and (2) all four composites contained leachable vanadium.

The 615.5-616.5 ft interval of Hole # DB0732-2C produced a 30-PV (pore volume) leach residue assaying 2.95% U_3O_8 in the +20-mesh fraction, and the same coarse fraction from the 616.5-617.3 ft interval of that hole assayed 5.02% U_3O_8. The weight fractions were small, 0.7% and 1.8%, but the respective uranium distributions were 28% and 30% of total uranium retained in the residues. Possibly, these losses in the coarsest grain fraction were due simply to calcite encapsulation or another post-mineralization event. In any case, a QEMSCAN characterization of the uranium could shed light on the likelihood of increased uranium dissolution by reagent diffusion during longer retention times in a commercial well field. If this interpretation is supported by new evidence, there is a potential for ultimate uranium extractions (not overall recoveries) well over 90% from higher-grade intervals. Table 13.1 includes calculated uranium extractions based on the ELI leach tests without accounting for possible improvements at longer retention times.

The leach tests were conducted on four core intervals recovered from two holes. One interval represented low-grade resource at 0.067% U_3O_8 and the other three intervals represented resource ranging from 0.14% U_3O_8 to 0.74% U_3O_8. Based on the known volume of core in the selected intervals and the apparent wet density, wet masses of sample representing a 100mL pore volume (PV), assuming 30% porosity, were delivered to the reaction vessels. 5PV lixiviant charges (500mL of 2g/L $NaHCO_3$, 0.5 g/L H_2O_2) were mixed with the resource samples and vessel rotation was started. Over a six-day period, 30PV of lixiviant was delivered to and extracted from the vessels.

13.3 Results

As shown in Table 13.1, the four composites contained variable concentrations of vanadium, but most of it, at least by one method of calculation, was dissolved by the oxygenated bicarbonate lixiviant. The uranium and vanadium dissolutions in Table 13.1 were calculated from worksheets describing individual ELI leaching cycles and are based on assays of heads and residues. There are analytical uncertainties, however, so Tables 13.2 and 13.3 summarize results obtained by different approaches. The uranium dissolutions in Table 13.2 are based on dividing the uranium mass in the leachates by the sum of the masses of uranium in leachates and residues. The vanadium dissolutions in Table 13.3 are based on dividing the sum of the vanadium masses in the leachates by the vanadium mass in the sample prior to leaching. Thus, the vanadium dissolutions given in Table 13.3 are lower than those in Table 13.1, while the uranium dissolutions in Tables 13.1 and 13.2 are comparable (ref., Roughstock, 2018). Available data do not allow a rigorous determination of the amount of vanadium that will dissolve during commercial leaching, but it is clear that vanadium will be present in the pregnant leach solutions.

Analyses of the resulting leach solution indicated leach efficiencies of 71% to 92.8% as shown in Table 13.1. Peak recovery solution grades ranged from 414 mg/L to 1,654 mg/L. Tails analysis indicated efficiencies of 75.8%to 97%, see Table 13.2. The differences between the two calculations are likely to involve the difficulty in obtaining truly representative 1 g subsamples of the feed and tails solids. The solution assays are believed to be more accurate and representative than the feed/tails results and they typically showed a less conservative estimate of uranium leachability.

These preliminary leach tests indicate that the uranium deposits at Dewey-Burdock appear to be readily mobilized in oxidizing solutions and potentially well suited for ISR mining. The results presented in this section provide an indication of the leachability of uranium from the host formation. The results are not an absolute indication of the potential head grade or recoverability values. However, the data do support Azarga personnel operating experience of average head grades of uranium in pregnant lixiviant of 60 ppm and recovery rates of 80%.

Table 13.1: Uranium and Vanadium Dissolutions Based on Solids Assays

	Core Assays (mg/kg)		Residue Assays (mg/kg)		Dissolutions (%)	
Sample	Uranium	Vanadium	Uranium	Vanadium	Uranium	Vanadium
DB 07-11-4C #1	670	59	70	35	90.3	45.0
DB 07-32-2C #2	2,020	678	625	175	71.0	74.7
DB 07-32-2C #3	7,370	378	2,336	358	71.0	5.9
DB 07-32-2C #4	1,370	79	103	31	92.8	61.4

(ref., Roughstock, 2018)

Table 13.2: Uranium Dissolutions Based on Leachate and Residue Assays

Sample	Uranium in Leachates (mg)	Uranium in Residues (mg)	Total Uranium (mg)	Uramium Dissolution (%)
DB 07-11-4C #1	324	10.0	334	97.0
DB 07-32-2C #2	722	229.5	952	75.8
DB 07-32-2C #3	3,235	386.5	3,621	89.3
DB 07-32-2C #4	775	73.7	849	91.3

(ref., Roughstock, 2018)

Table 13.3: Vanadium Dissolutions Based on Head and Leachate Assays

	Head: Pre-Test		Leachate		
Sample	Dry Head Mass (g)	Vanadium (mg/kg)	Vanadium (mg)	Vanadium Extracted (mg)	Vanadium Dissolution (%)
DB 07-11-4C #1	631	59	37	6.5	17.4
DB 07-32-2C #2	610	648	395	194.9	49.3
DB 07-32-2C #3	597	348	208	24.1	11.6
DB 07-32-2C #4	629	79	50	17.5	35.0

(ref., Roughstock, 2018)

The ELI report states, “Vanadium mobilization occurred in all intervals; however, uranium appeared to leach first and preferentially.” This conclusion is generally supported by the test results. There are potentially important consequences of high vanadium dissolution. Vanadium in the VO-3 and VO4-2 valence states will exchange onto and elute from a strong-base anionic resin along with uranium. However, the resin’s affinity for uranium is stronger, so vanadium can be “crowded off” the resin with higher uranium loadings. Based upon present data, vanadium ratios are variable and may require additional attention within the processing facility. There are several options for removal of vanadium, including elution and separation by IX or solvent extraction. Should further testing or initial operations prove that vanadium is inhibiting uranium recovery, the addition of a vanadium removal system to the processing plant may be necessary. Capital costs for a vanadium circuit are not presented in the economic analysis at this time.

Further testing to determine the U/V ratios in leach solutions and the favored approach to handling U and V separation is recommended.

14.0 MINERAL RESOURCE ESTIMATE

The mineral resources for the Property reported herein have been estimated utilizing the grade-thickness (GT) contour method. The GT contour method is well accepted within the uranium ISR industry and is suited to guide detailed mine planning and estimates of recoverable resources for roll front type deposits such as the Dewey-Burdock Property. A discussion of the methodology is presented below in Section 14.4.

14.1 Assumptions

Resources within the Dewey-Burdock Project are identified recognizing that roll front mineralization occurs in long, narrow, sinuous bodies which are found adjacent and parallel to alteration (redox) fronts. These commonly occur in multiple, vertically stacked horizons, each of which represents a unique resource entity. Resource classification requires horizontal continuity within individual horizons. Accumulation of resources in a vertical sense (i.e., accumulating multiple intercepts per drill hole) is not valid in ISR applications. Individual roll front mineral horizons are assumed to be 50 ft. wide (based on project experience) unless sufficient information is available to establish otherwise.

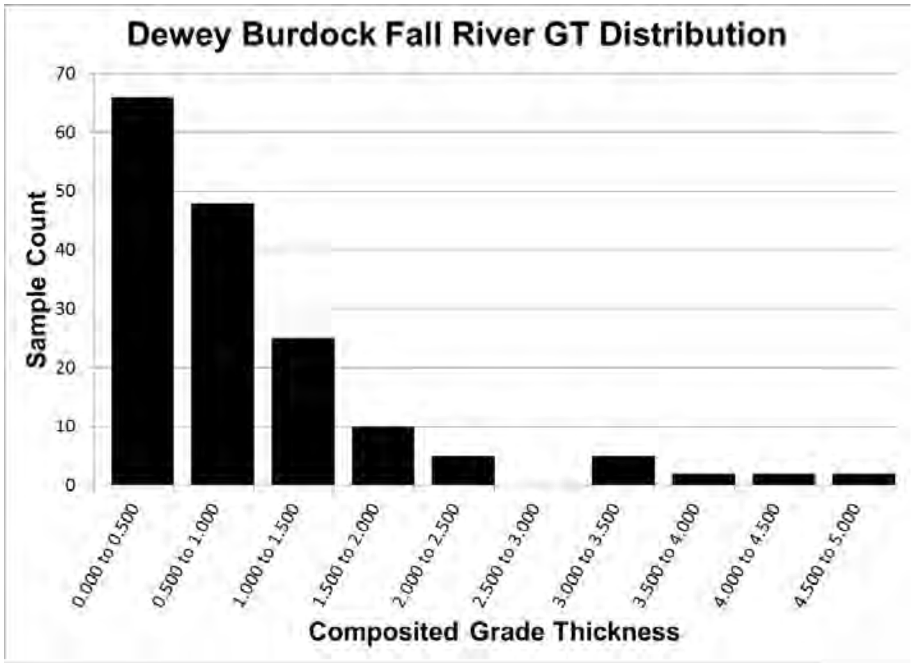
In addition, certain assumptions were incorporated throughout all calculations:

1. No disequilibrium. Therefore, the radiometric equilibrium multiplier (DEF) is 1.0.
2. The unit density of mineralized rock is 16 cubic ft. per ton based on numerous core density measurement results.
3. All geophysical logs are assumed to be calibrated per normal accepted protocols, and grade calculations are accurate.
4. All mineral classified as a resource occurs below the static water table for ISR Resources.

14.1.1 Statistical Analysis

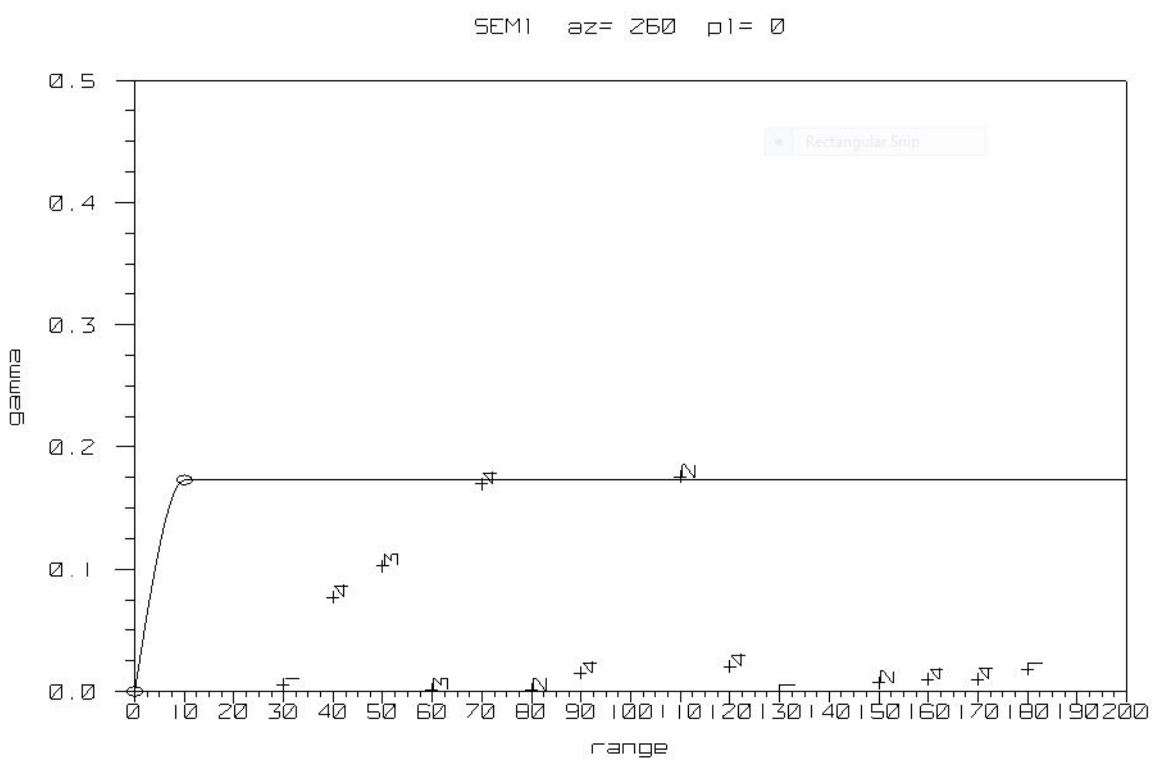
A small dataset of 166 holes from the Fall River area were evaluated individually for statistical information. This dataset consisted of only mineral grade zones used in the contouring of Fall River pods. A separate drillhole database was created in Vulcan and from this database a composite database was created. The composite database held a single record for each drillhole with the location and total grade thickness of all mineral grade intervals flagged for a single Fall River zone. The minimum grade thickness was 0.13, maximum was 5.04, and average was 0.94. Using this data, a 99% clip grade is 4.63. Below is a graph showing the distribution of composited grade thickness for the Fall River holes.

Figure 14.1: Dewey Burdock Fall River GT Distribution



Geostatistics were run on this dataset to determine the optimum drillhole spacing. The semivariogram below shows two groups of drillholes both indicating that a drillhole spacing of about 75 ft is ideal.

Figure 14.2: Drilling Semivariogram



14.2 Cutoff Selection

Cutoffs were selected through analysis of a wide-range of site specific data, as discussed thoughout this report, including the continuity and distribution of mineralized intercepts, project scale, metallurgical testing results, long-term commodity prices, and project processing and mining costs. Resource estimates for this PEA have employed mineral intercepts reported at a 0.020% cutoff, recognizing that ISR mining is much less sensitive to grade than conventional mining. The cutoffs used in this report are typical of ISR industry practice and represent appropriate values relative to current ISR operations. Experience at other ISR operations have demonstrated that grades below 0.020% can technologically be successfully leached and recovered, given supporting economics. Due to the nature of roll front deposits and production well designs, the incremental cost of addressing low grades is minimal (given the presence of higher grades). Resource estimation also used a 0.20 GT cut-off for all drilling. In summary, minerals reportable as resources must meet the following cut-off criteria (see also Section 14.4):

Minimum Grade: 0.020% eU_3O_8

Grade measured below this cut-off is considered as zero value.

Minimum GT (Grade x Thickness): 0.20 GT

Intercepts with GT values below this cut-off are mapped exterior to the GT contours employed for resource estimation, given zero resource value and therefore are excluded from reported resources.

Minimum Thickness: No minimum thickness is applied, but is inherent within the definition of GT (Grade Thickness).

14.3 Resource Classification

Resource estimates were prepared using parameters relevant to the proposed mining of the deposit by ISR methods. The methodology relies on detailed mapping of mineral occurrences to establish continuity of intercepts within individual sandstone host units. This method is more regimented and results in a more detailed analysis than methods utilized during earlier stages of property evaluation (RBS&A, 2006 and prior).

Dewey-Burdock resources were classified as measured, indicated and inferred based on drill spacing. Audited polygons were correctly classified based on drill spacing. Only areas with mineralized drill holes within approximately 250 ft of each other and on the same horizon were classified as indicated and those at greater distance than 250 ft of each other were classified as inferred.

The most recent and all relevant data was used in the calculation of this mineral resource. The preparation of this resource report was supervised by a qualified person. The mineral resource estimates in this report were reviewed and accepted by the Qualified Person, Mr. Steve Cutler.

Azarga Uranium employs a conservative resource classification system which is consistent with standards established by the CIM. Mineral resources are identified as Measured, Indicated and Inferred based ultimately on the density of drill hole spacing, both historical and recent; and continuity of mineralization within the same mineral horizon (roll front).

In simplest terms, to conform to each classification, resources determined using the GT contour method (see Section 14.4) must now meet the following criteria:

1. Meet the 0.02% grade cut-off
2. Occur within a contiguous mineral horizon (roll front)
3. Fall within the mapped GT contour and
4. Extend no farther from the drill hole than the radius of influence specified below for each category.

Employing these considerations, mineralization which meets the above criteria is classified as a resource and assigned a level of confidence via the following drill spacing guidelines:

Measured:

≤ 100 ft. (i.e., mineral on trend, within the 0.20 GT contour, and which does not extend beyond 100 ft. from any given "ore-quality" drill hole)

Indicated:

100 - 250 ft. (i.e., mineral on trend, within the 0.20 GT contour, and which extends from 100 ft. to 250 ft. from any given "ore-quality" drillhole)

Inferred:

250 - 500 ft. (i.e., mineral on trend, within the 0.20 GT contour, and which extends from 250 ft. to 500 ft. from any given "ore-quality" drillhole)

Mineral occurring more than 500 ft beyond any given "ore-quality" drill hole is considered mineral potential and given no resource value.

Isolated occurrences of mineral meeting the GT and grade cut-off criteria (i.e., single isolated "ore-quality" drill holes) are classified as Inferred, and are defined as mineral which occurs within the GT contour for the given mineral horizon and extending no more than a 500 ft beyond the sample point (drill hole). See Section 14.4 Methodology for additional discussion.

14.4 Methodology

14.4.1 Fundamentals

The Property resources are defined by utilizing both historical and recent drilling information. The basic unit of mineralization is the "Mineral Intercept" and the basic unit of a mineral resource is the "Mineral Horizon", which is generally synonymous to a roll front. Mineral intercepts are assigned to named mineral horizons based on geological interpretation by Azarga geologists founded on knowledge of stratigraphy, redox, and roll front geometry and zonation characteristics. Resources are derived and reported per mineral horizon (i.e., per roll front). In any given geographic area, resources in multiple mineral horizons may be combined into a "resource area" (further defined in Section 16.2).

14.4.2 Mineral Intercepts

Mineral intercepts are derived from drill hole gamma logs and represent where the drill hole has intersected a mineralized zone. Calculation of uranium content detected by gamma logs is traditionally reported in terms of mineral grade as eU_3O_8% (equivalent uranium) on one-half foot depth increments. A mineral intercept is defined as a continuous depth interval in which mineralization meets or exceeds the grade cut-off value, which is 0.02% for the Dewey-Burdock Property. Mineralization below the cut-off grade is treated as zero value. A mineral intercept is described in terms of:

- Thickness of the mineralized interval that meets cutoff criteria
- Average Grade of mineral within that interval
- Depth to the top of that interval

In addition, a GT value is assigned to each mineral intercept, defined as the average grade of the intercept times the thickness of the intercept. GT is a convenient and functional single term used to represent the overall quality of the mineral intercept. It is employed as the basic criteria to characterize “ore-quality”. Based on uranium recoveries from production operations using ISR methods, Azarga Uranium is following industry standard by defining this as GT ≥ 0.20 for current and future resource estimations. Intercepts which do not make the “ore–quality” GT cut-off are excluded from the resource calculation but may be taken into consideration when drawing GT contours. As noted above, use of the term “ore-quality” by Azarga Uranium is applied in a generic sense and has no direct relation to any associated commodity price

Each intercept is assigned to a stratigraphic and mineral horizon by means of geological evaluation. The primary criterion employed in assignment of mineral intercepts to mineral horizons is roll front correlation. Depth and elevation of intercepts are secondary criteria which support correlation. The evaluation also involves interpretation of roll front zonation (position within the roll front) by means of gamma curve signature, redox state, lithology and relative mineral quality. Mineral intercept data and associated interpretations are stored in a drill hole database inventoried per drill hole and mineralized horizon. Using AutoCAD software, this database is employed to generate map plots displaying GT values and interpretive data for each mineral horizon of interest. These maps become the basis for GT contouring as described below.

14.4.3 GT Contouring and Resource Estimation

For the map plots of GT values mentioned above, the GT contour lines are drafted honoring all GT values. Contours may be carefully modified by Azarga geologists where justified to reflect knowledge of roll front geology and geometry. The GT contour maps thus generated for each mineral horizon form the foundation for resource calculation. In terms of geometry, the final product of a GT contoured mineral horizon typically represents a mineral body that is fairly long, narrow, and sinuous which closely parallels the redox front boundary. Parameters employed to characterize the mineral body are:

Thickness: Average thickness of intercepts assigned to the mineral horizon

Grade: Average grade of mineral intercepts assigned to the mineral horizon

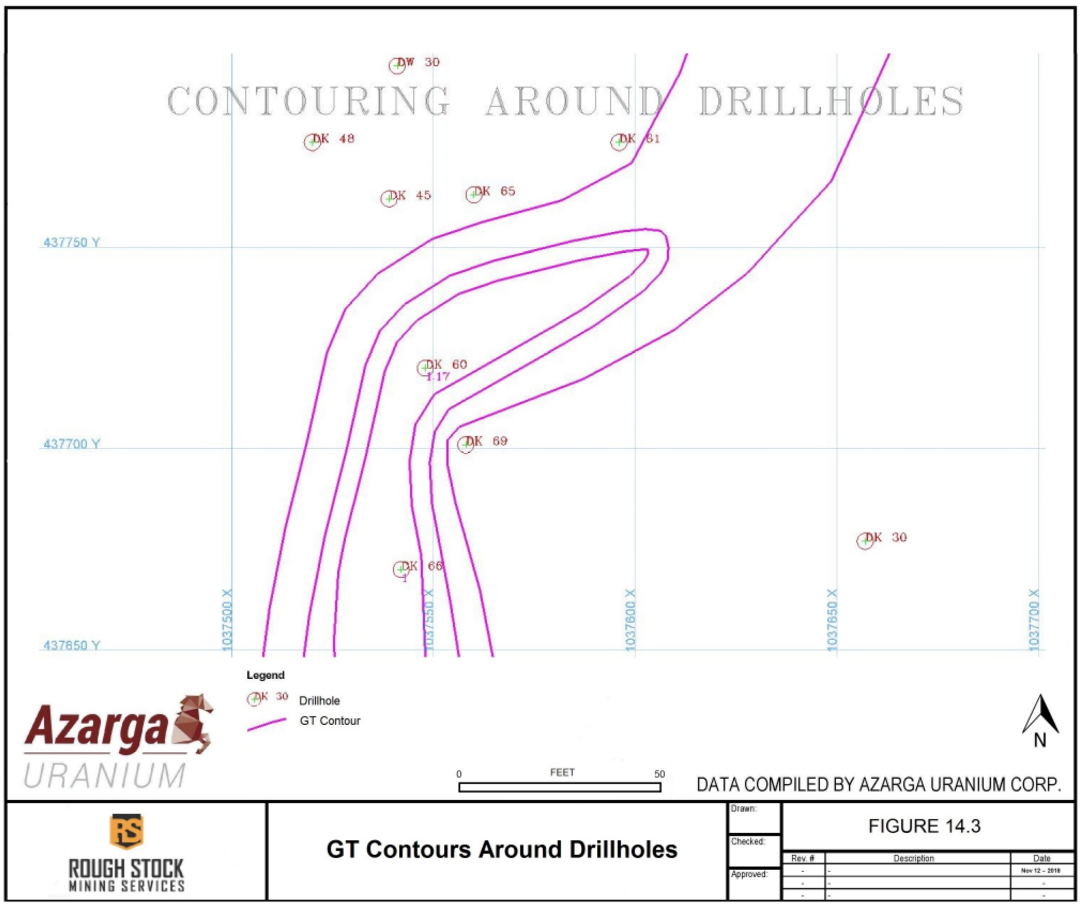
Depth: Average depth of mineral intercepts assigned to the mineral horizon

Area: Defined as the area interior to the 0.20 GT contour lines for inferred and indicated resources, more specifically:

Width: Defined by the breadth of the 0.20 GT contour boundaries. Where sufficient data is unavailable, (i.e., wide-spaced drilling), the width is assumed to be no greater than 50 ft

Length: Defined by the endpoints of the 0.20 GT contour boundaries. Where sufficient data is unavailable, length is limited to 1000 ft (i.e., 500 ft on either side of an isolated drill hole – Inferred resource category).

