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Statute	Information Required	Permit Application Reference
SDCL 45-6B-7 (4)	Preliminary wildlife study	Section 3.9 and Appendix 3.9-A
SDCL 45-6B-7 (5)	Characteristics of affected land of historic, archaeological, geologic, scientific, or recreation significance	Sections 2.3 and 3.11
SDCL 45-6B-7 (6)	Description of implementation plan of Reclamation Plan to meet requirement of SDCL 45-6B-37 to SDCL 45-6B-46	Section 6
SDCL 45-6B-7 (7)	Description of how the Reclamation Plan will rehabilitate the affected land	Section 6.4
SDCL 45-6B-7 (8)(a) and (b)	Map of all the proposed affected land	Plates 5.3-1 and 5.3-2
SDCL 45-6B-7 (9)(a) through (mm)	Baseline water quality and level of aquifers	Section 3.4
SDCL 45-6B-7 (10)	Location of proposed reservoirs, tailings ponds, tailings disposal sites, dams, dikes, and diversion canals	Figure 5.3-1 and 5.3-2; Plates 5.3-1 and 5.3-2
SDCL 45-6B-7 (11)	Provisions for stripping, storage and replacement of overburden and topsoil	Sections 5.3.7 and 6.4.3
SDCL 45-6B-7 (12)	Estimated cost of implementing and completing the proposed reclamation	Section 6.7 and Appendix 6.7-A
SDCL 45-6B-8	Identification of previously mined land	Section 3.2.5.2 and Figure 3.2-8
SDCL 45-6B-9	Previously mined land reclamation for underground mining	Section 3.2.5.2 and Figure 3.2-8
SDCL 45-6B-10 (1)	Identify the area corresponding with application	Figure 2.0-1
SDCL 45-6B-10 (2)	Show adjoining surface owners of record	Plate 2.2-2
SDCL 45-6B-10 (3)	Map scale not more than 1:25,000	Noted
SDCL 45-6B-10 (4)	Show water wells, creeks, roads, buildings, pipelines, power and communication lines on and within 200 feet of all boundaries of affected land	Figures 3.1-1 and 3.2-6; Plates 3.4-1, 3.5-1, 5.3-1 and 5.3-2; Appendix 3.5-A
SDCL 45-6B-10 (5)	Show total area involved in operation	Plates 5.3-1 and 5.3-2
SDCL 45-6B-10 (6)	Indicate on map or by statement the general type, thickness, and distribution of soil	Section 3.3, Appendix 3.3-A and Plate 3.3-1
SDCL 45-6B-11	Approval of Reclamation Plan by other agencies.	Noted
SDCL 45-6B-12	Consultation with surface owner.	Appendix 6.4-A
SDCL 45-6B-13	Hearing and order for instrument of consultation not obtained.	Noted
SDCL 45-6B-14	Application fee	Application fee of $50,000 is provided under separate cover

Table 1.1-1: South Dakota Codified Law (Continued)

Statute	Information Required	Permit Application Reference
SDCL 45-6B-15	Copy of application filed with DENR and Fall River and Custer County Register of Deeds.	Appendix 1.0-A (DENR copy); application to be filed concurrently with Fall River and Custer County Register of Deeds
SDCL 45-6B-16	Publication of notice of application.	Notice will be published
SDCL 45-6B-17	Mailing of notice of application to owners.	Mailings will be conducted
SDCL 45-6B-18	Fees for permit amendments.	Noted
SDCL 45-6B-19	Protection of confidential information.	Noted
SDCL 45-6B-20	Site inspection prior to permit issuance.	Noted
SDCL 45-6B-20.1	Additional proof of financial assurance.	Powertech (USA) understands that the financial assurance will be set after a site inspection.
SDCL 45-6B-20.2	Time for filing under 45-6B-20.1.	Powertech (USA) understands that additional financial assurance may be required due to the use of chemicals in the extraction process.
SDCL 45-6B-21	Surety amount and duration determination criteria.	Noted
SDCL 45-6B-22	Surety bond	Noted
SDCL 45-6B-23	Cash or securities in lieu of surety.	Noted
SDCL 45-6B-24	Surety payable to state.	Noted
SDCL 45-6B-25	Surety liability.	Noted
SDCL 45-6B-26	Amount of surety penalty.	Noted
SDCL 45-6B-27	Increase or reduction in surety penalty.	Noted
SDCL 45-6B-28	Objections or support of application.	Noted
SDCL 45-6B-29	County request for hearing.	Noted
SDCL 45-6B-30	Hearing on application.	Noted
SDCL 45-6B-31	Modification of application prior to hearing.	Noted
SDCL 45-6B-32 (1)	Application incomplete or surety not posted.	Noted
SDCL 45-6B-32 (2)	Applicant has not paid required fee.	Application fee of $50,000 is provided under separate cover.
SDCL 45-6B-32 (3)	Any part of the proposed mining operation, reclamation program or proposed future use is contrary to the laws or regulations of this state or the United States.	The proposed ISR operations will be carried out under all applicable state and federal laws.
SDCL 45-6B-32 (4)	The mining operation will not adversely affect the stability of any significant, valuable, and permanent man-made structures located within 200 feet of the affected land, except where there is an agreement between the operator and the