Figure 14.3: GT Contours Around Drillholes



For resource estimation the area of a mineral horizon is further partitioned into banded intervals between GT contours, to which the mean GT of the given contour interval is applied. Area values for each contour interval are then determined by importing AutoCAD drawing files into Vulcan software and the use of area calculation tools. Once areas are derived and mean GT values are established for each contour interval, resources are then calculated for each contour interval employing the following equation. Resources per contour interval are then compiled per mineral horizon and per mineral 'pod' as discussed below:

$$\textbf{POUNDS} = \frac{\textbf{AREA x GT x 20 x DEF}}{\textbf{TF}}$$

Where:

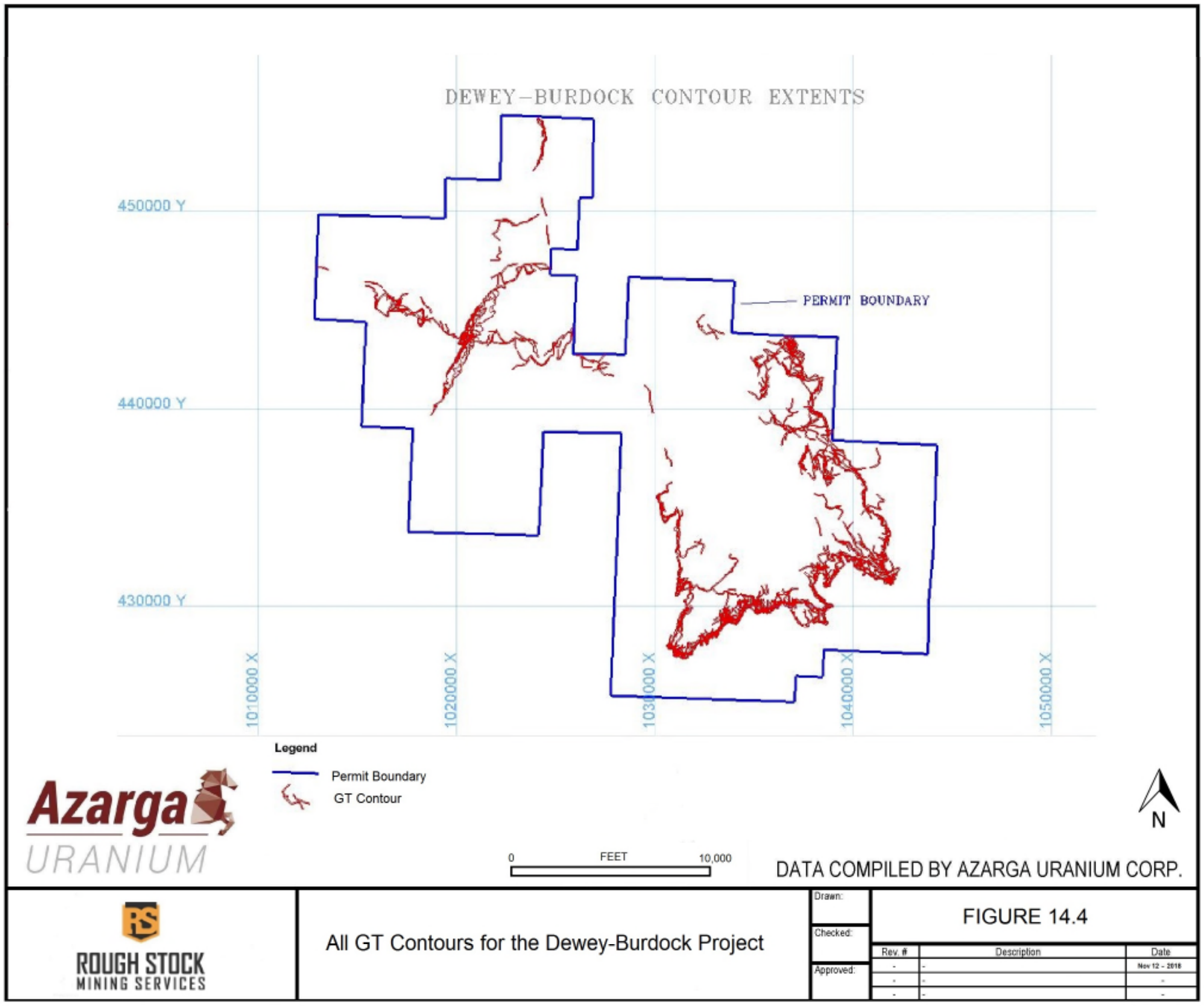
POUNDS	= Resources (lbs.)
AREA	= Area measured within any given GT contour interval (ft^2)
GT	= Mean GT within any given contour interval (%-ft.)
20	= Conversion constant: tons to unit lbs. (1% of a ton)
DEF	= Disequilibrium factor (=1.0 no disequilibrium)
TF	= Tonnage Factor: Rock density, a constant (=16.0 ft^3/ton). Enables conversion from volume to weight.

In map-view resources for any given mineral horizon often occur in multiple ‘pods’. Individual pods are then compiled per mineral horizon, summed and categorized by level of confidence (Measured, Indicated, or Inferred) using the criteria discussed in Section 14.1.

As is evident, the GT contour method for resource estimation is dependent on competent roll front geologists for accurate correlation and accurate contour depiction of the mineral body. Nonetheless, uranium industry experience has shown that the GT contour method remains the most dependable for reliable estimation of resources for roll front uranium deposits.

Figure 14.4 illustrates the outlines of mineral occurrences in the Dewey-Burdock Property defined by the 0.2 GT contours.

Figure 14.4: All 0.2 GT Contours for the Dewey-Burdock Project



14.5 Audit of Mineral Resources

As an additional audit of resource modeling methods for the Dewey-Burdock Property all of the data for this project was loaded into Vulcan software by Ms. Jennifer Evans. The resource shapes were originally drawn in AutoCAD .dxf files and the drillhole data was stored in an Excel database. The resource shapes were directly imported into Vulcan. Data from the Excel database was also directly imported into Vulcan using the .csv format.

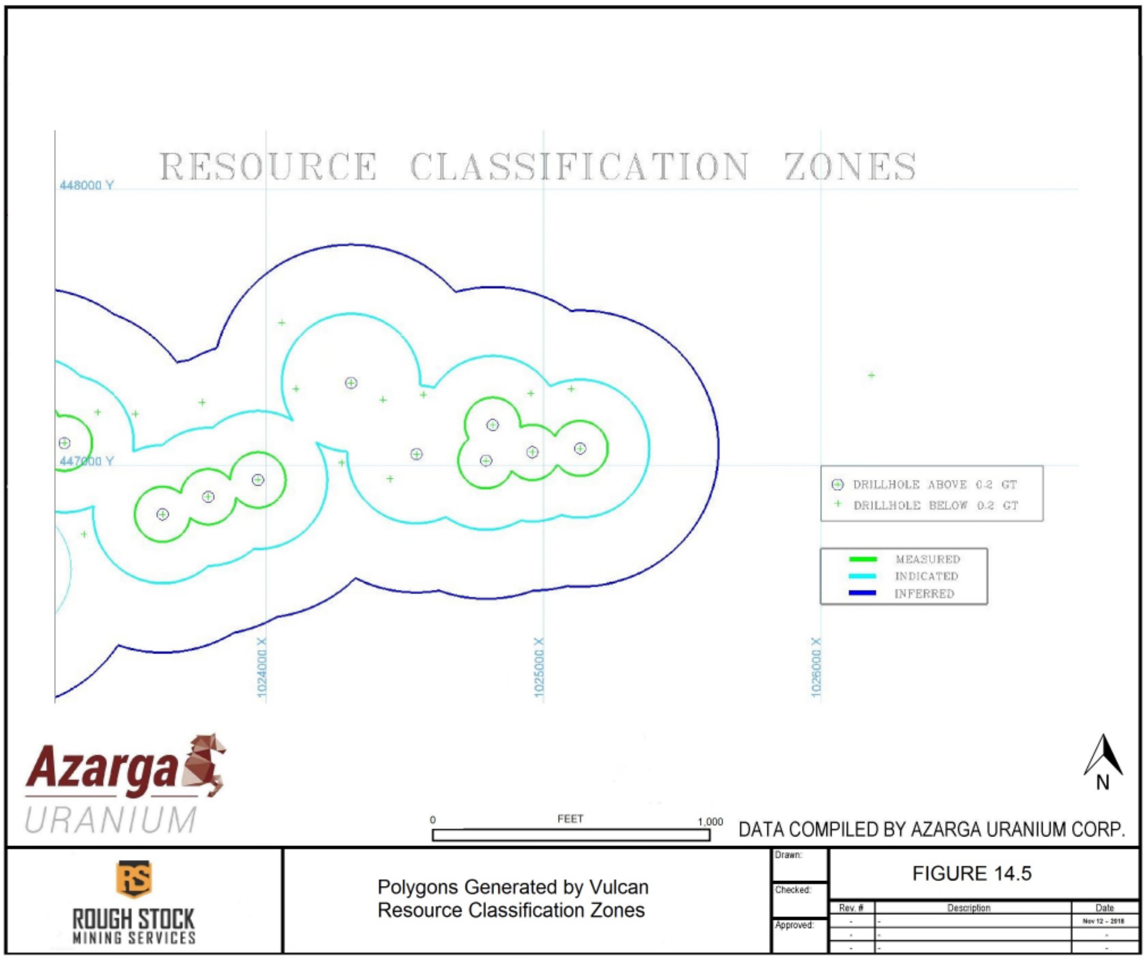
14.5.1 Resource Contour Checking

Each resource contour was checked for accuracy as well as divided into Measured, Indicated, and Inferred resource categories during this audit. All drillholes containing resource grade material were loaded in Vulcan and each GT contour was compared to the

GT value of the drillhole to ensure only drillholes with the appropriate GT values were used to draw each contour. GT values were reviewed for all drillholes to ensure that only resource grade material was included in the contours and that the shape of the contours corresponded with the drillhole collar locations.

Boundaries were created in Vulcan to visually represent the allowable distances from drillhole collars for each resource category. The example below shows the three resource categories and their distances from the drillhole collars. It was ensured that all contours fell within these boundaries. Green represents measured with a 100 foot radius from the drillhole collar, turquoise represents indicated with a 250 foot radius, and dark blue represents inferred with a 500 foot radius. The original pod contours were then broken into smaller sections to calculate the area of the contour falling within each resource category.

Figure 14.5: Polygons Generated by Vulcan Resource Classification Zones



14.5.2 Resource Pounds Checking

To calculate pounds of uranium, area was multiplied by an average GT. Contours building up to the highest contour, were assigned a GT in the middle of the range of values that the contour represented. For example, the contour representing GT values 0.5 to 1 was assigned an average GT of 0.75 for the resource calculation. A change was implemented for this review in 2019, the contours with the highest GT were assigned a GT by averaging the values of the drillholes falling within the contour, then taking that GT value and averaging it with the lower most value of the contour. Previously, these highest contours were simply assigned the lower most value of the contour.

For each contour, the pounds reported as resource were checked. This was done by calculating the square footage for each contour in Vulcan. If the shape was more complex, with several grade contours, the square footage within each contour was calculated and used to find a contour net area. The contour net area from Vulcan was then cross-referenced to that used by Azarga Uranium in their resource calculation to ensure that all contour areas matched. Number of pounds per contour were then calculated using the average GT for each contour provided by Azarga Uranium. For one contour in each the Dewey and Burdock areas, the calculation of the average GT was checked by using zone picks in original drill hole database. The resultant GT calculations and resource values for the polygons match those derived by Azarga Uranium.

14.5.3 Results and Recommendations

Every pod used for Dewey-Burdock resource calculations has been reviewed and all errors corrected. All corrections were recorded in a spreadsheet that documented the solution as well as a checked final product.

The method for contouring around drill holes was correct. Data errors, typos, and flagging changes were caught and corrected. This resulted in the shape of many of the pods changing during this process. The result of this process was a final resource calculation spreadsheet free of errors that is now being carefully maintained.

The method of calculating resources was also correct and very few errors were found in this stage of the process. Resources were recalculated for all pods where errors required either data or shape changes.

The methodology change implemented in 2019 for calculation of the uppermost grade contours in each pod fine tuned the GT estimation process. It provides a more realistic average for the highest contours since, all GT values falling within the contour are greater than the lowest allowable value which was previously being set as the average GT.

14.6 Summary of Mineral Resources

The deposits within the Project area contain Measured ISR resources of 14.29M pounds U_3O_8 with 5,419,779 tons at an average grade of 0.132% U_3O_8, Indicated ISR resources of 2.84M pounds U_3O_8 with 1,968,443 tons at a grade of 0.072% U_3O_8 for a total M&I resource of 17.12M pounds U_3O_8 at a 0.2GT cut-off. The Inferred ISR resource of 645,546 tons at a grade of 0.055% U_3O_8 totals 712,624 pounds U_3O_8, at a 0.2GT cut-off.

Table 14.1: 2019 Mineral Resource Estimate Summary (Effective date-December 3, 2019)

ISR Resources	Measured	Indicated	M & I	Inferred
Pounds	14,285,988	2,836,159	17,122,147	712,624
Tons	5,419,779	1,968,443	7,388,222	645,546
Avg. GT	0.733	0.413	0.655	0.324
Avg. Grade (% U_3O_8)	0.132%	0.072%	0.116%	0.055%
Avg. Thickness (ft)	5.56	5.74	5.65	5.87

Note: Resource pounds and grades of U3O8 were calculated by individual grade-thickness contours. Tonnages were estimated using average thickness of resources zones multiplied by the total area of those zones.

Cautionary Statement: This Preliminary Economic Assessment is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. The estimated mineral recovery used in this Preliminary Economic Assessment is based on site-specific laboratory recovery data as well as Azarga

personnel and industry experience at similar facilities. There can be no assurance that recovery at this level will be achieved. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

As shown in Table 14.2 below, the process of re-contouring and recalculation of the drillhole data, which used the 0.20 GT cut-off, has produced some relatively small changes to the overall resource estimate.

14.6.1 Quality Control/Quality Assurance Review

Drilling for the Dewey-Burdock Project both historical and recent is interpreted on 0.5 ft intervals following standard industry practice.

There are no sets of twinned drill holes, however there are many instances of drill holes within 10 ft of each other demonstrating similar mineralized depth and values.

As stated in Section 25, there are a number factors which may effect realization of the resource estimate. The cutoff grade and cutoff GT assumptions would be components subject to these factors and could be materially affected by future changes in commodity price and actual realized costs of production. These cutoff assumptions are based on actual commercial operations which the Authors find representative of the Dewey-Burdock Project. It is possible, though considered unlikely, that actual operation and future changes may result in factors that could potentially effect these assumptions. Particularly these would be anticipated to be related to the risks of uranium recovery and processing as stated in section 25.1.1 and market and contract conditions as described in section 25.1.5.

14.6.2 CIM Compliance

Dewey-Burdock resources were classified as Measured, Indicated, and Inferred based on drill spacing. Audited contours were correctly classified based on drill spacing. Only areas with mineralized drill holes within 100 ft of each other and on the same horizon were classified as Measured, those within 250 ft of each other were classified as Indicated and those within 500 ft were classified as Inferred.

The most recent and all relevant data was used in the calculation of this mineral resource.

Table 14.2: Comparison of 2018 Resource Estimate with Current ISR Mineral Resource Estimate

	2018 Resource Estimate[1]	Grade	Current PEA[2]	Grade	% Change Pounds
Estimated Measured Resource (lb)	13,779,000	0.132%	14,285,988	0.132%	
Estimated Indicated Resource (lb)	3,160,000	0.068%	2,836,159	0.072%	
Estimated M&I Resource (lb)	16,939,000	0.113%	17,122,147	0.116%	1.1%

Estimated Inferred Resource (lb)	818,000	0.056%	712,624	0.055%	-13%

[1]*(ref., Roughstock, 2018)*

[2]***Cautionary statement: This Preliminary Economic Assessment is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. The estimated mineral recovery used in this Preliminary Economic Assessment is based on site-specific laboratory recovery data as well as Azarga personnel and industry experience at similar facilities. There can be no assurance that recovery at this level will be achieved. Mineral resources that are not mineral reserves do not have demonstrated economic viability.***

15.0 MINERAL RESERVE ESTIMATES

Mineral reserves were not estimated for this PEA.

16.0 MINING METHODS

This section of the PEA describes extraction and uranium processing, the cost estimate approach and assumptions used to develop the capital costs and operating costs.

Azarga plans to recover uranium at the Project Area using the In-Situ Recovery (ISR) method. The ISR method has been successfully used for over five decades elsewhere in the United States as well as in other countries such as Kazakhstan and Australia. ISR mining was developed independently in the 1970s in the former USSR and the United States for extracting uranium from sandstone type uranium deposits that were not suitable for open cut or underground mining. Many sandstone deposits are amenable to uranium extraction by ISR mining, which is now a well-established mining method that accounted for approximately 50 percent of the world's uranium production in 2019 (ref., WNA 2019). The bottle roll tests (see Section 13) demonstrate the potential feasibility of both mobilizing and recovering uranium with an oxygenated carbonate lixiviant.

Mining dilution (rock that is removed along with the ore during the mining process) is not a factor with the ISR method as only minerals that can be mobilized with the lixiviant are recovered. There are some metals, such as vanadium, that can be mobilized with the lixiviant and can potentially dilute the final product if not separated before packaging. If vanadium occurs in high enough concentration, it can be economically separated and sold as a separate product. However, as discussed in Section 13, vanadium is not considered a dilutant or a product in this PEA.

Many impacts typically associated with conventional uranium mining and milling processes can be avoided by employing uranium ISR mining techniques. The ISR benefits are substantial in that no tailings are generated, surface disturbance is minimal in the well fields, and restoration, reseeding, and reclamation can begin during operations. As a particular mining area is depleted, groundwater restoration will begin immediately after, significantly reducing both the time period of post-production restoration, and the cumulative area not restored at any point in time. At the end of the project life, affected lands and groundwater will be restored as dictated by permit and regulatory requirements.

16.1 Geotechnical and Hydrological Mine Design and Plans

16.1.1 Wellfields

Well fields are the groups of wells, installed and completed in the mineralized zones that are sized to effectively target delineated resources and reach the desired production goals. One or more header houses controls the operation of each well field. The mineralized zones are located within the geologic sandstone units where the leaching solutions are injected and recovered via injection and recovery wells in an ISR well field.

The Project Area is divided into two Resource Areas – Dewey and Burdock. Figure 4.2 illustrates the resource areas, their boundaries and proposed trunk lines. Each of these Resource Areas is further subdivided into well fields. Each well field is serviced by several header houses depending on its size. Across the entire Project Area, Azarga estimates the average flow of individual production wells will be approximately 20 gpm, with each header house planned to produce approximately 500 gpm.

The resource areas are divided into well fields for scheduling development work, which also allows the establishment of specific baseline data, monitoring requirements, and restoration criteria. Each well field consists of a potentially mineable resource block representing an area that will be developed, produced and restored as a unit. In the revised estimate as a part of this PEA 51 such well fields are estimated throughout the Project Area. Several well fields may be in production at any one time with additional well fields in various states of development and/or restoration. Hydro-stratigraphic unit restoration of a well field will begin immediately after mining in the well field is complete.

Well fields will typically be developed based on conventional five-spot patterns. Injection and production wells within a well field will be completed in the mineralized interval of only one mineralized zone at any one time. Injection and production wells will be completed in a manner to isolate the screened uranium-bearing interval. Production zone monitor wells will be located in a pattern around the well field or units with the completion interval open to the entire production zone. Overlying and underlying monitor wells will also be completed in the hydro-stratigraphic units immediately above and below the production zone to monitor and minimize the potential for vertical lixiviant migration. Overlying monitor wells will be completed in all overlying units and underlying wells will be completed in the immediately underlying unit unless the well field immediately overlies the Morrison formation, in which case Azarga has demonstrated that the Morrison is sufficiently thick and continuous such that NRC will not require excursion monitoring beneath the Morrison.

16.1.2 Well Field Pattern

The Burdock resource area is estimated to include 19 well fields on approximately 4.2 million square feet (93 acres). There will be the equivalent of approximately 560 conventional five-spot square patterns, 120 ft x 120 ft in dimension. Actual pattern geometry may easily vary depending upon actual field conditions. Azarga expects to delineate on average, a 120 ft x 120 ft grid.

The Dewey resource area is estimated to consist of 32 well fields extending over approximately 3.2 million square feet (73 acres). Pending future changes that will reflect a clearer understanding of site specifics such as permeability variations and well performance, there will be the equivalent of approximately 890 conventional five-spot square patterns, 120 ft x 120 ft in dimension. Actual pattern geometry may easily vary depending upon actual field conditions. Azarga expects to delineate on average, a 120ft x 120 ft grid.

Perimeter monitor wells will be located approximately 400 ft beyond the well field perimeter with a maximum spacing of 400 ft between wells. In addition, internal monitor wells will be located within the wellfield, at a rate of approximately one per four acres to monitor overlying or underlying hydro-stratigraphic units where required by permit.

Each injection well and production well will be connected to the respective injection or production manifold in a header house. The manifolds will route the leaching solutions to pipelines, which carry the solutions to and from the ion exchange columns located in the CPP or Satellite facility. Flow meters, control valves, and pressure gauges in the individual well lines will monitor and control the individual well flow rates. Well field piping will typically be high-density polyethylene pipe, as is appropriate to properly and safely convey the mining solutions.

In order to effectively recover the uranium, and also to complete the groundwater restoration, the wells will be completed so they can be used as either injection or recovery wells, allowing flow direction to be reversed at any time during the production or restoration phases of the Project. A slightly greater volume of water (approximately 1%) will be recovered from the mineralized resource zone hydro-stratigraphic unit than the volume injected (bleed) in order to create an inward flow gradient towards the recovery wells to minimize the potential for excursions of lixiviant from the wellfields.

16.1.3 Well Completion

The Authors understand that Azarga intends to perform delineation drilling in each proposed resource area prior to installing the injection and recovery wells to better define mineral resources for design of well fields. This allows the designing geologist to understand in greater detail the width, depth, and thickness of the mineralized zone and the depth of the underlying shale aquitard prior to specifying the screen interval for the injection and recovery wells, which optimizes the locations of specific injection and recovery wells. As the drilling density is at times less than 100 ft between historic drill holes, it may be possible to reduce this cost and place more reliance on historic data in the delineation process.

A well field will consist of patterns of recovery and injection wells (e.g., the pattern area) within a ring of perimeter monitor wells. These monitor wells will be used to detect horizontal excursions, if any, of the groundwater-based leaching solutions away from the mineralized zone. Internal monitor wells will also be completed in the overlying and underlying hydro-stratigraphic unit, as necessary, to detect vertical excursions should they occur. Inside the wellfield area, wells will be installed and completed in the mineralized zone to provide baseline water quality information prior to the mining process and to gauge groundwater restoration performance after mining is complete.

Pilot holes for monitor, recovery and injection wells will be drilled through the target completion interval. The hole will be logged, reamed, casing set, and cemented to isolate the completion interval. Recovery and injection wells are planned to be under-reamed as part of the well completion process. After under-reaming, setting the screen and installing a gravel filter pack (if necessary), the well will be air lifted and/or swabbed to remove any remaining drilling mud and/or cuttings. The primary goal of this well development is to allow clear formation water to freely enter the well screen and sustain optimal flowrates.

16.1.4 Mechanical Integrity testing

After a well has been completed and before it is made operational, a mechanical integrity test (MIT) of the well casing will be conducted. The MIT method that will be employed is pressure testing.

If a well casing does not meet the MIT, the casing will be repaired and the well retested. If a repaired well passes the MIT, it will be employed in its intended service. If an acceptable MIT cannot be obtained after repairs, the well will be plugged. A new well casing integrity test will also be conducted after any well repair using a down-hole drill bit or under reaming tool.

Wells will again be subject to MIT every five years after start-up.

16.1.5 Well Field Production

The proposed uranium ISR process will involve the dissolution of the water-soluble uranium compound from the mineralized host sands at near neutral pH ranges. The lixiviant contains dissolved oxygen and carbon dioxide. The oxygen oxidizes the uranium, which is then complexed with the bicarbonate formed by dissolution of carbon dioxide. The uranium-rich solution (typically ranging from 20 ppm to 250 ppm, but may be higher or lower) will be pumped from the recovery wells to the nearby CPP or Satellite facility for uranium concentration with ion exchange (IX) resin. A slightly greater volume of water will be recovered from the mineralized zone hydro-stratigraphic unit than injected, referred to as "bleed", in order to create an inward flow gradient towards the well fields. Thus, overall recovery flow rates will always be slightly greater than overall injection rates. This bleed solution will be disposed, as permitted, via injection into deep disposal wells (DDW) after treatment for radionuclide removal.

The well fields will be developed within the resource areas in a sequential fashion. Figure 16.2 indicates the order in which the well fields are proposed to be developed, put into production and ultimately restored and reclaimed.

16.1.6 Well Field Reagents, Electricity and Propane

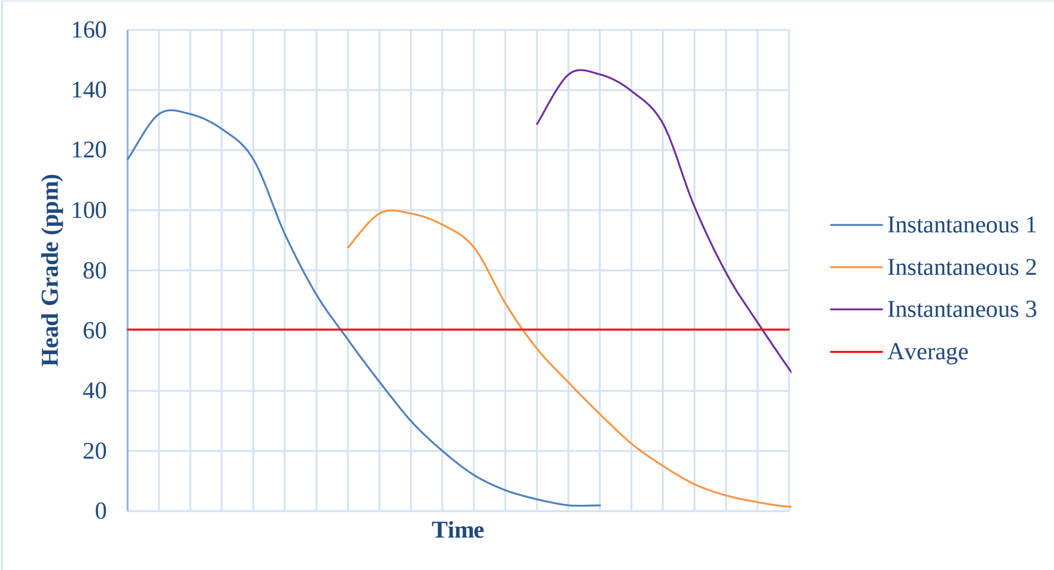
Due to the varying nature of production over the life of the mine, well field reagents, electricity and other consumable costs are expected to vary by year. Details regarding reagent and power use are discussed in Section 17.

The mining approach is governed by how the production units are designed, the rate of resource recovery and the duration of the mine development, processing and closure. The following describes each of these mine development and operation components.

16.1.7 Production Rates

The development plan is subject to change due to recovery schedules, variations with production unit recoveries, facility operations, economic conditions, etc. Figure 16.2 presents the life of mine schedule used in the evaluations in this document. Mineral resource head grade is projected to average approximately 60 ppm over the entire production schedule. Initial head grades in new well fields can be several hundred ppm, while head grades from nearly mined out well fields will be significantly lower. As pregnant lixiviant is gathered from individual well fields it is co-mingled with solutions from other operating well fields to make up an average head grade of about 60 ppm. Figure 16.1 illustrates the concept for maintaining a 60 ppm head grade using cumulative decline curves. Since there is a peak followed by a successive depletion in the amount of uranium extracted from the formation from a given well field, careful planning of mixing schemes from high yield well fields and lower yield well fields is required to maintain the head grade for the operation.

Figure 16.1: Cumulative Decline Curves



Peak production of approximately one million pounds (mlbs) per year is anticipated in Year 3 of the mine plan continuing through Year 15. Uranium production will continue during Year 16 at a lower production rate with total production over the life of the mine estimated to be 14.27 million pounds[1].

16.2 Header Houses

Header houses will be used to distribute barren lixiviant to injection wells and collect pregnant lixiviant from recovery wells. Each header house will be connected to two production trunk lines and two restoration trunk lines as needed. The header houses will include manifolds, valves, flow meters, pressure gauges, instrumentation and oxygen for incorporation into the barren lixiviant, as required.

Each header house is estimated to service typically 78 wells (48 injection and 30 recovery) depending on resource delineation. Table 16.1 presents the current anticipated header house and well summary by Resource Area.

[1] Cautionary statement: This Preliminary Economic Assessment is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

Table 16.1: Well Field Inventory

	Burdock	Dewey
Number of Header Houses	19	32
Number of Recovery wells	559	889
Number of Injection wells	904	1,449
Number of Perimeter Monitoring wells	692	576
Number of Interior Monitoring wells	46	175
Number of Overlying Monitoring wells	46	93
Number of Underlying Monitoring wells	0	82

16.2.1 Well Field Piping System

Pipelines will transport the pregnant and barren lixiviant to and from the IX columns of the CPP and Satellite facilities. The individual well flow rates and manifold pressures will be monitored in the header houses. The operator will be capable of shutting down header house production lines from the control system. High density polyethylene (HDPE), PVC, stainless steel, or equivalent piping will be used in the well fields and will be designed and selected to meet design operating conditions. The lines from the CPP and Satellite facilities, header houses and individual well lines will be buried for freeze protection and to minimize pipe movement as is typical for ISR mines in the area. Figure 16.3 illustrates the approximate location for trunk lines to/from the well fields and the CPP and Satellite facilities.

16.3 Mine Development

The Project is proposed to be developed with a gradual phased approach. The initial facility will accept up to 1,000-gpm lixiviant flow rate and expand to accept 4,000-gpm. Resin will be transferred from IX vessels to resin trailers to be transported and sold to an off-site processing facility for the first few years. Once the flow rate capacity reaches 4,000-gpm, the Burdock Facility will be expanded to include processing capabilities up to 1.0 million pounds per year. Once the Burdock resource area has been economically depleted, the IX vessels will be removed from the Facility and transported to Dewey, where a satellite facility will be constructed to mine the Dewey resource area. The proposed phases are as follows:

- Phase I – Construction of two header houses and the Burdock CPP Facility with one IX train (estimated 1,000 gpm, average flow rate, 1,100 gpm maximum flow capacity) and capability to transfer resin to a transport vehicle for off-site toll processing.
- Phase II – Construction of an additional two header houses and expansion of the Burdock CPP Facility to two IX trains (estimated 2,000 gpm average flow rate, 2,200gpm maximum flow capacity).
- Phase III – Construction and operation of sufficient header houses to support expansion of the Burdock CPP Facility to four IX trains (estimated 4,000 gpm average flow rate, 4,400 gpm maximum flow capacity)
- Phase IV – Construction and operation of sufficient header houses to support expansion of Burdock CPP Facility to maintain four IX trains (estimated 4,000 gpm

average flow rate, 4,400 gpm maximum flow capacity) and on-site uranium processing capabilities up to approximately one million pounds per year.

- Phase V – Construction of the Dewey Satellite Facility and transfer of IX vessels from the Burdock CPP Facility to the Dewey Facility.

Mine development will begin simultaneous with construction of the Burdock CPP Facility and the first wellfields in the Burdock area. Each header house is expected to produce 500 gpm of pregnant lixiviant, which is the minimum flow requirement for the initial Burdock CPP Facility IX circuit operation. Header houses within the wellfields will be constructed in conjunction with the Phases II and III as flow rate capacity to the CPP increases, see Figure 16.2.

As the productivity or head grade from the initial header houses or well fields decreases below economic limits, patterns from additional header houses or well fields will be placed into operation in order to maintain the desired flow rate and head grade at the facilities.

Delineation drilling will be an on-going process throughout the life of well field development. As additional mineral resource information is acquired, the well field design and mine plan will adjust accordingly. The project boundaries may adapt to in-coming delineation drilling results, subject to permitting requirements. The specific details of mineral extraction may also be adjusted to ensure the highest yield of recovered minerals is obtained.

16.3.1 Life of Mine Plan

The CPP will be constructed in phases over the course of four years, see Figure 16.2. In Year -1 and Year 1, the first phase of the CPP will be built at the Burdock site and will include the resin transfer system and ion exchange (IX) systems, as further discussed in Section 17. However, it will not contain elution, precipitation, and drying equipment until the later phases of the project. Pregnant lixiviant from the well field will be processed through the IX columns and the resulting loaded resin will be shipped to the nearest processing plant where the uranium can be extracted. For this PEA that facility is assumed to be the Energy Fuels Resources plant at White Mesa in Utah, however an agreement with Energy Fuels resource has not been developed at the time of this PEA. IX Trains will be subsequently added to the plant each year for the next two years to allow for a ramped production schedule. In Year 3, the Burdock facility will be expanded into a full CPP which will include all processing equipment necessary to produce and package yellowcake. The satellite facility at Dewey will be constructed in Year 7 and become operational by the end of Year 7 in the mine plan.

W&C has estimated the mine life based on head grade, estimated resource, flow rates and closure requirements for the two Resource Areas. The first well field and header houses will be brought on line in conjunction with the commissioning of the CPP. Initial flow rates to the CPP may range between 500 and 1,000 gpm, but as additional well fields are installed and brought on line the flow rate to the CPP and will increase incrementally until the maximum flow throughput of the CPP of 4,000 gpm is achieved. Based on the mine plan, the maximum flow throughput will not be achieved until the third year after operations begin in the mine plan. This maximum flow throughput of 4,000 gpm is expected to be sustained for 13 years excluding a small dip in production during Year 7 when IX columns are relocated from the Burdock Facility to the Dewey Facility.

As well fields are mined out, removed from production and put into groundwater restoration, new well fields will be brought on-line to maintain the maximum facility throughout. This will occur until the resource recovery rates drop below what is economically justifiable. For the purposes of this PEA, it is assumed the well fields will be depleted in Year 16.

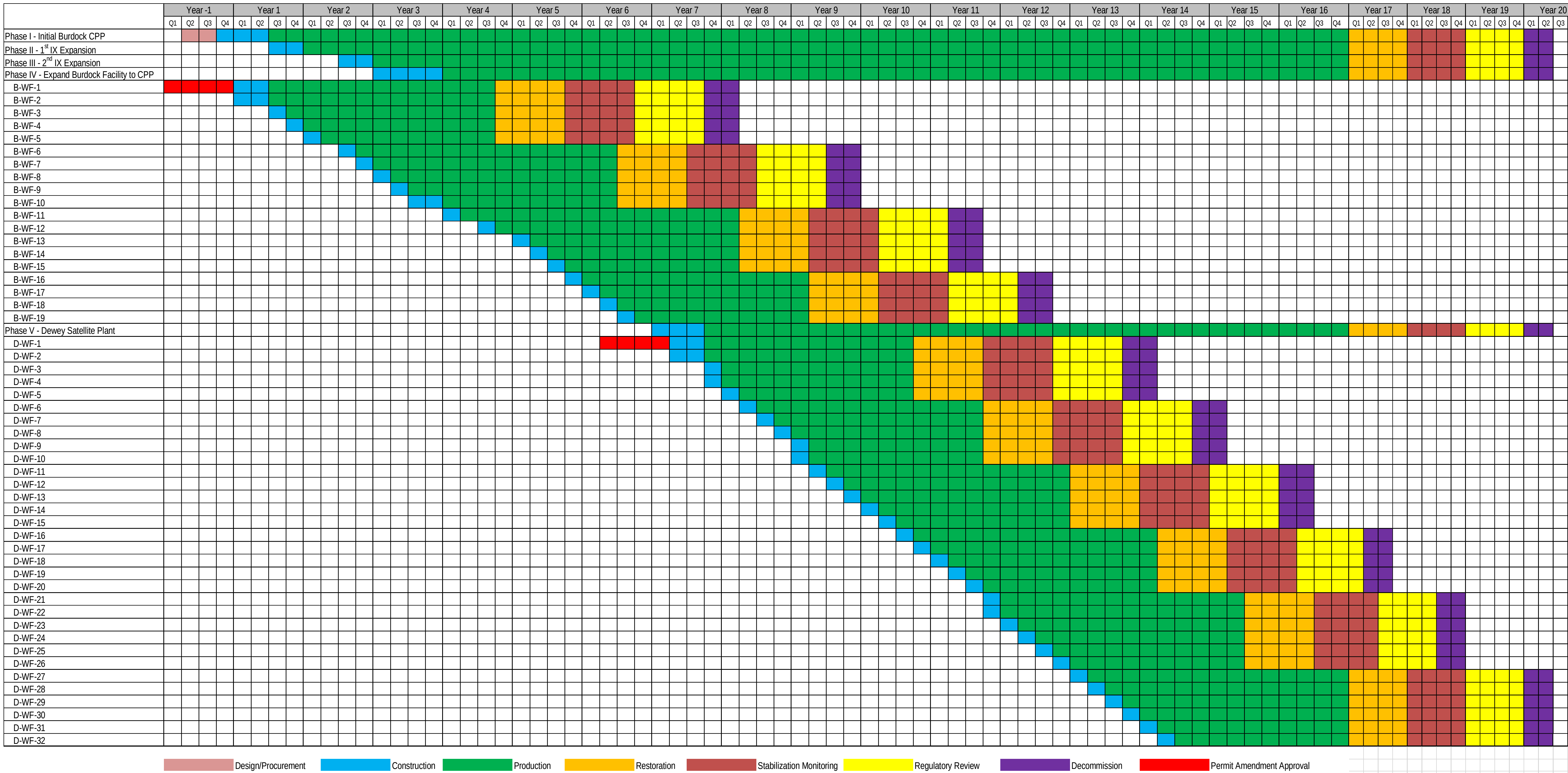
Figure 16.2 provides the operating and production schedule for the Project as currently defined. Production will generally occur at each well field consecutively and the Project production will occur over a period of approximately 16 years. Restoration and decommissioning/reclamation will also be implemented concurrently with production and will continue approximately four years beyond the production period. The overall mine life is approximately 21 years from initiation of construction activities to completion of restoration and decommissioning/reclamation.

The Project cash flow analysis assumes that closure of all well fields and facilities will occur approximately 3.5 years after economic depletion of the uranium within the target mineralized zones of the resource areas, see Figure 16.2.

16.4 Mining Fleet and Machinery

This Project will be performed by ISR methods as described in the previous sections. The major “equipment” is the wellfield infrastructure which consists of injection, extraction and monitoring wells; header houses; and pipelines as described above. The mining fleet and machinery is limited to relatively small surface equipment such as pickup trucks, drill rigs (contracted) and work over equipment for servicing the wells. The plant (CPP) consists primarily of tanks and pumps. Sections 17 and 21 provide an overview of the equipment and estimated costs.

Figure 16.2: Life of Mine Plan



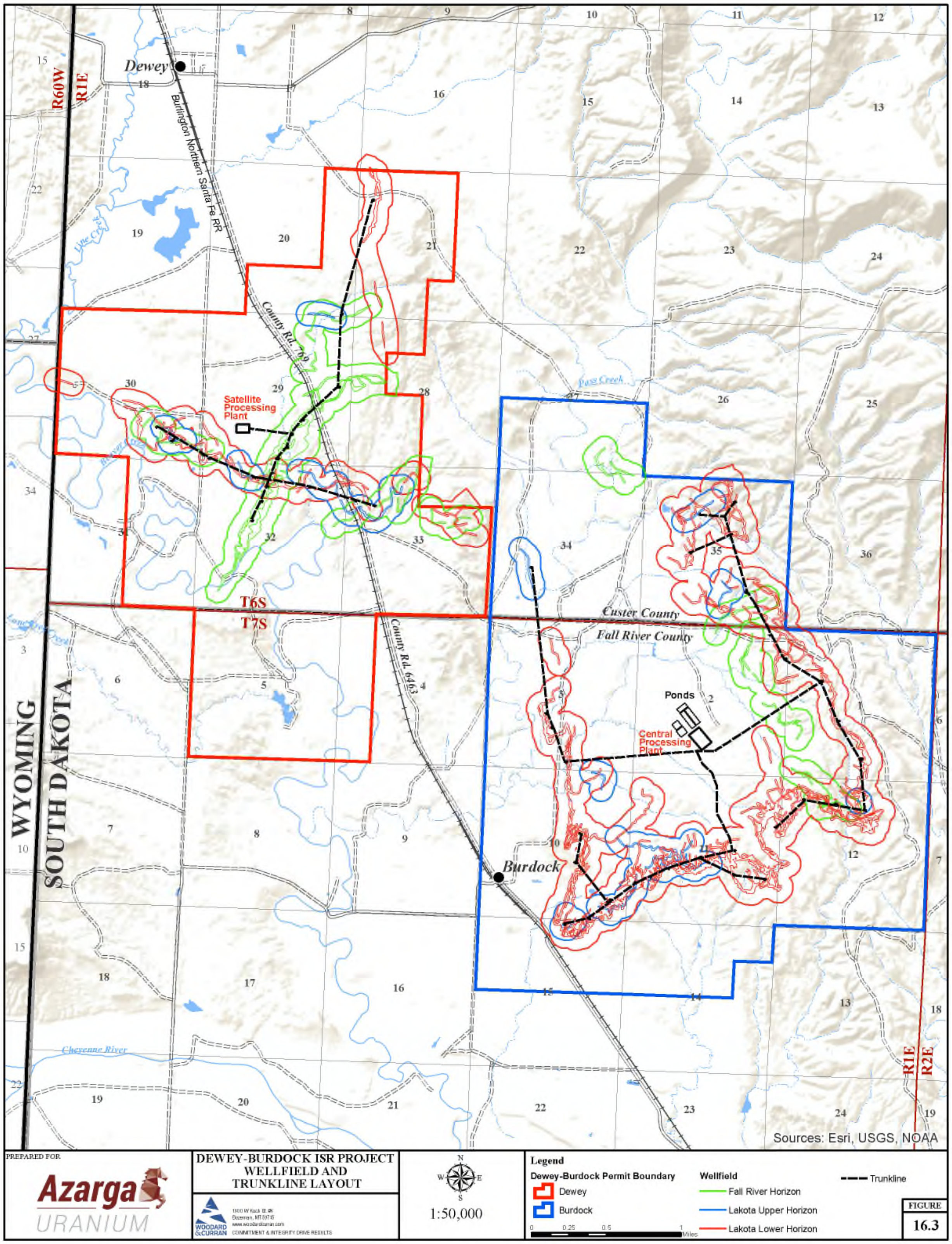
Notes:

1) Well field completion is based on completed wells required to meet production in a given year. Thus, the well fields are built on an 'as-needed' basis and may not require a full year of construction activities.

2) Phase I construction activities also account for pre-construction design activities.

3) All wellfield license amendments are to be completed during the permit amendment period.

Figure 16.3: Well Field and Trunkline Layout



17.0 RECOVERY METHODS

17.1 Recovery

The design of the Project is consistent with that of currently and historically operating ISR facilities. It includes no untested technologies or equipment.

W&C notes that the Dewey-Burdock uranium resources are potentially mineable by in-situ leach and recovery (ISR) mining methods, and this is the basis upon which further conceptual mine and process plant design are predicated.

Recovery of the estimated mineral resource is projected at 80% from the mineral deposit placed underneath of patterns, through to feed to the plant. This value is an estimate based on industry experience and Azarga personnel experience at comparable ISR uranium mines including Smith Ranch and Highlands which are both located within 90 miles of the project site.

It is also projected that 100% of the resource will be placed under a mining pattern and an average 0.5% recovery will be realized during restoration thus accounting for a total estimated recovery of 80% of the total mineral resource not including any plant losses. Therefore, the overall potential yellowcake production is estimated to be 14.268 million pounds[2], as shown in Table 17.1 below.

Table 17.1: Estimated Recoverable Resources (Effective date – December 3, 2019)

	Measured Resources	Indicated Resources	M&I Resources	Inferred Resources
Pounds	14,285,988	2,836,159	17,122,147	712,624
Estimated Recoverability	80%	80%	80%	80%
Estimated Total Recovery	11,428,790	2,268,927	13,697,717	570,099

Note: Recovery factor is applied at each individual well field, thus some rounding differences may occur in summarization.

Cautionary Statement: This Preliminary Economic Assessment is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. The estimated mineral recovery used in this Preliminary Economic Assessment is based on site-specific laboratory recovery data as well as Azarga personnel and industry experience at similar facilities. There can be no assurance that recovery at this level will be achieved. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

The estimate of 80% recovery used in this PEA is based on the following:

1. As discussed in Section 13, laboratory dissolution results ranged from 71 to 97%, indicating the deposit is amenable to ISR mining methods. Laboratory testing is not necessarily a direct correlation to the recovery that can be realized in the mine but it does provide an indication of the potential recovery that could be achieved. A comparison was made between metallurgical testing for the Dewey Burdock project and several other uranium ISR projects, see Table 17.2. As illustrated in Table 17.2, the grade and metallurgical recovery results for the Dewey Burdock project are generally

higher than those for the other projects. In addition, the generally higher metallurgical recovery results for Dewey Burdock were accomplished with fewer pore volumes as compared to the other projects. Thus, the use of an 80 percent resource recovery factor, when compared to the other projects, is somewhat conservative and considered reasonable by the Authors.

Table 17.2: Comparison of Metallurgical Test Results

Project	Average Grade (Percent)	Estimated Recovery (Percent)	Pore Volumes	Metallurgical Recovery (Percent)
Reno Creek [1]	0.054	74	30-90	86
Lost Creek [1]	0.055	80	50	83
Lance [2]	0.0485	72.5-76	NA	76
Churchrock [1]	0.105	67	50	72
Dewey Burdock [1]	0.114	80	30	85

Notes: 1. From Preliminary Economic Assessments and Pre-feasibility Studies published on SEDAR. 2. JORC compliant Feasibility Study, 2012.

2. Based on the operating experience of the Azarga personnel and personnel experience at the Smith Ranch and Highlands Uranium ISR mines in Wyoming, it has been typical to achieve an 80% overall recovery along with head grades averaging 60 ppm. Operating uranium ISR companies do not make this information publicly available and as is common for most ISR evaluations, the past experience of the operators is relied upon. In addition, this assumed recovery rate is within the range of potential recovery rates indicated in the other sources identified herein.
3. In addition, other sources have been identified and are included in Table 17.3 which indicate that similar recovery rates have been realized at other operations. Table 17.3 presents recovery values reported by other uranium ISR operations for projects in the vicinity of the Dewey-Burdock project.
4. The World Nuclear Association has stated that in the USA the most successful operations have achieved a total overall recovery of about 80% of the ore, the minimum is about 60% (ref., WNA, 2017).

Table 17.3: Recovery Values Published by Other Uranium Operations[1]

Company	Property	Location	Grade, % U_3O_8	Estimated Metallurgical Recovery %
Cameco	Crow Butte	Nebraska	0.12	85.0
Cameco	Gas Hills-Peach	Wyoming	0.11	72.0
Cameco	North Butte/Brown Ranch	Wyoming	0.08	80.0
Cameco	Smith Ranch-Highland	Wyoming	0.09	85.0
Uranium One	Willow Creek	Wyoming	0.054	80.0
UR Energy	Lost Creek	Wyoming	0.052	80.0
			Average	**80.3**

Notes: 1. Source of information is from the NI 43-101 Technical Report, Reno Creek Preliminary Feasibility Study, May 9, 2014.

Therefore, for the purpose of this PEA, it is the Qualified Person, Matthew Yovich's opinion that Azarga's assumed head grade of 60 ppm and uranium recovery of 80% of the estimated resource are reasonable estimates.

17.2 Processing Plant Designs

The proposed, fully constructed CPP will have four major process circuits: the uranium recovery/extraction circuit (IX); the elution circuit to remove the uranium from the IX resin; a yellowcake precipitation circuit; and the dewatering, drying and packaging circuit. The Satellite facility will include IX and resin transfer systems to provide loaded resin to the CPP for removal of uranium from the resin and further processing at the CPP.

Figure 17.1 presents a simplified, typical process flow diagram for the CPP

Figure 17.1: Process Flow Diagram

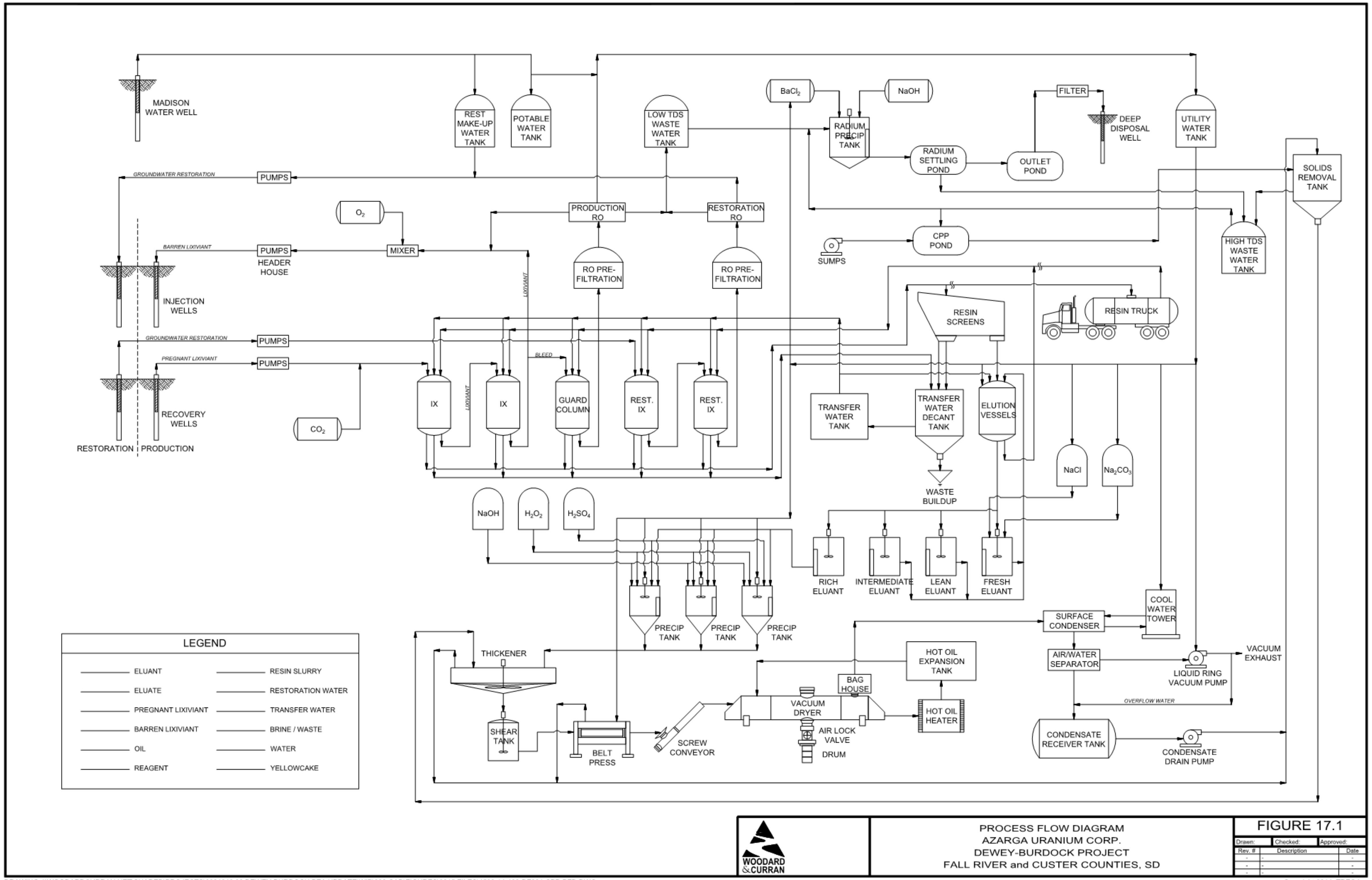


Figure 17.2: Burdock Facility General Arrangement

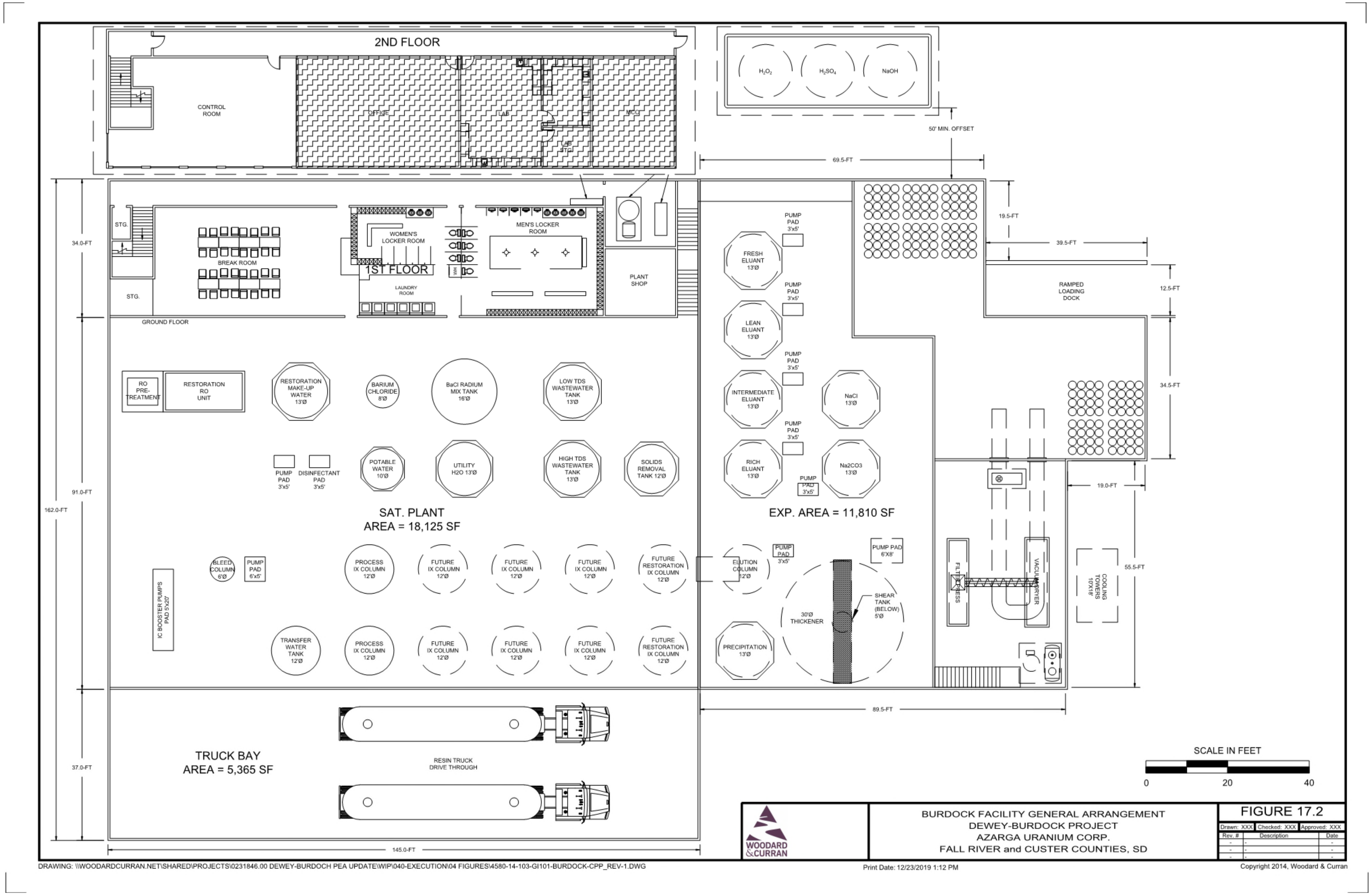
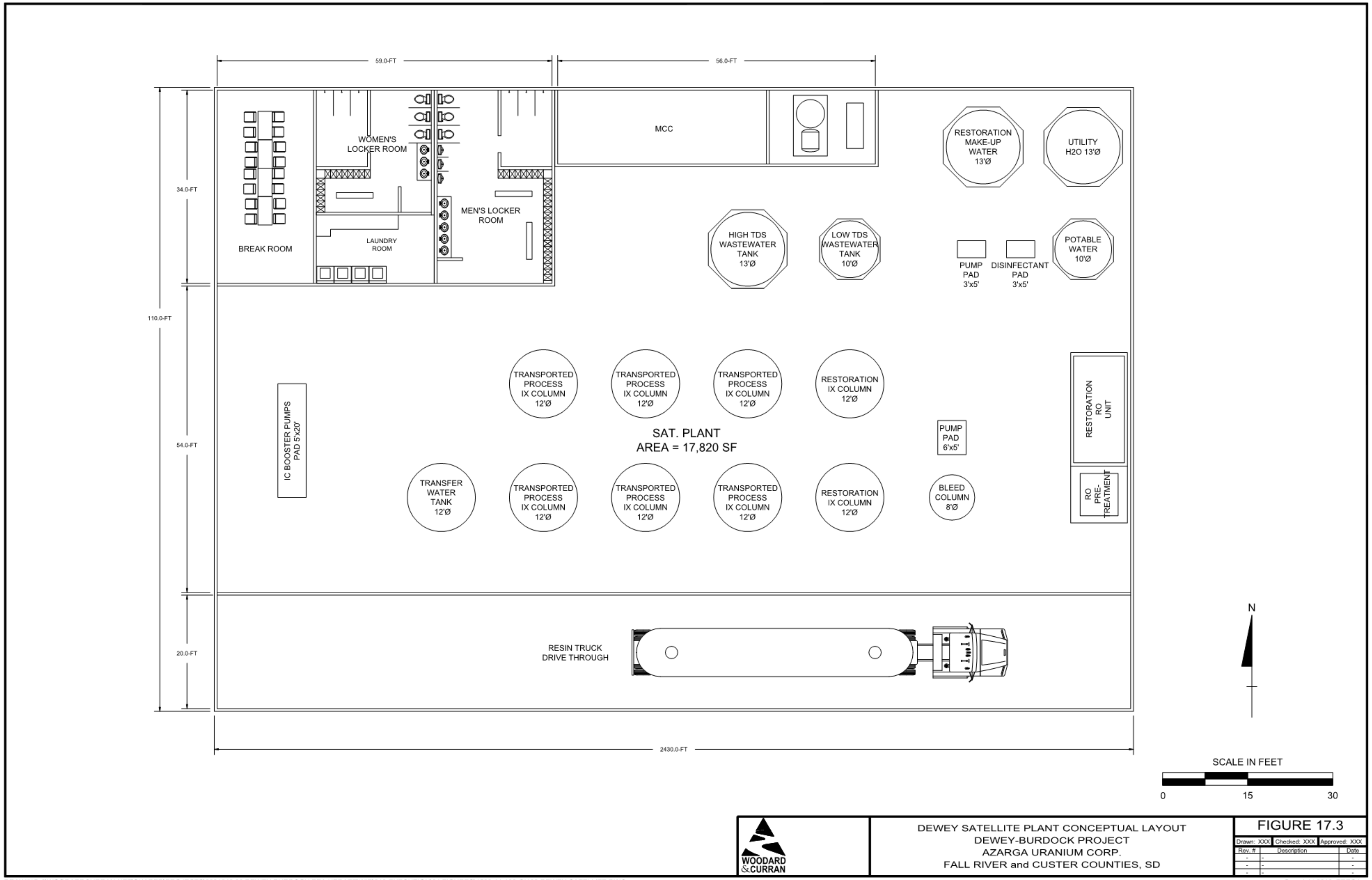


Figure 17.3: Dewey Facility General Arrangement



One CPP and one Satellite Facility are proposed for the project. The CPP will be located at the Burdock site and the Satellite Facility will be located at the Dewey site. The distance between the two facilities is approximately four miles, see Figure 4.2. The CPP and Satellite facility general arrangements are provided in Figures 17.2 and 17.3, respectively.

Table 17.4 provides the conceptual design criteria for the Dewey-Burdock project. These conceptual production values were used in the conceptual design of the CPP, Satellite plant and for the economic analysis of this project.

Table 17.4: Summary of Design Criteria for Dewey-Burdock Project

Item	Value	Units
Estimated M&I Resources	17,122,000	LBS U_3O_8
Estimated Inferred Resources	713,000	LBS U_3O_8
Estimated Overall Recovery	80%	-
Estimated Production[1]	14,268,000	LBS U_3O_8
Design Annual Yellowcake Production	1,000,000	LBS U_3O_8
Estimated Life of Mine	21	Yr
Daily Operation Schedule	24	Hr/Day
Annual Operating Schedule	350	Day/Yr
Average Head Grade	60	PPM
Maximum Design Flow Rate	4,000	GPM

[1] Cautionary statement: This Preliminary Economic Assessment is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

The CPP will be constructed in phases over the course of four years. In Years -1 and 1, the first phase of the CPP will be designed and built at the Burdock site and will include the resin transfer system and ion exchange (IX) systems. Pregnant lixiviant from the well field will be processed through the IX columns and the resulting loaded resin will be shipped to the nearest processing plant where the uranium can be extracted. IX Trains will be subsequently added to the plant each year for the next two years to allow for a ramped production schedule. In Year 3 the Burdock facility will be expanded (operational in Year 4) into a full CPP which will include all processing equipment necessary to produce and package yellowcake. The satellite facility at Dewey will be constructed in Year 7 and become operational in Q4 of Year 7 in the mine plan.

The Dewey Satellite facility will recover all obtainable resources from the Dewey well fields. IX vessels will be moved from the Burdock CPP to the Dewey Satellite Facility, as needed. Loaded resin from the Dewey Satellite facility will be transported to the CPP by truck for further processing.

Recovery of uranium by IX involves the following process circuits (described in detail in the following sections):

- Ion Exchange
- Production bleed

- Elution
- Precipitation
- Filtration, Drying and Packaging
- Radium removal

The Satellite Facility will be capable of processing 4,000 gpm of lixiviant. The average uranium concentration for this design is 60 ppm. Trucks will be used to transfer resin between the Satellite Facility and the CPP.

The CPP will contain ion exchange circuits, an elution circuit, a precipitation circuit, and a washing, drying and packaging circuit. In combination with the IX circuit, the elution, precipitation, product washing/filtering, drying and processing circuits will be capable of producing more than 2,858 pounds U_3O_8 per day (1Mlbs/yr).

17.2.1 Ion Exchange

A total of four pressurized IX trains will be used over the life of the mine. The first IX train will be installed prior to the start of production in Year 1, and additional trains will be added periodically through Year 2. The plant will have four trains at full production capacity, when combined will be capable of producing 1,000,000 lb U_3O_8 per year. Each vessel is designed to contain a 500 cubic foot batch of anionic ion exchange resin. The vessels will be configured in parallel trains of two columns operating in a series, utilizing pressurized down-flow methodology for loading. Production and Injection booster pumps are located upstream and downstream of the trains, respectively.

The vessels are designed to provide optimum contact time between pregnant lixiviant and IX resin. An interior stainless-steel piping manifold system will distribute lixiviant evenly across the resin. The dissolved uranium in the pregnant lixiviant is chemically adsorbed onto the ion exchange resin, and the resultant barren lixiviant exiting the vessels should normally contain less than 2 ppm of uranium. However, based on operating experience it is expected to be feasible to operate at a significantly lower concentration leaving the vessels.

17.2.2 Production Bleed

After the resource has been effectively loaded on the resin, the barren lixiviant is released from the vessel and passes to the injection booster pumps to be injected back into the well field. A bleed is maintained in the groundwater hydro-stratigraphic unit to confine and control hydraulic flow patterns. There is typically a small fraction of uranium remaining in the lixiviant solution prior to returning to the well field. The bleed is directed to a smaller IX column known as the bleed column where a majority of the remaining fraction is loaded onto ion exchange resin. The barren bleed is discharged at a constant flow rate to the radium treatment system prior to discharging into the settling ponds, which is designed for a minimum of 13 days residence time. Flow from the settling ponds will be tested to confirm conformance with discharge standards and then disposed of via the DDW.

17.2.3 Elution Circuit

During the initial CPP phase, loaded and regenerated resin from the IX circuit will be hauled to and from a tolling facility for elution extraction and subsequent processing. Upon completion of the plant expansion all processing will be performed within the CPP at the Burdock site.

Following the IX circuit, loaded resin is transferred to the elution circuit where uranium is stripped off and resin is regenerated for recycled use. A mixture of sodium chloride and sodium carbonate is added to the elution vessels to initiate uranium stripping. Eluted resin, or barren resin, is then rinsed and returned to the IX vessels for further loading. The elution process consists of four stages: three (3) eluant stages will contact one 500 ft^3 batch of resin with four bed volumes of eluant each and one (1) rinse stage will contact the batch with four bed volumes of fresh water. Uranium (as uranyl carbonate) are then contained in the rich eluate solution.

17.2.4 Precipitation Circuit

Sulfuric acid is then added to the rich eluate to bring the pH down to the range of 2 to 3 where the uranyl carbonate breaks down, liberating carbon dioxide leaving free uranyl ions. In the next stage, sodium hydroxide (caustic soda) is added to raise the pH to the range of 4 to 5. After this pH adjustment, hydrogen peroxide is added in a batch process to form an insoluble uranyl peroxide (UO_4) compound. After precipitation, the pH is raised to approximately 7 and the uranium precipitate slurry is pumped to a 30ft diameter thickener. The uranium-depleted supernate solution overflows the thickener and is disposed of via a deep injection well. The supernate solution will be treated to remove radium and other radionuclides before disposal, as required.

The precipitation cycle procedures and methods to be employed for this project have been used extensively in ISR programs and in conventional uranium milling operations and is a highly accepted and successful method of processing uranium.

17.2.5 Product Filtering, Drying and Packaging

After precipitation, the uranium precipitate, or yellowcake, is removed for washing, filtering, drying and product packaging in a controlled area. The yellowcake from the thickener underflow is washed to remove excess chlorides and other soluble contaminants. The slurry is then dewatered in a filter press and the filter cake is transferred in an enclosed conveyor directly to the yellowcake dryer.

The yellowcake will be dried in a low temperature (<300°F) vacuum dryer; which is totally enclosed during the drying cycle and is heated by circulating thermal fluid through an external jacket. The off gases generated during the drying cycle, which is primarily water vapor, is filtered to remove entrained particulates and then condensed. Compared to conventional high temperature drying by multi-hearth systems, this dryer has no significant airborne particulate emissions.

The dried yellowcake is packaged into 55gal drums for storage before transport by truck to a conversion facility.

17.2.6 Radium Removal from Wastewater

Wastewater discharged from processing operations will be treated to remove radionuclides before disposal via the DDW. Conventional treatment for radium removal is traditionally done with barium chloride ($BaCl_2$) treatment, resulting in the precipitation of a sludge that can be separated to decrease total volume for disposal. To achieve the separation of sludge from wastewater, the solution is discharged to a pond for settling. It is anticipated the pond where settling occurs is sufficient to hold all material accumulated over the life of the project. The reagent tanks used in the radium removal process are placed on a curbed concrete pad to provide support and secondary containment. Due to the possibility of sustained below-freezing temperatures, the radium removal tanks will be located within the CPP.

17.3 Predicted Mass Balance

Azarga developed a mass balance derived from specific project design criteria. The predicted mass balance results for the Dewey-Burdock IX circuit, Elution and Precipitation stage and Drying process were used to develop the conceptual design. It is assumed that the head grade from the well field is 60 ppm, which is based on Azarga's proprietary experience at similar plants. The predicted flow rates and recoveries in the mass balance will produce the target annual yellowcake production of 1Mlb.

17.4 Predicted Water Balance

Uranium ISR is a water-intensive process; therefore, water is recycled through the system to reduce water usage. The brine disposal system design is also dependent on the amount and quality of the wastewater produced. The wastewater disposal option investigated for the Dewey-Burdock project was deep well disposal.

In summary, the Dewey-Burdock project water balance is based on a production flow rate of 4,000 gpm which includes approximately 40 gpm of bleed flow to the DDW. The CPP will see a water use of approximately 12 gpm from the local fresh water supply well. Restoration activities will include 250 gpm feed to the RO, with 175 gpm returned to the wellfield and 75 gpm to the DDW. Make-up water from a Madison well will be used to minimize wellfield drawdown if necessary.

As mentioned earlier, the production well field is expected to require less than 1% bleed (40 gpm) in order to maintain favorable hydraulic conditions; however, the disposal system has a capacity to dispose approximately 3% (127 gpm).

17.5 Equipment Characteristics and Specifications

As of the date of this report, a preliminary design has been completed for the Project facilities and equipment. However, based on Qualified Person, Matthew Yovich's and Azarga's experience on similar ISR projects, the type, size and amount of equipment required to implement the Project is very well known and includes recent pricing from other similar projects. The equipment described above in this Section and Section 21 were used to develop the CAPEX and OPEX costs presented herein.

Major required mobile equipment will include resin haul tractors and trailers to deliver loaded resin from the satellite facility to the central processing plant, pump hoists, cementers, forklifts, pickups, logging trucks, and generators. In addition, several pieces of heavy equipment will be on site for excavation of mud pits, road maintenance, and reclamation activities. Azarga will lease or purchase mobile equipment as needed for the project.

Product Handling and Storage - The yellowcake drying and packaging stations will be segregated within the processing plant for worker safety. Dust abatement and filtration equipment will be deployed in this area of the facility. Storage of yellowcake drums will be in a dedicated and locked storage room while they await transport.

Transport - Following standard industry protocols, yellowcake will be transported in 55 gallon steel drums. The shipment method will be via specifically licensed trucking contractor. Approximately 317 shipments are estimated from the Dewey-Burdock project of the life of the mine based upon the present resource estimate.

Liquid Waste Disposal - Azarga retained Petrotek Engineering Corp. to prepare a UIC Class V permit application (ref., Powertech, 2012), which provides a conceptual design and cost estimate for deep disposal wells at the Dewey-Burdock project. The present plan is to construct two deep disposal wells. The target injection zones include the Minnelusa Formations. Preliminary studies indicate that both formations are suitable for injection of wastewater and EPA has issued draft permits for this activity currently pending a final decision.

Azarga has also extensively investigated the use of land application of treated water as a method of disposal. For the purposes of this PEA, only deep well injection was considered in the economic analysis. Two Class V wells permitted under EPA are used in this economic assessment.

Solid Waste Disposal - Solid wastes at an ISR facility include, but are not limited to, spent resin, empty packaging, tank sediments and filtration products, motor vehicle maintenance waste, office waste, and clothing. All waste materials will be reviewed and entered into waste stream classifications on site.

Waste classified as non-contaminated (non-hazardous, non-radiological) will be disposed of in the nearest permitted sanitary waste disposal facility. Waste classified as hazardous (non-radiological) will be segregated and disposed of at the nearest permitted hazardous waste facility. Radiologically contaminated solid wastes, that cannot be decontaminated, are classified as 11.e(2) byproduct material. This waste will be packaged and stored on site temporarily, and periodically shipped to a licensed 11.e(2) byproduct waste facility or a licensed mill tailings facility.

17.6 Energy, Water and Process Material Requirements

17.6.1 Energy Requirements

Estimates used in the evaluation presented in this document assume the consumption of approximately 1 MBTUH (million British thermal units per hour) of propane to operate one dryer and assume the use of two dryers running for six hours per day each. To heat the CPP and satellite plant during winter months, an estimated 3.9 MBTUH of propane is required. Additionally, this PEA estimates nearly 12 million kWh annually of electricity will be necessary to operate the CPP and the well fields during peak production with simultaneous mining and restoration activities.

17.6.2 Water Requirements

As previously mentioned, bleed from the lixiviant will be routed to RO treatment, and permeate will be re-introduced to the injection stream or disposed of. Fresh water will be supplied from a Madison formation well and used for process make-up, showers, domestic uses, and will be available for plant wash-down and yellowcake wash. Approximately 1.9 gpm of fresh water is anticipated to suffice this demand.

17.6.3 Process Material Requirements

Chemicals that are anticipated to be used during processing and the assumed annual peak production consumption rates listed in the table below. There may be small quantities of other chemicals used at the site which are not listed in the table below.

Table 17.5: Estimated Chemical Consumption Rates

Reagent	Consumption	
CO_2 Consumption	1.65	lb/lb U_3O_8
O_2 Consumption	3.30	lb/lb U_3O_8
Soda Ash Consumption	0.92	lb/lb U_3O_8
NaCl Consumption	4.61	lb/lb U_3O_8
H_2SO_4 Consumption	1.00	lb/lb U_3O_8
H_2O_2 Consumption	0.36	lb/lb U_3O_8
NaOh Consumption	0.92	lb/lb U_3O_8
$BaCl_2$ Consumption	0.004	lb/lb U_3O_8

The different types of chemicals will be stored, used and managed so as to ensure worker and environmental safety in accordance with standards developed by regulatory agencies and vendors. The sulfuric acid, hydrogen peroxide and Caustic storage areas will include secondary containment. Sodium hydroxide and the various acid and caustic chemicals are of potential concern and will be stored and handled with care. To prevent unintentional releases of hazardous chemicals and limit potential impacts to the public and environment, Azarga will implement its internal operating procedures consistent with federal, state and local requirements.

18.0 PROJECT INFRASTRUCTURE

The basic infrastructure (power, water and transportation) necessary to support an ISR mining operation at the proposed Project is located within reasonable proximity of the site as further described below.

18.1 Utilities

18.1.1 Electrical Power

The Black Hills Electric Cooperative is anticipated to be the power provider for the project. It has been established that the most cost-effective power source for the project is from a substation located in Edgemont, South Dakota. Approximately 15 miles of new 69 kV power line is necessary to provide power to the plant. Main power for the Dewey-Burdock project will be distributed from a new substation located at the County road 6463 tie in point along highway 18. From the substation, power will be carried by overhead distribution lines to medium voltage transformers located near the CPP and Satellite sites.

The project will utilize a smaller overhead powerline, currently available in the vicinity of the project location for construction and the first two years of operation, thereby deferring the cost of installing the new 69kV line from Edgemont to the project site for two years. The currently available line has capacity for the processing facility and well field loads during the first two years of operation and ramp-up, but capacity will be exceeded during Year 3. Costs for an upgrade and extension of the existing line for construction and the first two years of operation have been accounted for in Year -1 in this study, and costs for the new 69kV line have been incorporated into this study during Year 2.

Smaller loads will have a transformer that will reduce from 480 volts to 208/120 volts as required. All three-phase motors will be started and controlled through standard MCCs. A lock-out point will be provided for each motor and the driven machinery as required by the National Electrical Code (NEC).

18.1.2 Domestic and Utility Water Wells

Two water wells are necessary to provide domestic water to the CPP and Satellite plant. Geological testing has identified the nearest accessible domestic water supply to be approximately 3,000 ft below the surface in the Madison Formation. Water from the Madison wells will be pumped to the plant and stored in either the utility water tank or the domestic water tank. The utility water tank will provide make-up water for plant processing circuits, while the domestic water tank will provide water for items such as showers, toilets, sinks emergency stations, etc. A chlorination system is not anticipated to be installed. All drinking water will be brought to the site from appropriate off-site sources.

18.1.3 Sanitary Sewer

A gravity absorption field septic system will be located at both the CPP and satellite to receive effluent. The systems will be designed in accordance with state and local health and sanitation requirements. The systems are currently proposed to be located close to the CPP and satellite buildings and will operate via gravity flow.

The septic systems will be periodically maintained to prevent solids buildup in the septic tanks and absorption field distribution lines. The ground surface above the absorption field will be maintained to prevent soil erosion and effectively divert storm water runoff.

18.1.4 Transmission Pipelines

As discussed in Section 16, both the pregnant lixiviant and restoration water will be conveyed via a series of buried pipelines ranging from 1 ½ to 14 inches in diameter. The individual well flow rates and manifold pressures will be monitored in the header houses. These data will be transmitted to the CPP for remote monitoring through a master control system. High density polyethylene (HDPE), PVC, stainless steel, or equivalent piping will be used in the well fields and will be designed and selected to meet design operating conditions.

The lines from the CPP, header houses and individual well lines will be buried for freeze protection and to minimize pipe movement. Figure 16.2 illustrates the approximate locations for trunk lines to/from the well fields and the Plant.

18.2 Transportation

18.2.1 Railway

The Burlington Northern Railroad runs parallel to County Road 6463 along the length of the project and extends southeast to the town of Edgemont. Rail access may be negotiated to facilitate transport and delivery of construction equipment and supplies.

18.2.2 Roads

The nearest population center to the Dewey-Burdock Project is Edgemont, South Dakota (population 900) located on US Highway 18, 14 miles east from the Wyoming-South Dakota state line. Fall River County Road 6463 extends northwestward from Edgemont to the abandoned community of Burdock located in the southern portion of the Dewey-Burdock project, about 16 miles from Edgemont. This road is a two lane, all weather gravel road. Fall River County Road 6463 continues northwest from Burdock to the Fall River-Custer county line where it becomes Custer County Road 769 and continues on to the hamlet of Dewey, a total distance of about 23 miles from Edgemont. This county highway closely follows the tracks of the BNSF (Burlington Northern Santa Fe) railroad between Edgemont and Newcastle, Wyoming. Dewey is about 2 miles from the northwest corner of the Dewey-Burdock project.

An unnamed unimproved public access road into the Black Hills National Forest intersects Fall River County Road 6463 4.3 miles southeast of Burdock and extends northward about 4 miles, allowing access to the east side of the Dewey-Burdock project. About 0.9 miles northwest from Burdock, an unimproved public access road to the west from Fall River County Road 6463 allows access to the western portion of the Dewey-Burdock project. Private ranch roads intersecting Fall River County Road 6463 and Custer County Road 769 allow access to all other portions of the Dewey-Burdock Project.

Secondary access roads will be improved with added structural support and properly graded to reduce maintenance costs. A small road section will be constructed to connect existing unimproved roads to the plant buildings for immediate access to both the Burdock CPP, and the Dewey Satellite plant. In addition, secondary access roads will be used at the Project to provide access to the header house buildings. The secondary access roads will be constructed with limited cut and fill construction and may be surfaced with small sized aggregate or other appropriate material.

18.3 Buildings

18.3.1 Buildings and Parking Requirements

Dedicated maintenance facilities will be located in the CPP building. In addition to maintenance of mobile equipment, the most commonly overhauled equipment is expected to be the submersible pumps utilized in the recovery wells.

Routine maintenance shall be performed on the buildings to keep all systems in good working order. Parking areas shall be periodically graded and snow removal shall be performed as necessary.

18.3.2 Heating Systems

Building heating is proposed using gas forced air heated by propane combustion.

18.3.3 Diesel and Gasoline Storage

Diesel and gasoline will be stored on site in individual tanks. Both tanks will be manufactured for the use of fuel storage, and they will be double-walled for spill leak prevention. A concrete containment area will be provided around the tanks to prevent potential environmental impacts. Diesel and gasoline transfer pumps may be used to refuel vehicles, heavy equipment, and miscellaneous small equipment. A fuel truck may be used to transport fuel to large equipment vehicles and well field operations.

18.3.4 Laboratory

A laboratory space will be required for testing procedures and sample analysis, as well as storage for sample receipts, sample preparation, chemicals, and analytical documentation. The laboratory will also be equipped with changing facilities and an eyewash station. The building will be leased and operated from the nearby town of Edgemont in the first three years of production. The plant expansion will include a new lab and office facility which will be used throughout the remainder of the life of mine.

18.3.5 Maintenance Shop

A Maintenance Shop Building will be required for storage of backup process equipment, spare parts, tools, special equipment, and shop space for equipment maintenance. The building will be leased and operated from the nearby town of Edgemont for the life of the mine.

18.4 Ponds

A wastewater stream will be produced from the process, bleed, and restoration flows at the CPP and must be properly disposed of by permitted wastewater systems. Two Class V deep disposal wells will be constructed for wastewater disposal at the Burdock site. Prior to deep well injection, radionuclides and solids will be removed from the stream. A combination of ion exchange and radium removal in settling ponds will be used for removal of radionuclides including radium. A wastewater stream from the Dewey site will be pumped to the Burdock site for treatment and disposal.

A design (ref., Powertech, 2013f) was completed for the wastewater impoundments, and the design is detailed in the Pond Design Report, dated August of 2009. The design utilized for this PEA includes one radium settling pond, one outlet pond, one CPP pond, one surge pond, and one spare pond. A summary of the report is provided in this section.

Storage impoundments on site are designed to perform various processing and storage functions. See Figure 4.2. All wastewater is treated prior to deep well injection in radium settling ponds and an outlet pond. A surge pond is available for the storage of treated wastewater in event than the disposal well must be shut down for service or other reasons Process water from the CPP may be stored in the CPP pond and may be returned to the CPP for additional processing. All ponds are designed to hold precipitation that falls on the ponds. Allowance has been made for all ponds to store water resulting from the 100-year, 24-hour storm event while maintaining 3 ft of freeboard.

The uranium recovery process results in a waste stream of approximately 12 gpm. Allowance has been made for some of this water to be stored in a central plant pond. All precipitation falling directly on the pond surfaces will be stored in the ponds and disposed of via deep well injection.

18.4.1 Radium Settling Pond

A radium settling pond will be constructed at the Burdock site to allow radium to settle out of solution. The settlement process is accomplished by adding barium chloride to the water. Co-precipitation of radium occurs when natural sulfate (SO_4) in the water combines with radium (Ra) and barium (Ba) to form $RaBaSO_4$. The requirements for efficient settlement of solids out of a solution have been incorporated into the size and dimensions of the ponds and include the following:

- Sufficient retention time for the settlement of radium out of solution
- Adequate surface area to prevent the development of large surface currents
- Pond geometry or arrangement that will prevent short circuiting of flows through the pond

18.4.2 Outlet Pond

An outlet pond has been designed for the Burdock Sites and has been sized to accommodate one day’s production water and precipitation from the 100-year, 24-hour storm event falling on both the radium settling and outlet pond. The design will be capable of storing 5.1-acre-ft, allocated as follows:

- 2.7-acre-ft for production water from the Radium Settling Pond
- 1.7-acre-ft for the 100-year, 24-hour design storm event falling on the radium settling pond
- 0.4-acre-ft for the 100-year, 24-hour design storm event falling on the outlet pond

18.4.3 CPP Pond

The CPP pond is located at the Burdock Site and has been sized to accommodate a discharge of 10.81 gpm over a period of one year. The design will be capable of storing 15.9-acre-ft, allocated as follows:

- 15.2-acre-ft for brine from the CPP
- 0.7-acre-ft for the 100-year, 24-hour design storm event

18.4.4 Surge Pond

The surge pond will be located at the Burdock Site and has been sized to accommodate 8.3 acre-feet. The surge pond will provide surge capacity for treated liquid waste flowing out of the outlet ponds. It has been sized to accommodate approximately 16 days of water production.

- 8.3-acre-ft for surge capacity from the outlet pond

18.4.5 Spare Pond

A spare pond has been designed to be identical to the radium settling pond, which are the largest double-lined ponds in the system. The spare pond is located adjacent to the radium settling pond and has been designed to accommodate water from any of the radium settling or central plant ponds, should additional storage be required.

The spare storage pond has been designed sufficient to provide a temporary replacement for any operating ponds should it need to be taken out of service for repair.

19.0 MARKET STUDIES

This section discusses the basis for the uranium commodity pricing used in the PEA and the status of any contracts for commodity pricing and/or project implementation.

The uranium commodity markets are volatile. Due to the increased focus on nuclear energy, and the potential for uranium supply issues related to expansion of the industry, long-term contract prices are higher than the spot price. Long-term contact prices have some variance due to individual pricing terms and potential for adjustment over the sales period.

Pricing for a PEA can be determined by several approaches. One, is to use a three-year trailing average, another is to use current spot price and yet another is to use analyst forecasts. The three-year trailing average and current spot price approaches are considered overly conservative due to the incident at Fukushima Daiichi which had a significant depressive impact over several years on uranium prices due to shutdown of all reactors in Japan. This resulted in a combined decrease in demand and readily available increase of low-cost fuel from the inventories of the shutdown nuclear reactors. This anomaly impacted the three-year trailing average and current spot price which are, therefore, not considered reasonable approximations for the future price of uranium and not consistent with price trends prior Fukushima.

Uranium analysts are forecasting that the uranium price will increase significantly from its current level starting around 2020 as a result of increased demand and supply shortages. An average uranium price of $55 per pound of U_3O_8 based on an average of recent market forecasts by various professional institutes was determined to be an acceptable price for the PEA. Azarga has no contracts in place for sale of product from the project. Contracts for yellowcake transportation, handling and sales will be developed prior to commencement of commercial production.

Table 19.1: Market Long Term Price Forecasts

Analyst	Date	Forecast ($/pound U_3O_8)
CIBC	Nov. 2019	$45
Eight Capital	Nov. 2019	$50
Haywood Capital Markets	Jun. 2019	$70
RBC Capital Markets	Jul. 2019	$65
Scotiabank	Nov. 2019	$50
TD Securities	Oct. 2019	$50
Average:		**$55**

19.1 Product Markets, Analysis, Studies and Pricing Reviewed by the QP

Uranium does not trade on an open market like other commodities such as gold, silver and copper. Sales of uranium as U_3O_8 are predominantly contracted on a medium and long term basis with prices determined by a pre-set formulae linked to the reported long term and/or spot prices and are typically significantly higher than spot prices. Azarga has not entered into nor have they initiated negotiations on a contract for uranium sales. For this PEA, Azarga has adopted a price forecast based on averaging uranium price forecasts developed by several banks. Table 19.1 summarizes recent uranium price forecasts by analysts. This table demonstrates that long term price forecasts range from $45 to $70 and average $55. Based on the uranium price forecast data in Table 19.1, the PEA has assumed U_3O_8 production is sold at a price of $55 per pound. Qualified Person, Matthew Yovich agrees with the pricing scenario used in this PEA.

W&C has reviewed the referenced reports identified in Table 19.1 as well as other relevant publications such as the Uranium 2018: Resources, Production and Demand publication dated 2018 a joint report by the Nuclear Energy Agency and International Atomic Energy Agency. The review indicates that the common consensus for all sources is that uranium demand will rise based on current and projected nuclear energy needs. Uranium demand is a function of its consumption for the generation of electricity in nuclear reactors. According to OECD by the year 2035, world nuclear electricity generating capacity is projected to increase from 391 GWe net (at the beginning of 2017) providing a range of between 331 GWe net in the low demand case and 568 GWe net in the high demand case, with the midpoint of this range representing 449.5 GWe or an increase of about 36%. OECD also reports that, the high case scenario projection forecasts a 10% increase by 2025, indicating that significant expansion activities are already underway in several countries. OECD reports world annual reactor-related uranium requirements are projected to increase from 62,825 tonnes of uranium metal (tU) at the end of 2016 to between 53,010 tU and 90,820 tU by 2035, with a midpoint of the range representing 71,915 tU or an increase of about 14% (ref., OECD et al., 2018).

Meeting projected demand will require timely investments in new uranium production facilities because of the long lead times (typically in the order of ten years or more in most producing countries) required to develop production facilities that can turn resources into refined uranium ready for nuclear fuel production.

Given the variability of uranium sales price, and potential for large swings, the sales price has significant impacts to the economic analysis. A sensitivity analysis is provided in Section 22 which illustrates the potential variance in NPV and IRR based on fluctuations in the price of uranium.

19.2 Contracts

Azarga has no contracts in place for sale of uranium product for this project nor have they initiated any sales agreement negotiations.

No other contracts are in place or being negotiated for construction of the project. These will be initiated upon completion of project financing and are anticipated to be typical industry contracts for construction and equipment, material and chemical supply.

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 Environmental Studies

Azarga (Powertech) conducted an environmental baseline data collection program on the Dewey-Burdock site from July 2007 to September 2008. An independent, third-party contractor directed sampling and analysis activities to characterize pre-mining conditions related to water, soils, air, vegetation, and wildlife of the site and surrounding areas.

In addition to the baseline environmental data collected by the third-party contractor, U.S. Nuclear Regulatory Commission (NRC) staff prepared a Generic Environmental Impact Statement (GEIS) (ref., USNRC, 2009) for western-area license applicants that addressed common environmental issues associated with the construction, operation, and decommissioning of ISR facilities, as well as ground water restoration at such facilities. The GEIS served as a starting point for the site-specific environmental review of the Dewey-Burdock license application. Findings of the site-specific assessment are presented in NRC's Final Supplemental Environmental Impact Statement (FSEIS) for the Dewey-Burdock Project (ref., USNRC, 2014).

Results of the baseline studies, GEIS and FSEIS indicate that environmental concerns are unlikely for the Dewey-Burdock Resource Areas.

20.1.1 Potential Well Field Impacts

The injection of treated groundwater as part of uranium recovery or as part of restoration of the production zone is unlikely to cause changes in the underground environment except to restore the water quality consistent with baseline or other NRC approved limits and to reduce mobility of any residual radionuclides. Further, industry standard operating procedures, which are accepted by NRC and other regulating agencies for ISR operations, include a regional pump test prior to licensing, followed by more detailed pump tests after licensing for each individual area where uranium will be recovered prior to its production.

During ISR operations, potential environmental impacts of well field operations include consumptive use, horizontal fluid excursions, vertical fluid excursions, and changes to groundwater quality in production zones (ref., USNRC, 2009). Through analyses in the GEIS and continued in the FSEIS, NRC staff concluded that impacts of well field operations on the environment will be small. That is, well field operations will have environmental effects that are either not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the area's groundwater resources (ref., USNRC, 2014).

NRC staff concluded the potential environmental impact of consumptive groundwater use during well field operation will be small at the Dewey-Burdock Project because such consumptive use will result in limited drawdown near the project area, water levels will recover relatively rapidly after groundwater withdrawals cease and it is dependent upon a State water appropriation permit. The State has recommended approval of the permit after considering important site-specific conditions such as the proximity of water users' wells to well fields, the total volume of water in the production hydro-stratigraphic units, the natural recharge rate of the production hydro-stratigraphic units, the transmissivities and storage coefficients of the production hydro-stratigraphic units, and the degree of isolation of the production hydro-stratigraphic units from overlying and underlying hydro-stratigraphic units.

NRC staff also concluded the potential environmental impact from horizontal excursions at the proposed Dewey-Burdock ISR Project will be small. This is because i) EPA will exempt a portion of the uranium-bearing aquifer from USDW classification according to the criteria under 40 CFR 146.4, ii) Powertech is required to submit well field operational plans for NRC and EPA approval, iii) inward hydraulic gradients will be maintained to ensure groundwater flow is toward the production zone, and iv) Azarga's NRC-mandated groundwater monitoring plan will ensure that excursions, if they occur, are detected and corrected.

Similarly, potential impacts from vertical excursions were concluded by NRC staff to be small. The reasons given for the conclusion included i) uranium-bearing production zones in the Fall River Formation and Chilson member of the Lakota Formation and are hydrologically isolated from adjacent aquifers by thick, low permeability layers (i.e., the overlying Graneros Group and underlying Morrison Formation), ii) there is a prevailing upward hydraulic gradient across the major hydro-stratigraphic units, iii) Azarga's required mechanical integrity testing program will mitigate the impacts of potential vertical excursions resulting from borehole failure, and iv) Azarga has committed to properly plugging and abandoning or mitigating any previously drilled wells and exploration holes that may potentially impact the control and containment of well field solutions within the proposed project area.

Lastly, potential impacts of well field operations on groundwater quality in production zones were concluded by NRC staff to be small because Azarga must initiate groundwater restoration in the production zone to return groundwater to Commission-approved background levels, EPA MCL's or to NRC-approved alternative water quality levels at the end of ISR operations.

20.1.2 Potential Soil Impacts

NRC staff have concluded that potential impacts to soil during all phases of construction, operation, hydro-stratigraphic unit, and decommissioning of the Dewey-Burdock Project will be small (ref., USNRC, 2014).

During construction, earthmoving activities associated with the construction of the Burdock central plant and Dewey satellite plant facilities, access roads, well fields, pipelines, and surface impoundments will include topsoil clearing and land grading. Topsoil removed during these activities will be stored and reused later to restore disturbed areas. The limited areal extent of the construction area, the soil stockpiling procedures, the implementation of best management practices, the short duration of the construction phase, and mitigative measures such as reestablishment of native vegetation will further minimize the potential impact on soils.

During operations, the occurrence of potential spills during transfer of uranium-bearing lixiviant to and from the Burdock central plant and Dewey satellite facility will be mitigated by implementing onsite standard procedures and by complying with NRC requirements for spill response and reporting of surface releases and cleanup of any contaminated soils.

During groundwater restoration, the potential impact to soils from spills and leaks of treated wastewater will be comparable to those described for the operations phase.

During decommissioning, disruption or displacement of soils will occur during facility dismantling and surface reclamation; however, disturbed lands will be restored to their pre-ISR land use. Topsoil will be reclaimed, and the surface will be graded to the original topography.

The following proposed measures will be used to minimize the potential impacts to soil resources:

- Salvage and stockpile soil from disturbed areas.
- Reestablish temporary or permanent native vegetation as soon as possible after disturbance utilizing the latest technologies in reseeding and sprigging, such as hydroseeding.
- Decrease runoff from disturbed areas by using structures to temporarily divert and/or dissipate surface runoff from undisturbed areas.
- Retain sediment within the disturbed areas by using silt fencing, retention ponds, and hay bales.
- Fill pipeline and cable trenches with appropriate material and re-grade surface soon after completion.
- Drainage design will minimize potential for erosion by creating slopes less than 4 to 1 and/or provide rip-rap or other soil stabilization controls.
- Construct roads using techniques that will minimize erosion, such as surfacing with a gravel road base, constructing stream crossings at right angles with adequate embankment protection and culvert installation.
- Use a spill prevention and cleanup plan to minimize soil contamination from vehicle accidents and/or wellfield spills or leaks

20.1.3 Potential Impacts from Shipping Resin, Yellowcake and 11e.(2) Materials

The Project operations will require truck shipment of resin, yellowcake and 11e.(2) materials.

<u>Ion Exchange Resin Shipment</u>

Ion exchange resin requires transportation of loaded ion exchange resins by tanker trucks to a central processing facility. The radiological impacts of these shipments are typically lower than estimated risks associated with finished yellowcake shipments because i) ion exchange resins are less concentrated (about 0.009 ounces uranium per gallon) than yellowcake and therefore will contain less uranium per shipment than a yellowcake (about 85% uranium by weight) shipment, ii) uranium in ion exchange resins is chemically bound to resin beads; therefore, it is less likely to spread and easier to remediate in the event of a spill, and iii) the total annual distance traveled by ion-exchange shipments will be less than the same for yellowcake shipments. The NRC regulations at 10 CFR Part 71 and the incorporated U.S. Department of Transportation regulations for shipping ion exchange resins, which are enforced by NRC onsite inspections, also provide confidence that safety is maintained and the potential for environmental impacts with regard to resin shipments remains small (ref. USNRC, 2009 and 2014).

Yellowcake Shipment

After yellowcake is produced at an ISR processing facility, it is transported to a conversion plant in Metropolis, Illinois (the only conversion facility in the United States), to produce uranium hexafluoride (UF6) for use in the production of nuclear reactor fuel. NRC and others have previously analyzed the hazards associated with transporting yellowcake and have determined potential impacts are small. Previously reported accidents involving yellowcake releases indicate that in all cases spills were contained and cleaned up quickly (by the shipper with state involvement) without significant health or safety impacts to workers or the public. Safety controls and compliance with existing transportation regulations in 10 CFR Part 71 add confidence that yellowcake can be shipped safely with a low potential for adversely affecting the environment. Transport drums, for example, must meet specifications of 49 CFR Part 173, which is incorporated in NRC regulations at 10 CFR Part 71. To further minimize transportation-related yellowcake releases, delivery trucks are recommended to meet safety certifications and drivers hold appropriate licenses (ref., USNRC, 2009 and 2014).

11e.(2) Shipment

Operational 11e.(2) byproduct materials (as defined in the Atomic Energy Act of 1954, as amended) will be shipped from the Dewey-Burdock Project by truck for disposal at a licensed disposal site. All shipments will be completed in accordance with applicable NRC requirements in 10 CFR Part 71 and U.S. Department of Transportation requirements in 49 CFR Parts 171–189. Risks associated with transporting yellowcake were determined by NRC to bound the risks expected from byproduct material shipments, owing to the more concentrated nature of shipped yellowcake, the longer distance yellowcake is shipped relative to byproduct material destined for a licensed disposal facility, and the relative number of shipments of each material type. Therefore, potential environmental impacts from transporting byproduct material are considered small (ref., USNRC, 2009 and 2014).

20.2 Socioeconomic Studies and Issues

A Socioeconomic Assessment for the Project was performed by Knight Piesold and Co. in 2008 and updated by WWC Engineering August 2013. The Assessment's summary of the economic impact was as follows (ref., WWC, 2013):

> *According to the economic impact analysis, the most significant benefits are the potential to create jobs, which will have direct and indirect effects on the local economies. Additional significant benefits include capital expenditures and tax benefits to the State of South Dakota, Custer County and Fall River County.*
>
> *Impacts to the regional housing market should be minimal because of the large percentage of local workers. Impacts to schools and public facilities should be negligible because of their present ability to absorb any associated regional influx.*
>
> *This economic impact analysis indicates that the construction and operation costs including capital costs of this project will result in positive economic benefits to the local and regional economy by the creation of hundreds of jobs and millions of dollars in tax revenue over the life of the project.*
>
> *The development the ISR project should present Custer and Fall River counties*

with net positive gain.

20.3 Permitting Requirements and Status

The three most significant permits/licenses are (1) the Source and Byproduct Materials License, which was issued by NRC April of 2014; (2) the Large Scale Mine Permit (LSM), to be issued by the South Dakota DENR; and (3) UIC Class III and V wells (injection and/or deep disposal), which require permits from the EPA.

The land within the Project boundary includes mining claims on private and federal lands. Access to these lands, as stated in Section 2, is controlled under surface rights held by Azarga, or by public access. Thus, a BLM Plan of Operations and associated Environmental Assessment which will reference the already completed Environmental Impact Statement previously finalized by NRC with BLM as a cooperating agency will be completed.

Permit/license amendments will be required for expanded well field areas covered in this PEA and for the purposes of this report are assumed to occur later in the project life. See the life of mine schedule in Section 16.

The status of the various federal and state permits and licenses that are needed for the Project are summarized in Table 20.1. Prior to the start of mining (the injection of lixiviant), Azarga will obtain all the following necessary permits, licenses, and approvals required by the NRC, DENR and EPA. Some permits are only applicable later in the project life prior to construction of the Dewey satellite plant.

Table 20.1: Permitting Status

Permit, License, or Approval Name	Agency	Status
Uranium Exploration Permit	DENR	Submitted - July, 2006 Approved - January, 2007
Special, Exceptional, Critical, or Unique Lands Designation Permit	DENR	Submitted - August, 2008 Approved - February, 2009
UIC Class III Permit	EPA	Submitted - December, 2008 Draft Permit Received – March 2017 Updated Draft Permit Received – August 2019 Approval pending
Source and Byproduct Materials License	NRC	Submitted - August, 2009 Approved - April, 2014
Plan of Operations (POO)	BLM	Submitted - October, 2009 Approval pending
UIC Class V Permit	EPA	Submitted - March, 2010 Draft Permit Received – March 2017 Updated Draft Permit Received – August 2019 Approval pending
Groundwater Discharge Plan (GDP)	DENR/WMB	Submitted - March, 2012 DENR Recommended Approval - December, 2012 Approval pending
Water Rights Permit (WR)	DENR/WMB	Submitted - June, 2012 DENR Recommended Approval - November, 2012 Approval pending

Large Scale Mine Permit (LSM)	DENR/BME	Submitted - September, 2012 DENR Recommended Approval - April, 2013 Approval pending
Minor Permits:		
Air Permit	DENR	Deemed Unnecessary - February, 2013
Avian Management Plan -	GFP/US FWS	Submitted - September, 2013
Non-Purposeful Eagle Take Permit	USFWS	Submitted - January, 2014
NPDES Construction Permit	DENR	To Be Submitted
NPDES Industrial Stormwater Permit	DENR	To Be Submitted
Septic System Permit	DENR	To Be Submitted
EPA Subpart W Pond Construction Permit	EPA	To Be Submitted
County Building Permits	Custer and Fall River counties	To Be Submitted

20.4 Community Affairs

Azarga has an ongoing community affairs program. Azarga maintains routine contacts with landowners, local communities and businesses, and the general public. Once the project commences, the senior project operational managers and environmental manager will be onsite at the facility and are included in the administrative support labor costs for operations.

There is vocal opposition to the project by Non-Governmental Organizations (NGO) and individuals though typically not in the Edgemont area. This has created increased regulatory efforts and logistics for accommodating public involvement, but at the time of this report, the NRC license has been issued, the draft EPA permits have been issued and the State of South Dakota large scale mine permit has been recommended for approval.

There has already been extensive public involvement including public hearings and public comment on the project for the NRC license and draft EPA permits. Hearings for State of South Dakota permits begun in 2013 but were suspended pending completion of federal licenses. These hearings will resume, subject to uranium market conditions, following issuance of the final EPA permits, see Table 20.1.

20.5 Project Closure

20.5.1 Byproduct Disposal

The 11e.(2) or non-11e.(2) byproduct disposal methods are discussed in detail in Section 17. Deep disposal wells, landfills, and licensed 11e.(2) facilities will be used depending on waste classification and type.

20.5.2 Well Abandonment and Groundwater Restoration

Groundwater restoration will begin as soon as practicable after uranium recovery in each well field is completed. If a depleted well field is near an area that is being recovered, a portion of the depleted area's restoration may be delayed to limit interference with the on- going recovery operations.

Groundwater restoration will require the circulation of native groundwater and extraction of mobilized ions through reverse osmosis treatment. The intent of groundwater restoration is to return the groundwater quality parameters consistent with that established during the pre-operational sampling required for each well field. As previously noted, groundwater from the Inyan Kara at the Dewey-Burdock project does not presently meet EPA drinking water standards, as established in the site characterization baseline data collected by Azarga.

Restoration completion assumes up to six pore volumes of groundwater will be extracted and treated by reverse osmosis. Following completion of successful restoration activities and regulatory approval, the injection and recovery wells will be plugged and abandoned in accordance with DENR regulations. Monitor wells will also be abandoned following verification of successful groundwater restoration.

20.5.3 Demolition and Removal of Infrastructure

Simultaneous with well abandonment operations, the trunk and feeder pipelines will be removed, tested for radiological contamination, segregated as either solid 11e.(2) or non-11e.(2) then chipped and transported to appropriate disposal facilities. The header houses will be disconnected from their foundations, decontaminated, segregated as either solid 11e.(2) or non-11e.(2), and transported to appropriate disposal facilities. The facilities' processing equipment and ancillary structures will be demolished, tested for radiological properties, segregated and either scrapped or disposed of in appropriate disposal facilities based on their radiological properties.

20.5.4 Reclamation

All disturbances will be reclaimed including, wellfields, plant sites and roads. The site will be re-graded to approximate pre-development contours and the stockpiled topsoil placed over disturbed areas. The disturbed areas will then be seeded.

20.6 Financial Assurance

Financial Surety will be required by NRC, the State of South Dakota, BLM and EPA. The Project will be secured for the estimated amount of total closure costs which include groundwater restoration, facility decommissioning and reclamation with a bond provided by a broker at a rate of 3% of the surety amount until positive cash flow is achieved then reducing to a rate of 2% thereafter. The annual financial surety amount is based on the estimated amount of annual development that would require closure in the case of default by the owner. The costs for Project closure and financial assurance are included in the economic analysis presented herein. Table 21.2 presents the closure cost summary.

21.0 CAPITAL AND OPERATING COSTS

W&C prepared this estimate of capital and operating costs on the basis of the preliminary design data and assumptions described herein. The costs were developed on a first principle basis, including specifications and current vendor quotes for all major pieces of equipment, installation and construction costs. In addition, W&C has current cost information from a very similar ISR project located in Wyoming. Variable contingency ranging from 0 to 30% has been applied to individual materials, activities and estimates. The weighted average of all applied contingency is equivalent to 10% over the total cost of the project. The magnitude of contingency for each item was determined by how recently the quote was received, the historical cost volatility of the item and the level of confidence in the designated quantity, e.g., trunkline lengths. This level of contingency has been substantiated on other similar sized construction projects for which the Qualified Person, Matthew Yovich, has experience. Both the capital and operating costs are current as of the middle of 2019. The predicted level of accuracy of the cost estimate is +/- 25%. The budget prices for the major items identified in this study have been sourced in the United States.

21.1 Capital Cost Estimates

The capital costs (CAPEX) provided in the following tables address the development of facilities at both Dewey and Burdock phased in accordance to the mined development plan described in Section 16. Capital cost estimates are representative of the capital and infrastructure costs required for the estimated resources as of the date of this report. The current life of mine schedule is shown in Figure 16.2. The life of mine schedule anticipates pre-production construction work will begin in Year -1.

Detailed discussion of mining and recovery methods and associated infrastructure are provided in Section 16, Section 17, and Section 18.

The following sections provide a summary of the quantities and assumptions used to develop the capital costs for the five phases of the project. Table 21.1 provides a summary of initial capital costs, Table 21.2 summarizes the total well field capital costs spread over Years 1 through 12, and Table 21.3 summarizes the CPP and satellite plant capital costs and illustrates how they have been divided between each phase. The estimated initial capital costs for the first two years of the Project life (Years -1 and 1) are approximately $31.7 million with sustaining capital costs of $157.7 million spread over the next 17 years (Years 2 through 18) of production, see Tables 21.1 and 22.1.

Table 21.1: Initial CAPEX

	Total (US$000s)	Year -1 (US$000s)	Year 1 (US$000s)
Pre-Construction Capital Costs	$1,025	$1,025	$0
Plant Development Costs	$19,403	$7,429	$11,974
Wellfield Development Costs	$11,244	$970	$10,274
Total	$31,672	$9,424	$22,248

Table 21.2: Total Well Field CAPEX

	Cost (US$000s)
Wellfield Materials & Drilling	$104,173
Wellfield Construction Costs	$32,017
Total Wellfield CAPEX	$136,190

Table 21.3: Total Plant Capital Cost Summary ($000s)

Item Description	Cost	Average Contingency	Phase I Initial Burdock Facility	Phase II Additional IX Train	Phase III Additional 2 IX Trains	Phase IV Burdock CPP Expansion	Phase V Dewey Sat. Facility
Plant Development Costs							
DIV-01: General Requirements	$3,328,980	0%	$1,514,421	$66,620	$524,585	$703,076	$520,279
DIV-03: Concrete	$2,614,692	15%	$1,160,672	$0	$0	$585,761	$868,258
DIV-05: Metals	$1,222,013	10%	$325,870	$0	$0	$678,896	$217,247
DIV-09: Finishes	$89,503	10%	$39,588	$0	$0	$19,895	$30,020
DIV-11: Equipment	$734,430	10%	$69,112	$0	$0	$665,318	$0
DIV-12: Furnishings	$1,239,158	10%	$254,854	$194,814	$389,627	$148,199	$251,664
DIV-13: Special Construction	$1,701,963	10%	$733,887	$0	$0	$411,571	$556,505
DIV-21: Fire Suppression	$541,097	10%	$239,333	$0	$0	$120,278	$181,486
DIV-22: Plumbing	$401,429	10%	$193,605	$0	$0	$19,435	$188,388
DIV-23: HVAC	$754,838	10%	$286,492	$0	$0	$186,674	$281,671
DIV-26: Electrical	$7,067,900	10%	$3,120,266	$0	$0	$1,631,594	$2,316,040
DIV-27: Communications	$67,890	10%	$33,945	$0	$0	$0	$33,945
DIV-31: Earthwork	$4,052,065	10%	$2,786,017	$0	$0	$453,375	$812,673
DIV-32: Exterior Improvements	$252,404	10%	$199,155	$0	$0	$0	$53,249
DIV-33: Utilities	$8,676,117	9%	$1,389,022	$0	$6,784,712	$0	$502,383
DIV-40: Process Integration	$5,289,157	10%	$1,708,490	$256,210	$512,419	$1,153,624	$1,658,415
DIV-41: Material Processing & Handling	$200,387	10%	$0	$0	$0	$200,387	$0
DIV-42: Process Heating Cooling & Drying	$835,824	10%	$0	$0	$0	$835,824	$0
DIV-43: Process Gas & Liquid Handling	$4,169,253	7%	$353,573	$280,881	$522,385	$2,115,002	$897,413
DIV-46: Water & Wastewater Equipment	$6,788,809	2%	$3,343,596	$0	$0	$2,528,647	$916,566
DIV-48: Electrical Power Generation	$106,262	10%	$106,262	$0	$0	$0	$0
Plant Development Subtotal	$50,134,171	8%	$17,858,160	$798,523	$8,733,728	$12,457,558	$10,286,201
Sales Tax (4%)	$2,005,367	0%	$714,326.38	$31,941	$349,349	$498,302	$411,448
Total Plant CAPEX	**$52,139,538**	**8%**	**$18,572,486**	**$830,464**	**$9,083,078**	**$12,955,861**	**$10,697,649**

21.2 Operating Cost Estimates

The operating costs (OPEX), current as of the middle of 2019, have been developed by evaluating each process unit operation and the associated required services (chemicals, power, water, air, waste disposal), infrastructure (offices, change rooms shop), salary and burden, and environmental control (heat, air conditioning, monitoring). The basis for the operating cost estimate is the life of mine schedule presented on Figure 16.2 and is based on design well field flows and head grade, process flow-sheets, preliminary process design, materials balance and estimated Project manpower requirements. The Annual Operating Cost Summary for the Project is provided in Table 21.4.

Table 21.4: Annual Operating Cost Summary (US$000s)

Annual Operating Cost Items	Total	Average Contingency	$ per Pound	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Plant Operating Labor[1]	$29,414,860	5%	$2.06	$0	$0	$872,845	$1,745,689	$1,745,689	$1,745,689	$1,745,689	$1,745,689	$1,745,689	$1,745,689
Plant Operating Expenses	$44,016,694	10%	$3.08	$0	$0	$322,543	$645,086	$1,290,171	$3,178,578	$3,178,578	$3,178,578	$3,178,578	$3,377,277
Wellfield Operating Labor	$7,342,713	5%	$0.51	$0	$0	$231,631	$463,263	$463,263	$463,263	$463,263	$463,263	$463,263	$463,263
Wellfield Operating Expenses	$9,776,601	10%	$0.69	$0	$0	$170,324	$340,648	$681,296	$681,296	$681,296	$681,296	$681,296	$681,296
Project General & Administrative[7]	$17,532,863	5%	$1.23	$0	$0	$1,152,088	$1,504,176	$1,504,176	$1,114,176	$1,114,176	$1,114,176	$1,114,176	$1,114,176
Plant & Well Field Operating Costs	**$108,083,731**		**$7.58**	**$0**	**$0**	**$2,749,431**	**$4,698,862**	**$5,684,595**	**$7,183,002**	**$7,183,002**	**$7,183,002**	**$7,183,002**	**$7,381,701**
Toll Mill Fee[2]	$7,202,800	10%	$0.50	$0	$0	$554,400	$2,208,800	$4,439,600	$0	$0	$0	$0	$0
Produced Product Shipping and Conversion Fee	$4,685,912	0%	$0.33	$0	$0	$41,381	$164,867	$331,377	$331,377	$331,377	$331,377	$310,686	$331,377
Product Transaction Costs	**$11,888,712**		**$0.83**	**$0**	**$0**	**$595,781**	**$2,373,667**	**$4,770,977**	**$331,377**	**$331,377**	**$331,377**	**$310,686**	**$331,377**
Wellfield Restoration	$4,892,225	25%	$0.34	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Decontamination / Decommissioning / Reclamation	$11,767,217	25%	$0.82	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
D&D and Restoration Costs	**$16,659,443**		**$1.17**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Administrative Costs[3]	$3,487,500	0%	$0.24	$0	50000	$162,500	$162,500	$162,500	$162,500	$297,500	$297,500	$297,500	$297,500
Financial Assurance[4]	$1,874,417	10%	$0.13	$0	$0	$35,413	$76,456	$68,083	$99,906	$99,906	$119,521	$129,328	$148,942
Financial Assurance Collateral	$0	0%	$0.00	$0	$0	$531,192	$615,642	$44,614	$556,907	$0	$343,255	$171,627	$343,255
Permit Amendments	$10	0%	$0.00	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Administrative Support Costs	**$5,361,927**		**$0.38**	**$0**	**$50,000**	**$729,105**	**$854,597**	**$275,197**	**$819,313**	**$397,406**	**$760,275**	**$598,455**	**$789,697**
Annual Well Field Development Cost Items	**Total**	**Average Contingency**	**$ per Pound**		**Year -1**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Well Field Completion Labor[5]	$32,016,990	5%	$2.24	$0	$970,212	$1,940,424	$1,940,424	$1,940,424	$1,940,424	$1,940,424	$1,940,424	$1,940,424	$1,940,424
Well Field Capital Costs[6]	$104,173,407	10%	$7.30	$0	$0	$8,333,873	$3,125,202	$5,208,670	$4,166,936	$5,208,670	$5,208,670	$5,208,670	$10,417,341
Total Well Field Development Costs	**$136,190,397**		**$9.55**	**$0**	**$970,212**	**$10,274,296**	**$5,065,626**	**$7,149,094**	**$6,107,360**	**$7,149,094**	**$7,149,094**	**$7,149,094**	**$12,357,764**

Annual Operating Cost Items	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Plant Operating Labor[1]	$1,745,689	$1,745,689	$1,745,689	$1,745,689	$1,745,689	$1,745,689	$1,745,689	$1,745,689	$872,845	$872,845	$436,422	$174,569
Plant Operating Expenses	$3,377,277	$3,377,277	$3,377,277	$3,377,277	$3,377,277	$3,377,277	$3,377,277	$2,026,366	$0	$0	$0	$0
Wellfield Operating Labor	$463,263	$463,263	$463,263	$463,263	$0	$463,263	$463,263	$463,263	$231,631	$231,631	$115,816	$46,326
Wellfield Operating Expenses	$681,296	$681,296	$681,296	$681,296	$681,296	$681,296	$681,296	$408,778	$0	$0	$0	$0
Project General & Administrative[7]	$1,114,176	$1,114,176	$1,114,176	$1,114,176	$704,176	$704,176	$704,176	$528,132	$352,088	$176,044	$176,044	$0
Plant & Well Field Operating Costs	**$7,381,701**	**$7,381,701**	**$7,381,701**	**$7,381,701**	**$6,508,438**	**$6,971,701**	**$6,971,701**	**$5,172,228**	**$1,456,564**	**$1,280,520**	**$728,282**	**$220,895**
Toll Mill Fee[2]	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Produced Product Shipping and Conversion Fee	$331,377	$331,377	$328,421	$328,421	$328,421	$328,421	$328,421	$207,234	$0	$0	$0	$0
Product Transaction Costs	**$331,377**	**$331,377**	**$328,421**	**$328,421**	**$328,421**	**$328,421**	**$328,421**	**$207,234**	**$0**	**$0**	**$0**	**$0**
Wellfield Restoration	$322,088	$1,583,598	$324,865	$433,153	$642,368	$160,609	$0	$0	$322,765	$1,102,780	$0	$0
Decontamination / Decommissioning / Reclamation	$0	$0	$539,968	$2,789,833	$629,962	$899,946	$1,349,919	$539,968	$0	$0	$1,231,907	$3,785,715
D&D and Restoration Costs	**$322,088**	**$1,583,598**	**$864,832**	**$3,222,986**	**$1,272,331**	**$1,060,555**	**$1,349,919**	**$539,968**	**$322,765**	**$1,102,780**	**$1,231,907**	**$3,785,715**
Administrative Costs[3]	$297,500	$287,500	$287,500	$287,500	$287,500	$100,000	$50,000	$0	$0	$0	$0	$0
Financial Assurance[4]	$148,942	$148,942	$148,942	$148,942	$148,942	$124,424	$99,906	$50,870	$38,661	$24,417	$13,874	$0
Financial Assurance Collateral	$0	$0	$0	$0	$0	-$429,068	-$429,068	-$858,137	-$213,652	-$249,261	-$184,518	-$242,787
Permit Amendments	$0	$0	$0	$0	$0	$0	$0	$0	$1	$2	$3	$4
Administrative Support Costs	**$446,442**	**$436,442**	**$436,442**	**$436,442**	**$436,442**	**-$204,644**	**-$279,162**	**-$807,267**	**-$174,990**	**-$224,842**	**-$170,641**	**-$242,783**
Annual Well Field Development Cost Items	**Year 9**	**Year 10**	**Year 11**	**Year 12**	**Year 13**	**Year 14**	**Year 15**	**Year 16**	**Year 17**	**Year 18**	**Year 19**	**Year 20**
Well Field Completion Labor[5]	$1,940,424	$1,940,424	$1,940,424	$1,940,424	$1,940,424	$1,940,424	$1,940,424	$970,212	$485,106	$485,106	$0	$0
Well Field Capital Costs[6]	$5,208,670	$8,333,873	$16,667,745	$10,417,341	$6,250,404	$6,250,404	$4,166,936	$0	$0	$0	$0	$0
Total Well Field Development Costs	**$7,149,094**	**$10,274,296**	**$18,608,169**	**$12,357,764**	**$8,190,828**	**$8,190,828**	**$6,107,360**	**$970,212**	**$485,106**	**$485,106**	**$0**	**$0**

Notes:
1) Plant operating labor includes labor for operating both the Burdock CPP and Dewey Satellite Plant.
2) Toll Mill Fee only applies to initial period before the Burdock CPP is expanded to include elution, precipitation and drying processes.
3) Administrative Costs provided by Azarga and include legal fees, Land & Mineral Acquisitions, NRC fees, insurance, office supplies.
4) Financial assurance is calculated as a surety with 3% annual premium required up until a positive cash flow is generated and 2% thereafter.
5) This PEA assumes all well field completion will be performed by contracted labor rather than Azarga personnel.
6) Well field materials are assumed to be procured by Azarga rather than the well field contractor.
7) Includes groundwater baseline sampling for each new well field through Year 16.

21.2.1 Personnel

The present work force estimates for the Dewey-Burdock project during full operation of the Central Processing Facility, Satellite Facility, and all associated well fields is 43 full time staff. In general, the work force can be segregated into the following groups: administration (7 staff), well field completion (16 staff), facilities operations (15 staff) and well field production and restoration (5 staff). Well field construction will be performed by contractors and it is assumed they will utilize approximately 13 employees. In addition, all labor for construction of the site facilities will be performed by contractors which is anticipated to average approximately 35 employees per day during construction operations and could peak as high as 60. Thus, at the peak of construction, as many as approximately 116 employees and contracted personnel could be working for the Project. Staff schedules will vary based upon duty; some will work a typical 8 hr day, 40 hrs per week, while others will work a shift schedule to cover the 24-hour operation of the facility. Additionally, a significant number of contracted persons are expected to work at the project on a full-time basis to perform drilling and construction activities. Labor costs are included in Tables 21.1 and 21.2 as appropriate for CAPEX labor and OPEX labor, respectively.

22.0 ECONOMIC ANALYSIS

Cautionary statement: This* Preliminary Economic Assessment *is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

22.1 Principal Assumptions

The economic analyses presented herein provide the results of the analyses for pre-U.S. federal income tax and estimated post U.S. federal income tax. The only difference between the two scenarios is estimated U.S. federal income tax. All other sales, property, use, severance and conservations taxes as well as royalties are included in both scenarios. Both economic analyses presented herein assume no escalation, no debt, no debt interest and no capital repayment. There is no State of South Dakota corporate income tax.

The sale price for the produced uranium as U_3O_8 is assumed a constant $55 per pound of U_3O_8 based on an average of recent market forecasts by various professional institutes. This basis for this price is discussed in Section 19.

Uranium recovery from the mineral resource was determined based on an estimated overall recovery factor of 80% of the resources as discussed in Section 17. The production schedule assumes an average solution uranium grade (head grade) of 60 ppm as described in Sections 16 and 17. It should be noted that significant variations in these assumptions for head grade and recovery can have significant impacts to the economic results presented.

The sales for the cash flow are developed by applying the recovery factor to the resource estimate for the Project (Section 14). The total uranium production as U_3O_8 over the life of the Project is estimated to be 14.268 million pounds. The production estimates and operating cost distribution used to develop the cash flow are based on the mine plan schedule presented on Figure 16.2.

This PEA assumes Year -1 as the Project start date. Pre-production and capital expenses commence on the Project start date. The start of production is one year after the start of construction, or mid-Year 1, see Figure 16.2. The NPV assumes mid-year discounting of the annual cash flows and is calculated based on a discounted cash flow.

22.2 Cash Flow Projection and Production Schedule

The estimated payback is in Quarter 4 of Year 2 with the commencement of design/procurement activities in Quarter 2 of Year -1 and construction beginning Quarter 4 of Year -1. The Project is estimated to generate net earnings over the life of the project of $372.7 million (pre-U.S. Federal income tax) and $324.4 million (post U.S. Federal income tax). It is estimated that the project has an internal rate of return (IRR) of 55% and a NPV of $171.3 million (pre-U.S. Federal income tax) and an IRR of 50% and a NPV of $147.5_million (post U.S. Federal income tax) applying an 8% discount rate, see Tables 22.1 and 22.2 below.

Table 22.1: Cash Flow (US$000s) Pre-U.S. Federal Income Tax

Cash Flow Line Items	Units	Total or Average	$ per Pound	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Uranium Production as U_3O_8[1,2]	Lbs 000s	**14,268**	-	**0**	**126**	**502**	**1,009**	**1,009**	**1,009**	**1,009**	**946**	**1,009**	**1,009**	**1,009**	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**	**631**	**0**	**0**	**0**	**0**
Uranium Price for U_3O_8[3]	US$/lb	**$55.00**	-	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00
Uranium Gross Revenue	**US$000s**	**$784,740**	-	**$0**	**$6,930**	**$27,610**	**$55,495**	**$55,495**	**$55,495**	**$55,495**	**$52,030**	**$55,495**	**$55,495**	**$55,495**	**$55,000**	**$55,000**	**$55,000**	**$55,000**	**$55,000**	**$34,705**	**$0**	**$0**	**$0**	**$0**
Less: Surface & Mineral Royalties[4]	US$000s	**$38,060**	$2.67	$0	$336	$1,339	$2,692	$2,692	$2,692	$2,692	$2,523	$2,692	$2,692	$2,692	$2,668	$2,668	$2,668	$2,668	$2,668	$1,683	$0	$0	$0	$0
Taxable Revenue	**US$000s**	**$746,680**	-	**$0**	**$6,594**	**$26,271**	**$52,803**	**$52,803**	**$52,803**	**$52,803**	**$49,507**	**$52,803**	**$52,803**	**$52,803**	**$52,333**	**$52,333**	**$52,333**	**$52,333**	**$52,333**	**$33,022**	**$0**	**$0**	**$0**	**$0**
Less: Severance & Conservation Tax[5]	US$000s	**$35,393**	$2.48	$0	$313	$1,245	$2,503	$2,503	$2,503	$2,503	$2,347	$2,503	$2,503	$2,503	$2,481	$2,481	$2,481	$2,481	$2,481	$1,565	$0	$0	$0	$0
Less: Property Tax[6]	US$000s	**$7,201**	$0.50	$0	$0	$0	$0	$0	$0	$870	$915	$960	$1,005	$1,050	$1,095	$870	$435	$0	$0	$0	$0	$0	$0	$0
Net Gross Sales	**US$000s**	**$704,086**	-	**$0**	**$6,281**	**$25,026**	**$50,301**	**$50,301**	**$50,301**	**$49,430**	**$46,245**	**$49,340**	**$49,296**	**$49,251**	**$48,757**	**$48,982**	**$49,417**	**$49,852**	**$49,852**	**$31,457**	**$0**	**$0**	**$0**	**$0**
Less: Plant & Well Field Operating Costs	US$000s	**$108,084**	$7.58	$0	$2,749	$4,699	$5,685	$7,183	$7,183	$7,183	$7,183	$7,382	$7,382	$7,382	$7,382	$7,382	$6,508	$6,972	$6,972	$5,172	$1,457	$1,281	$728	$221
Less: Product Transaction Costs	US$000s	**$11,889**	$0.83	$0	$596	$2,374	$4,771	$331	$331	$331	$311	$331	$331	$331	$328	$328	$328	$328	$328	$207	$0	$0	$0	$0
Less: Administrative Support Costs	US$000s	**$5,362**	$0.38	$50	$729	$855	$275	$819	$397	$760	$598	$790	$446	$436	$436	$436	$436	-$205	-$279	-$807	-$175	-$225	-$171	-$243
Less: D&D and Restoration Costs	US$000s	**$16,659**	$1.17	$0	$0	$0	$0	$0	$0	$0	$0	$0	$322	$1,584	$865	$3,223	$1,272	$1,061	$1,350	$540	$323	$1,103	$1,232	$3,786
Net Operating Cash Flow	**US$000s**	**$562,093**	-	**-$50**	**$2,207**	**$17,099**	**$39,570**	**$41,967**	**$42,389**	**$41,156**	**$38,153**	**$40,838**	**$40,814**	**$39,517**	**$39,746**	**$37,612**	**$40,871**	**$41,696**	**$41,481**	**$26,344**	**-$1,604**	**-$2,158**	**-$1,790**	**-$3,764**
Less: Pre-Construction Capital Costs	US$000s	**$1,025**	$0.07	$1,025	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Less: Plant Development Costs	US$000s	**$52,140**	$3.65	$7,429	$11,974	$9,083	$12,956	$0	$0	$0	$10,698	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Less: Well Feld Development Costs	US$000s	**$136,190**	$9.55	$970	$10,274	$5,066	$7,149	$6,107	$7,149	$7,149	$7,149	$12,358	$7,149	$10,274	$18,608	$12,358	$8,191	$8,191	$6,107	$970	$485	$485	$0	$0
Net Before-Tax Cash Flow	**US$000s**	**$372,738**	-	**-$9,474**	**-$20,041**	**$2,950**	**$19,465**	**$35,860**	**$35,240**	**$34,007**	**$20,306**	**$28,480**	**$33,665**	**$29,243**	**$21,137**	**$25,254**	**$32,680**	**$33,505**	**$35,374**	**$25,374**	**-$2,089**	**-$2,644**	**-$1,790**	**-$3,764**

Total cost per pound: $28.88

Notes:
1) Recovery is based on both site specific laboratory recovery data as well as the experience of Azarga personnel and other industry experts at similar facilities. This PEA is preliminary in nature and includes mineral resources which may not be recoverable at the rates indicated herein.
2) Production schedule is approximated by flow rate, average head grade and estimated recovery of resources. See Section 22 for a discussion of the economic sensitivity to these factors.
3) Uranium market price discussed in Section 19.
4) Surface and mineral royalties provided by Azarga and are estimated to be a cumulative 4.85%.
5) Severance tax for the state of South Dakota is 4.50% and conservation tax is 0.24%. There is no Ad Valorem tax in either Custer or Fall River counties.
6) Property tax is discussed in Section 22.

The Pre-Income Tax IRR and NPV analyses are based on Years -1 to Year 20.

IRR = 55% **assuming no escalation, no debt, no debt interest, no federal income tax, no depletion, no loss carry forward or capital repayment**

Discount Rate	NPV ($US 000s)*
6%	$205,946
8%	$171,251
10%	$143,201

*Based on Mid-year discounting

Table 22.2: Cash Flow (US$000s) Post U.S. Federal Income Tax

Cash Flow Line Items	Units	Total or Average	$ per Pound	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Uranium Production as U_3O_8[1,2]	Lbs 000s	14,268	-	0	126	502	1,009	1,009	1,009	1,009	946
Uranium Price for U_3O_8[3]	US$/lb	$55.00	-	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00
Uranium Gross Revenue	US$000s	$784,740	-	$0	$6,930	$27,610	$55,495	$55,495	$55,495	$55,495	$52,030
Less: Surface & Mineral Royalties[4]	US$000s	$38,060	$2.67	$0	$336	$1,339	$2,692	$2,692	$2,692	$2,692	$2,523
Taxable Revenue	US$000s	$746,680	-	$0	$6,594	$26,271	$52,803	$52,803	$52,803	$52,803	$49,507
Less: Severance & Conservation Tax[5]	US$000s	$35,393	$2.48	$0	$313	$1,245	$2,503	$2,503	$2,503	$2,503	$2,347
Less: Property Tax[6]	US$000s	$7,201	$0.50	$0	$0	$0	$0	$0	$0	$870	$915
Net Gross Sales	US$000s	$704,086	-	$0	$6,281	$25,026	$50,301	$50,301	$50,301	$49,430	$46,245
Less: Plant & Well Field Operating Costs	US$000s	$108,084	$7.58	$0	$2,749	$4,699	$5,685	$7,183	$7,183	$7,183	$7,183
Less: Product Transaction Costs	US$000s	$11,889	$0.83	$0	$596	$2,374	$4,771	$331	$331	$331	$311
Less: Administrative Support Costs	US$000s	$5,362	$0.38	$50	$729	$855	$275	$819	$397	$760	$598
Less: D&D and Restoration Costs	US$000s	$16,659	$1.17	$0	$0	$0	$0	$0	$0	$0	$0
Net Operating Cash Flow	US$000s	$562,093	-	-$50	$2,207	$17,099	$39,570	$41,967	$42,389	$41,156	$38,153
Less: Pre-Construction Capital Costs	US$000s	$1,025	$0.07	$1,025	$0	$0	$0	$0	$0	$0	$0
Less: Plant Development Costs	US$000s	$52,140	$3.65	$7,429	$11,974	$9,083	$12,956	$0	$0	$0	$10,698
Less: Well Feld Development Costs	US$000s	$136,190	$9.55	$970	$10,274	$5,066	$7,149	$6,107	$7,149	$7,149	$7,149
Net Before-Tax Cash Flow	US$000s	$372,738	-	-$9,474	-$20,041	$2,950	$19,465	$35,860	$35,240	$34,007	$20,306
Less: Federal Tax	US$000s	$48,386	$3.39	$0	$0	$0	-$3,206	-$3,752	-$4,106	-$3,886	-$3,135
After Tax Cash Flow	US$000s	$324,352	-	-$9,474	-$20,041	$2,950	$16,259	$32,108	$31,134	$30,120	$17,171

Cash Flow Line Items	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Uranium Production as U_3O_8[1,2]	1,009	1,009	1,009	1,000	1,000	1,000	1,000	1,000	631	0	0	0	0
Uranium Price for U_3O_8[3]	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00
Uranium Gross Revenue	$55,495	$55,495	$55,495	$55,000	$55,000	$55,000	$55,000	$55,000	$34,705	$0	$0	$0	$0
Less: Surface & Mineral Royalties[4]	$2,692	$2,692	$2,692	$2,668	$2,668	$2,668	$2,668	$2,668	$1,683	$0	$0	$0	$0
Taxable Revenue	$52,803	$52,803	$52,803	$52,333	$52,333	$52,333	$52,333	$52,333	$33,022	$0	$0	$0	$0
Less: Severance & Conservation Tax[5]	$2,503	$2,503	$2,503	$2,481	$2,481	$2,481	$2,481	$2,481	$1,565	$0	$0	$0	$0
Less: Property Tax[6]	$960	$1,005	$1,050	$1,095	$870	$435	$0	$0	$0	$0	$0	$0	$0
Net Gross Sales	$49,340	$49,296	$49,251	$48,757	$48,982	$49,417	$49,852	$49,852	$31,457	$0	$0	$0	$0
Less: Plant & Well Field Operating Costs	$7,382	$7,382	$7,382	$7,382	$7,382	$6,508	$6,972	$6,972	$5,172	$1,457	$1,281	$728	$221
Less: Product Transaction Costs	$331	$331	$331	$328	$328	$328	$328	$328	$207	$0	$0	$0	$0
Less: Administrative Support Costs	$790	$446	$436	$436	$436	$436	-$205	-$279	-$807	-$175	-$225	-$171	-$243
Less: D&D and Restoration Costs	$0	$322	$1,584	$865	$3,223	$1,272	$1,061	$1,350	$540	$323	$1,103	$1,232	$3,786
Net Operating Cash Flow	$40,838	$40,814	$39,517	$39,746	$37,612	$40,871	$41,696	$41,481	$26,344	-$1,604	-$2,158	-$1,790	-$3,764
Less: Pre-Construction Capital Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Less: Plant Development Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Less: Well Feld Development Costs	$12,358	$7,149	$10,274	$18,608	$12,358	$8,191	$8,191	$6,107	$970	$485	$485	$0	$0
Net Before-Tax Cash Flow	$28,480	$33,665	$29,243	$21,137	$25,254	$32,680	$33,505	$35,374	$25,374	-$2,089	-$2,644	-$1,790	-$3,764
Less: Federal Tax	-$3,308	-$3,556	-$3,566	-$3,472	-$2,698	-$3,440	-$3,881	-$4,149	-$2,230	$0	$0	$0	$0
After Tax Cash Flow	$25,172	$30,109	$25,677	$17,665	$22,557	$29,240	$29,624	$31,224	$23,144	-$2,089	-$2,644	-$1,790	-$3,764

Total cost per pound: $32.27

Notes:
1) Recovery is based on both site specific laboratory recovery data as well as the experience of Azarga personnel and other industry experts at similar facilities. This PEA is preliminary in nature and includes mineral resources which may not be recoverable at the rates indicated herein.
2) Production schedule is approximated by flow rate, average head grade and estimated recovery of resources. See Section 22 for a discussion of the economic sensitivity to these factors.
3) Uranium market price discussed in Section 19.
4) Surface and mineral royalties provided by Azarga and are estimated to be a cumulative 4.85%.
5) Severance tax for the state of South Dakota is 4.50% and conservation tax is 0.24%. There is no Ad Valorem tax in either Custer or Fall River counties.
6) Property tax is discussed in Section 22.

The Pre-Income Tax IRR and NPV analyses are based on Years -1 to Year 20.

IRR = 50% assuming no escalation, no debt, no debt interest or capital repayment

Discount Rate	NPV ($US 000s)*
6%	$177,938
8%	$147,485
10%	$122,870

*Based on Mid-year discounting

Figure 16.2 presents the Project schedule, as currently defined, and was used to develop cash flow and economic analysis from the capital, operating and closure costs. The schedule illustrates the proposed plan for production, groundwater restoration, and decommissioning of each well field. However, the plan is subject to change due to recovery rates, variations with resource head grades, processing issues, economic conditions, and other conditions and variables.

22.3 Taxes, Royalties and Other Interests

Azarga has no contracts presently in place for production from the Dewey-Burdock project. This includes sales contracts, tolling agreements, or any other financial arrangements with other parties associated with the purchase or price of final uranium product.

22.3.1 Federal Income Tax

The estimate of U.S. federal income taxes for the Project are not based on past operation history for this project or this company and are an estimate only. At this stage of development, a financial structure has yet to be developed for the corporation for accurately assessing federal income tax liabilities. It is possible that the tax liability presented herein is overstated because "ring fenced" treatment of the project tax estimate does not account for the potential offsetting tax deductions from other debts incurred in an overall corporate financial structure. This could be particularly true where other projects or expansions are likely to be funded from revenue from this project.

In order to illustrate the potential impact of federal taxes, two economic models have been developed for this PEA, one that includes an estimate of U.S. federal income tax and one that does not. Azarga does not anticipate paying federal income taxes until losses carried forward are utilized but which are not fully included in the estimate. Thus, these anticipated adjustments to tax liability are expected to reduce the net tax liability for the Project.

22.3.2 State Income Tax

There is no corporate income tax in South Dakota.

22.3.3 Production Taxes

Production taxes in South Dakota include property tax, sales and use tax, and severance and conservation tax. Neither Custer nor Fall River Counties impose an Ad Valorem tax on minerals as of the publication of this PEA.

As shown in Figure 16.3, the project area is divided by Custer County and Fall River County, and each impose their own methods of implementing property tax. The Dewey Facility will fall under the property tax of Custer County while the Burdock Facility will fall under Fall River County.

Custer County follows a discretionary tax formula to encourage development of certain industrial property within the county boundaries. After construction of the Dewey Facility, a 2.1% property tax will be imposed on the assessed value of the land and its permanent improvements for five years. However, its assessed value shall be defined as 20% of its actual value in the first year, 40% in the second year, 60% in the third year, 80% in the fourth year, and 100% in the fifth year (ref., Custer County, 2005).

Fall River County utilizes a different tax schedule. For the purposes of attracting new business, Fall River taxes solely the value of the surface property for the first five years, then adds a tax of 2.1% on the assessed value of improvements of greater than $30,000 for the remainder of the property ownership (ref., Edgemont Herald Tribune, 2011). Since Azarga does not own any surface property, the property tax for the first five years after the construction of the Burdock Facility is 0%.

Purchases of equipment and supplies are subject to sales and use tax. The State imposes a 4% tax on retail sales and services. Project economics presented in this report have sales and use tax of 4% included in the capital cost estimate.

Severance on uranium production is taxed at 4.5% of gross sales. Additionally, the state of South Dakota requires a conservation tax of 0.24% of gross sales for all energy mineral production.

22.3.4 Royalties

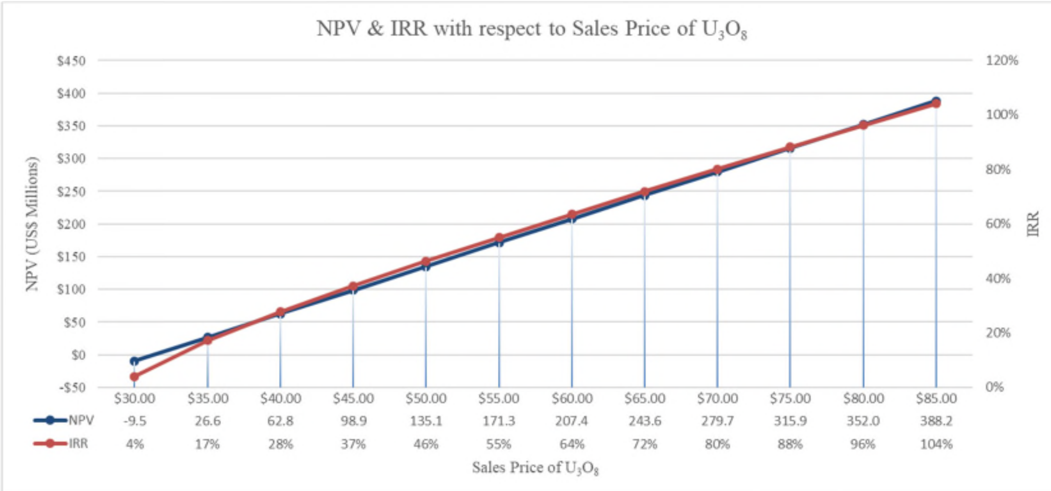
The project is subject to a cumulative 4.85% surface and mineral royalty at a sales price of $55 per lb U_3O_8. Each royalty is assessed on gross proceeds.

22.4 Sensitivity Analysis

22.4.1 NPV and IRR v. Uranium Price (Pre-U.S. Federal Income Tax)

This pre-U.S. federal income tax analysis is based on a variable commodity price per pound of U_3O_8 and the cash flow results presented herein. The Project is most sensitive to changes in the price of uranium. A one-dollar change in the price of uranium can have an impact to the NPV of approximately $7.23 million based on a discount rate of 8%. It will also impact the IRR by approximately 1.82%. See Figure 22.1.

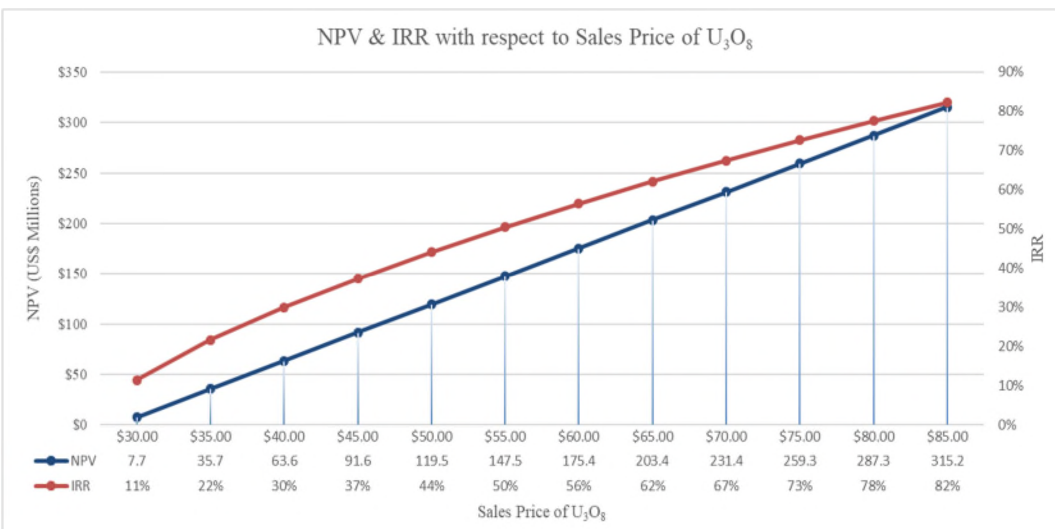
Figure 22.1: NPV & IRR v. Uranium Price (Pre-U.S. Federal Income Tax)



22.4.2 NPV and IRR v. Uranium Price (Post-U.S. Federal Income Tax)

This post U.S. federal income tax analysis is based on a variable commodity price per pound of U_3O_8 and the cash flow results presented herein. The Project is most sensitive to changes in the price of uranium. A one-dollar change in the price of uranium can have an impact to the NPV of approximately $5.59 million based on a discount rate of 8%. It will also impact the IRR by approximately 1.29% based on a discount rate of 8%. See Figure 22.2.

Figure 22.2: NPV & IRR v. Uranium Price (Post-U.S. Federal Income Tax)



22.4.3 NPV and IRR v. Variable Capital and Operating Cost (Pre-U.S. Federal Income Tax

The project pre-U.S. federal income tax NPV and IRR are also sensitive to changes in either capital or operating costs as shown on Figure 22.3 and Figure 22.4 below (NPV and IRR v. Variable Capital and Operating Cost). A 5% change in the operating cost can have an impact to the NPV of approximately \$3.59 million and the IRR of approximately 1.06% based on a discount rate of 8% and a constant uranium price of \$55.00 per pound of U_3O_8. A 5% change in the cost of capital can have an impact to the NPV of approximately \$5.70 million and the IRR of approximately 3.45% based on a discount rate of 8% and a constant uranium price of \$55.00 per pound of U_3O_8.

Figure 22.3: NPV v. Variable Capital and Operating Cost (Pre-U.S. Federal Income Tax)

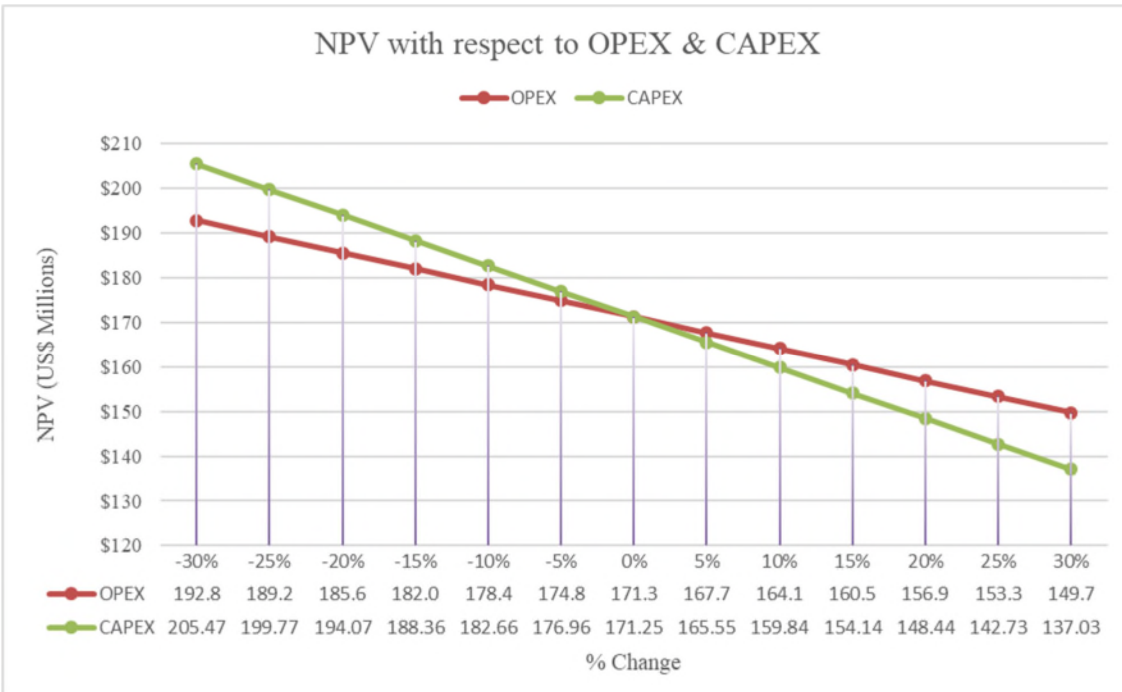
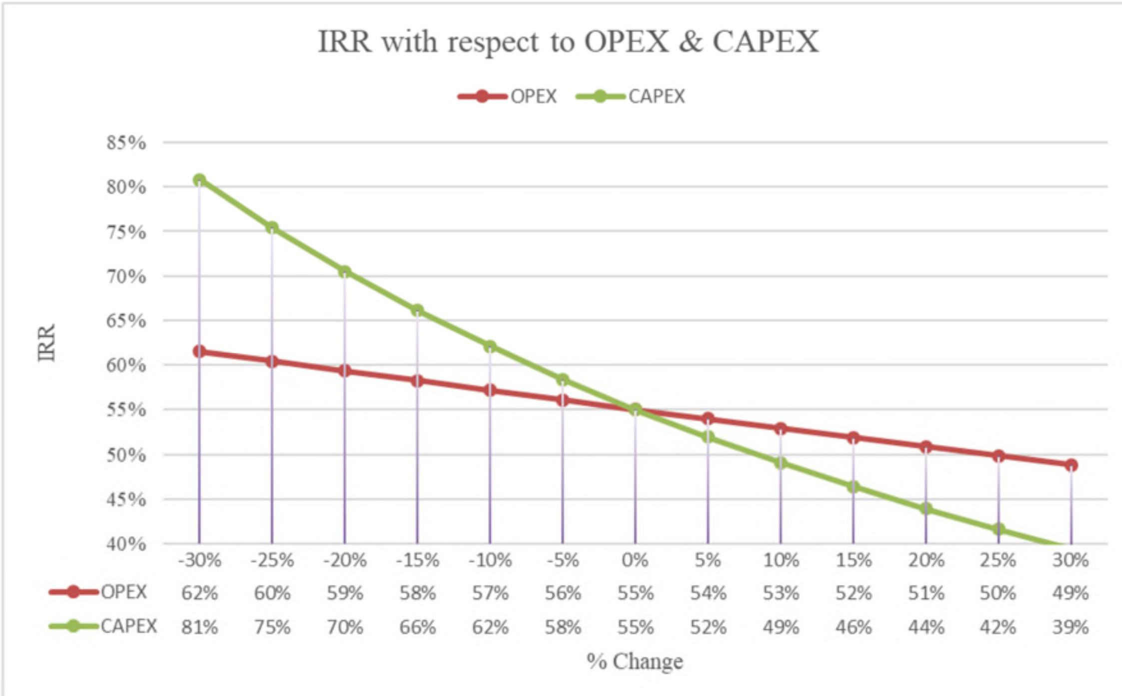


Figure 22.4: IRR v. Variable Capital and Operating Cost (Pre-U.S. Federal Income Tax)



22.4.4 NPV and IRR v. Variable Capital and Operating Cost (Post-U.S. Federal Income Tax)

The Project post U.S. federal income tax NPV and IRR are also sensitive to changes in either capital or operating costs as shown on Figures 22.5 and 22.6 below (NPV and IRR v. Variable Capital and Operating Cost). As indicated, federal income tax has minimal influence on the sensitivity of operating and capital cost changes to the IRR and NPV. A 5% change in the operating cost can have an impact to the NPV of approximately $3.59 million and the IRR of approximately 1.08% based on a discount rate of 8% and a constant uranium price of $55.00 per pound of U_3O_8. A 5% change in the capital cost can have an impact to the NPV of approximately $5.70 million and the IRR of approximately 3.37% based on a discount rate of 8% and a constant uranium price of $55.00 per pound of U_3O_8.

Figure 22.5: NPV v. Variable Capital and Operating Cost (Post-U.S. Federal Income Tax)

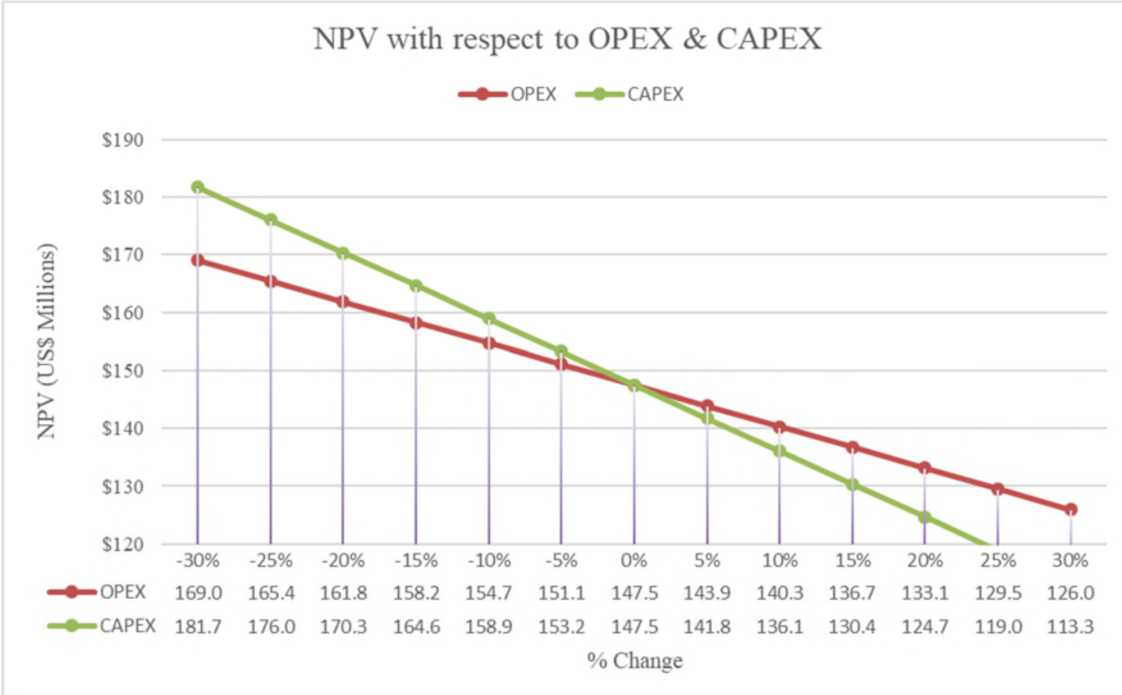
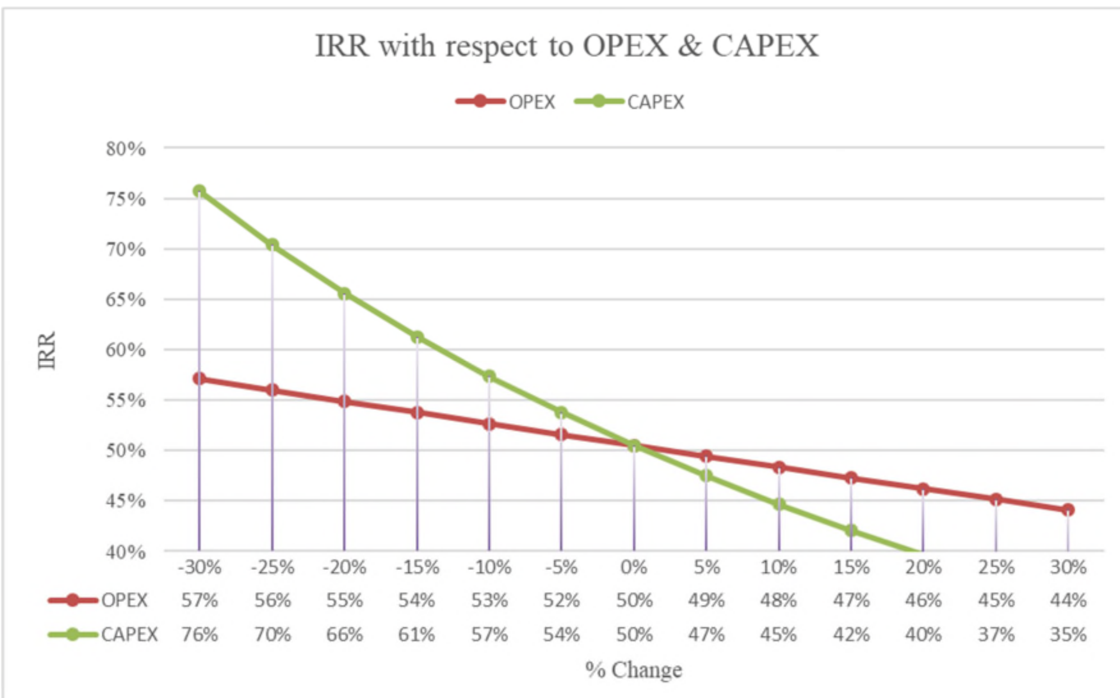


Figure 22.6: IRR v. Variable Capital and Operating Cost (Post-U.S. Federal Income Tax)



It should be noted that the economic results presented herein are very sensitive to head grade and recovery. Significant variations in the assumptions for head grade and recovery can have significant impacts to the economic results presented. However, there are too many variables associated with estimating the potential impact of head grade and recovery to the economics presented herein to develop a meaningful sensitivity analysis. The operational variables that influence head grade and recovery will be managed during operations to the extent practicable to minimize potential impacts.

23.0 ADJACENT PROPERTIES

There are no adjacent properties.

24.0 OTHER RELEVANT DATA AND INFORMATION

The existing open pit mines located in the east part of the property are not planned for any mining by Azarga. These pits remain the responsibility of previous operators and existing landowners. It is uncertain to what extent, if any, pit reclamation prior to the construction of well fields located within the existing pits would be necessary and these costs are not included in this estimate.

There are several projects controlled by Azarga which could potentially be satellites to the Dewey-Burdock Project once a CPP is constructed. This could potentially include Azarga’s Aladdin (Wyoming), Gas Hills (Wyoming), Dewey Terrace (Wyoming) and Centennial (Colorado) projects. These projects are located approximately 80 miles, 260 miles, 10 miles and 250 miles from the Dewey-Burdock site, respectively. These projects will not share common infrastructure, such as roads, powerlines and facility buildings with the Dewey-Burdock Project.

There are extensive unexplored oxidation and reduction or boundaries or “trends” within the project area which have yet to have been sufficiently drilled to determine the presence of mineralization. Further assessment of these trends has the potential to demonstrate additional mineralization within the project area. Historical record estimates indicate approximately 170 miles of these trends within the project area with a large portion (estimated at over 100 miles) that is sparsely drilled or unexplored. In particular, the potential exists for additional mineralization to the south, north, and west of existing Dewey mineralization.

25.0 INTERPRETATION AND CONCLUSIONS

After reviewing the available information, the Authors feel that the Project, located in southwest South Dakota, USA, is potentially viable. The sandstone hosted roll-front uranium deposits in the Project area are shown to be amenable to ISR extraction from Project site-specific bench-scale core leach testing results (ref., Roughstock, 2018). The uranium will be extracted from the sand bodies using injection and recovery wells designated specifically for the target sand horizons.

An economic analysis has been performed based on the current Project uranium production estimates using the production schedule in conjunction with the estimated recoverable resource of 14.268 million pounds[3] as discussed in Section 17. An overall recovery factor of 80% was used in the economic evaluation. Based on the estimated recovery, the potential economic performance of the Project is estimated to generate net earnings before federal income tax over the life of the project of $372.7 million (pre-U.S. federal income tax) and $324.4 million (Post-U.S. federal income tax). It is estimated that the project has an IRR of 55% and NPV of $171.3 (Pre-U.S. federal income tax) and an IRR of 50% and a NPV of $147.5 million (Post-U.S. federal income tax), applying an 8% discount rate as summarized in Table 25.1.

Table 25.1: Summary of Economics

Summary of Economics			
	Pre-U.S. Federal income tax at $55/lb	**Post-U.S. Federal income tax at $55/lb**	**Units**
Initial CAPEX	$31,672	$31,672	(US$000s)
Sustaining CAPEX	$157,682	$157,682	(US$000s)
Direct Cash OPEX	$10.46	$10.46	$/lb U_3O_8
U.S. Federal Income Tax	$0.00	$3.39	$/lb U_3O_8
Total Cost per Pound U_3O_8	$28.88	$32.27	$/lb U_3O_8
Estimated U_3O_8 Production[1]	14,268	14,268	Mlb U_3O_8
Net Earnings	$372,738	$324,352	(US$000s)
$IRR_{8\%}$	55%	50%	-
$NPV_{8\%}$	$171,251	$147,485	(US$000s)

This analysis also assumes a constant price of $55.00 per pound for U_3O_8 over the life of the Project. The calculated cost per pound of uranium produced is $28.88 including all

[1] Cautionary statement: This Preliminary Economic Assessment is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

costs, with an estimated direct cash operating costs of $10.46 per pound of U_3O_8 (Pre-U.S. federal income tax) and an estimated "all in cost" of approximately $32.27 (Post-U.S. federal income tax) per pound of U_3O_8.

25.1 Risk Assessment

The Project is located in a region where ISR projects have been and are operated successfully. The ISR mining method has been proven effective in geologic formations within Wyoming and Nebraska as described herein. Six Wyoming ISR facilities are currently in operation (Smith Ranch, North Butte, Willow Creek, Lost Creek, Ross and Nichols Ranch) and one operating facility in Nebraska (Crow Butte).

As with any pre-development mining property, there are risks and opportunity attached to the project that need further assessment as the project moves forward. The authors deem those risks, on the whole, as identifiable and manageable. The following sections describe the potential risks to development of the Project and attainment of the financial results presented in this PEA.

Because there will have been no well field scale pilot testing completed prior to construction of a full production facility, there is a risk that the total resource recovered, presently projected based on laboratory studies, may be overestimated. In addition, the current preliminary assessment includes 4% inferred resources. It is possible that future well field delineation drilling may not successfully upgrade all of the inferred resource to indicated or measured resources. Proceeding directly from a preliminary economic assessment to full production is a business decision and risk that Azarga is willing to accept based on prior ISR production history on similar deposits elsewhere in the U.S. The Authors concur with Azarga's approach to proceed from preliminary economic assessment to a scalable production decision. Although there is risk in investing the initial capital for production-scale well fields and a surface processing facility, the concept as described herein for initiating the Project with an IX plant and scaling to a full CPP helps to minimize that risk.

25.1.1 Uranium Recovery and Processing

It should be noted that recovery is based on both site specific laboratory recovery data as well as the experience of Azarga personnel and other industry experts at similar facilities. There can be no assurance that recovery at this level will continue to be achieved during production. This PEA is preliminary in nature and includes mineral resources which may not be recoverable at the rates indicated herein.

As discussed in Section 22.4.3, the financial indicators determined in this PEA are very sensitive to head grade and recovery. These factors are difficult to determine prior to initiation of an ISR project and can vary throughout the project life.

Bench-scale bottle roll and column tests have been performed on core samples from the Project. A potential risk to meeting the production and thus financial results presented in this PEA will be associated with the success of the well field operation and the efficiency of recovering uranium from the targeted host sands. A potential risk in the well field recovery process depends on whether geochemical conditions that affect solution mining uranium recovery rates from the mineralized zones are comparable or significantly different than previous bench-scale tests and experience at other operations. If they prove to be different, then potential efficiency or financial risks might arise.

The percent recovery results of several bottle roll leach amenability tests Azarga had performed by ELI are presented in Section 13. These indicate an average uranium dissolution of 85%; therefore, a recovery factor of 80% (as determined in earlier bench scale studies and used in this PEA) is potentially achievable given the following considerations:

- The pregnant lixiviant will consist of a mix of multiple well streams designed to have an average head grade of 60 ppm thus allowing for production to continue from individual wells long after the peak grade has been achieved (Figure 16.1). This targeted concentration will result in a higher depletion of the resources within the host sandstones leading to greater total recovery. The well field design package includes instrumentation and data collection equipment to optimize well field production by monitoring flow rates, injection pressure and formation pressure allowing control of hydraulic factors.
- As discussed in Section 13 laboratory dissolution results ranged from 71 to 97%, indicating the deposit is amenable to ISR mining methods. ISR PEAs for similar projects have predicted a range of recoverability from 67 to 80%. As indicated by these ranges of dissolution and recovery, it is possible to see lower recovery than estimated in this PEA.

During operation it is possible to manipulate head grades and production by varying flow rate. If head grade falls significantly below the target of 60 ppm, flow rates can be increased and/or additional wellfields brought into production to meet production goals. This will typically require additional equipment (CAPEX) and increased operating costs (power, chemicals, etc.).

Another potential risk is reduced hydraulic conductivity in the formation due to chemical precipitation or lower hydraulic conductivities than estimated, high flare and/or recovery of significant amounts of groundwater, the need for additional injection wells to increase uranium recovery rates, variability in the uranium concentration in the host sands and discontinuity of the mineralized zone confining layers. The risks associated with these potential issues have been minimized to the extent possible by extensive delineation and hydraulic studies of the site and the bench scale testing did not indicate the formation of precipitates that might impact hydraulic conductivity. In addition, well field-scale pumping tests will be performed prior to mining to confirm that there is adequate confinement to safely conduct ISR in each well field.

Process risk encompasses the risk associated with the process selection for recovering uranium, its proper implementation and attaining a final uranium product of acceptable quality. The facilities will be designed for average pregnant lixiviant flow rates and characteristics and their performance will vary with these criteria. Pregnant lixiviant properties, in particular solids and impurity contents, will also influence processing operations. Continual monitoring of pregnant lixiviant quality, tank bottoms chemistry and uranium product will be performed to optimize the process and provide for acceptable quality of the final product.

Capacity of wastewater disposal systems is another process risk. Limited capacity of deep disposal wells can affect the ability to achieve timely groundwater restoration. Azarga has included up to eight wells in the Class V UIC permit application to EPA. As well, Azarga is also permitting land application for the disposal of wastewater which was been permitted for other non-uranium mining operations in South Dakota. It is possible that a combination of both styles of wastewater disposal could be utilized to speed restoration and increase the economic viability of the project.

Another potential processing risk is the development of a cost beneficial agreement with an external source for processing loaded resin. This is considered a relatively low risk as there are operating facilities that are amenable to providing these services.

25.1.2 Transporting

Transportation of loaded resin or packaged yellowcake by Azarga could result in an accident and product spillage. If such an event were to occur, all spilled materials would be collected, and contaminated materials would be removed from the site and processed at a uranium processing mill as alternate feed, or disposed of at a licensed radiological waste facility as 11e.(2) byproduct material.

Risk of release during shipment cannot be eliminated, however; proper mitigation through implementation of shipping and spill response procedures can reduce the overall impact of such an event.

25.1.3 Delays in Permitting

The Dewey-Burdock project is the first uranium ISR facility to submit permit applications in the State of South Dakota. As such, there is inherent risk in a new permitting process, regulatory unfamiliarity with ISR methods, and an untested review period. The amount of time required for regulatory review of all permits associated with the commissioning of an ISR facility is highly variable and directly affects the economics of a project. The assumption presented in this PEA is that Azarga will have all permits necessary to begin construction of the facility commencing in 2021. The timeframe for obtaining the necessary licenses, permits, and approvals could be extended due to lack of required regulatory timelines and regulatory understaffing. Associated regulatory hearings such as those required for state approval can have logistical difficulties and have the potential to cause additional delays.

Permit/licensing of the additional resources determined in this report both within and outside of the current permit boundary are anticipated to be handled by administrative changes for both state and federal permits and licenses. Additional permits for expansion of the currently proposed aquifer exemption Class III UIC permit could be required but is expected to be facilitated by prior permit approval. These license and permit modifications would occur later in the project life such that sufficient time should be available within the project schedule to complete permitting ahead of construction and operation within these areas.

25.1.4 Social and/or Political

As with any uranium project in the USA, there will undoubtedly be some social/ political/ environmental opposition to development of the project. The Project has drawn attention from non-governmental organizations (NGOs) and individuals in the general public. This risk is being managed by Azarga through the State and Federal permitting processes. Extensive efforts by the regulatory agencies have proceeded to near completion to allow for considerable public involvement in the process. Opposition to the project has increased the regulatory efforts required and increased the logistical requirements of the permitting process. However, these efforts appear to be on the way to successful completion as evidenced by the project receiving a NRC license in April 2014 as well as recommendations for approval by the state of South Dakota of applications for water rights, large scale mine permit, and groundwater discharge plan. Also, recent completion of the proceedings with the ASLB and issuance of draft Class V and III UIC permits by EPA show additional progress. Though significant major approvals remain, it is the Authors opinion that additional significant delays are unlikely.

25.1.5 Market and Contract

Unlike other commodities, most uranium does not trade on an open market. Contracts are negotiated privately by buyers and sellers. Changes in the price of uranium can have a significant impact on the economic performance of the Project. As discussed in Section 22, a $1.00 change in the price of uranium can have an impact to the pre-U.S. federal income tax NPV of approximately $7.23 million and $5.59 million to the post-U.S. federal income tax NPV, based on a discount rate of 8%, (See Figure 22.1). This analysis assumes a constant price per pound of $55 for U_3O_8 over the life of the Project. The Authors believe that these estimates are appropriate for use in this evaluation. At the time of writing this PEA, Azarga has no long-term pricing contracts in place.

The marketability of uranium is subject to numerous factors beyond the control of Azarga. The price of uranium may experience volatile and significant price movements over short periods of time. Factors known to affect the market and the price of uranium include demand for nuclear power; political and economic conditions in uranium mining, producing and consuming countries; capital and operating costs; interest rates, inflation and currency exchange fluctuations; governmental regulations; availability of financing of new mines and nuclear power plants, reprocessing of spent fuel and the re-enrichment of depleted uranium tails or waste; sales of excess civilian and military inventories (including from the dismantling of nuclear weapons) by governments and industry participants; production levels and costs of production in certain geographical areas such as Kazakhstan, Russia, Africa and Australia; and changes in public acceptance of nuclear power generation as a result of any future accidents or terrorism at nuclear facilities.

Regardless of these potential issues and as discussed in Section 19, there are more nuclear power plants being designed and constructed and a supply deficit to demand is likely to warrant additional uranium mining.

26.0 RECOMMENDATIONS

Azarga's plan is to permit for operations, and upon permit approval, initiate construction and production in the first operational well field. The CPP will be constructed in phases over the course of four years. In year one, the first phase of the CPP will be built at the Burdock site and will include the resin transfer system and ion exchange (IX) systems. Pregnant lixiviant from the well field will be processed through the IX columns and the resulting loaded resin will be shipped to the nearest processing plant where the uranium can be extracted. IX Trains will be subsequently added to the plant each year for the next two years to allow for a ramped production schedule. In Year 3, the Burdock facility will be expanded into a full CPP (operational in Year 4) which will include all processing equipment necessary to produce and package yellowcake. The satellite facility at Dewey will be constructed in Year 7 and become operational in Q4 of Year 7 in the mine plan.

The Authors find that the development of the Project is potentially viable based on the assumptions contained herein. There is no certainty that the mineral recovery or the economics presented in this PEA will be realized. In order to realize the potential benefits described in this PEA, the following activities are required, at a minimum.

- Complete all activities required to obtain all necessary licenses and permits required to operate an in-situ uranium mine in the State of South Dakota. Approximate cost $400,000.
- Obtain agreement with a remote processing facility to process loaded resin prior to completion of the Project CPP. Minimal cost.
- Complete additional metallurgical testing to further verify and confirm the headgrade and overall resource recovery used in this analysis prior to advancing the Project. Approximate cost $250,000.
- Additional Permit / License amendments and approvals necessary to realize all resources included in this PEA. Approximate potential cost up to $500,000.
- Cost benefit analysis to determine best available process to handle vanadium should levels be significant. Approximate cost $75,000.
- Finalize facility and well field engineering designs, including construction drawings and specifications. Approximate cost $950,000.
- Identify procurement process for long lead items and perform cost benefit analysis for any alternative equipment or materials. Cost included in design phase above.

Cautionary statement: This Preliminary Economic Assessment is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

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28.0 DATE, SIGNATURE AND CERTIFICATION

This NI 43-101 technical report entitled "Preliminary Economic Assessment, Dewey-Burdock Uranium ISR Project, South Dakota, USA (Amended and Restated)" has been prepared and signed by the following authors.

Dated this 23rd day of December.

(signed) "*MATTHEW YOVICH*"
Matthew Yovich, P.E.

(signed) "*STEVE E. CUTLER*"
Steve E. Cutler, P.G.

CERTIFICATE OF QUALIFIED PERSON

I, Matthew Yovich, P.E., of 1800 West Koch, Bozeman, Montana, USA, do hereby certify that:

- I have been retained by Azarga Uranium Corp, to manage, coordinate, develop and write certain sections of the documentation for the Amended and Restated Dewey Burdock Property, Preliminary Economic Assessment of the Dewey-Burdock Uranium ISR Project, South Dakota, USA, with the effective date of December 3, 2019 (the "Technical Report").
- I am a Senior Consultant for Woodard & Curran, 1800 West Koch, Bozeman, Montana, USA.
- I graduated with a Bachelors Degree in Civil Engineering from the University of Wyoming.
- I am a Professional Engineer in the State of Montana.
- I have worked as a consulting Engineer for 30 years. My experience has encompassed infrastructure design, mine construction oversight, cost estimating and control, economic analyses, feasibility studies, property acquisition evaluation, design, construction management and mine closure/reclamation for numerous metal mining operations, conventional and ISR uranium facilities. I have provided engineering management support, engineering quality review and engineering analyses for the design and/or construction of five uranium ISR central processing facilities (three are in operation), two uranium ISR satellite plants and numerous technical and financial evaluations for other uranium processing facilities in Wyoming and New Mexico. I have also been responsible for numerous metal and uranium mine decommissioning and reclamation projects over the past 25 years. Some of the mining properties I have been involved with include:

  Lost Creek Uranium
  Moore Ranch Uranium
  Nichols Ranch Uranium
  Ludeman Uranium
  Ross Creek Uranium
  Bagdad Copper
  Willow Creek Uranium
  Church Rock Uranium
  Jackpile Uranium

- I have read the definition of "qualified person" set out in National Instrument (NI) 43-101 and certify by reason of my education, professional registration and relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
- I discussed with Mr. Steve Cutler his site visit of the Dewey Burdock project site on August 6, 2019 and was able to ascertain current conditions at the site had not changed.
- I have read the NI 43-101 and the Technical Report which has been prepared in accordance with the guidelines set forth in NI 43-101 and Form 43-101F1.
- I am responsible for the coordination, compilation and preparation of the Technical Report for Sections 16 through 24, portions of Sections 1 through 6, portions of Sections 25 through 27. I coordinated and assisted in the development of the various

cost estimates, summaries, analyses, risk evaluation and recommendations.

- I have no prior involvement with the Dewey Burdock Project.
- To the best of my knowledge, information and belief, as of December 3, 2019, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
- I am independent of the issuer applying all of the tests of NI 43-101.
- I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Dated this 23rd day of December 2020.

Signed: "*MATTHEW YOVICH*"

Matthew Yovich, P.E.

Professional Engineer Montana PE, No. 12327PE

CERTIFICATE OF QUALIFIED PERSON

I, Steven E. Cutler. P.G., of 250 Blue Sky Trail, Bozeman, Montana 59718 do hereby certify that:

- I have been retained by Azarga Uranium Corp., to manage, coordinate, develop and write certain sections of the documentation for the Dewey Burdock Property, Preliminary Economic Assessment of the Dewey-Burdock Uranium ISR Project, South Dakota, USA, dated December 3, 2019 (the "**Technical Report**").
- I am a Consulting Geologist, affiliated with Roughstock Mining Services, LLC at 250 Blue Sky Trail, Bozeman, Montana 59718, USA. I am Professional Geologist, AIPG #11103, in good standing.
- I was awarded a B.S. in Geology from Montana State University, Bozeman, Montana in 1984, and an M.S. Degree in Economic Geology from the University of Alaska-Fairbanks, Fairbanks, Alaska in 1992.
- Since 1984 I have practiced continuously as a Geologist, Supervisor, Chief Mine Engineer, Technical Services Manager, and Consultant for mining firms, and other mining consulting firms. My previous experience encompassed a wide variety of mining and metals types, resource and reserve estimation evaluations, mining planning, equipment selection, and cost analyses. I am the author of several publications on subjects relating to the mining industry.
- Continuously since 1984 Mr. Cutler has worked as a exploration and production geologist for mining companies and Roughstock Mining Services, including overall exploration manager for a number of projects and mines for surface reverse circulation and core drilling, and underground core and percussive drilling for variety of minerals. Since 2013, Mr. Cutler has been involved with resource modeling and auditing of ISR Uranium projects and mines in Wyoming and South Dakota and was the geology/resource QP for the following reports in addition the report in question.

    - Preliminary Assessment of Lost Creek Property, Sweetwater County, Wyoming, December 30, 2013 with TREC Engineering.
    - Technical Report for the Lost Creek Property, Sweetwater County, Wyoming, June 17, 2015 with TREC Engineering.

- I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association, and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
- I am responsible for the preparation of all of sections 7 through 15, portions of Sections 1 through 6 and portions of section 25 through 27 of the Technical Report.
- I visited the Dewey-Burdock Property on July 24, 2014 and August 6th, 2019 and was there for approximately eight hours each time.
- As defined in Section 1.5 of National Instrument 43-101, I am independent of the issuer, Azarga Uranium.
- I have not been involved with previous economic analyses or permitting activities for the subject property.

- My involvement at the Dewey-Burdock Project has been with geology and resource modeling of the ISR Uranium resources as part of this technical report. Previous involvement includes the same role and as Qualified Person for two prior 43-101 reports in 2015 and 2018 for the Dewey-Burdock project.
- To the best of my knowledge, information and belief, at December 3rd, 2019, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
- I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that Instrument and Form.

Dated this 23rd day of December 2020.

Signed: "*STEVE E. CUTLER*"

Steve E. Cutler, P.G.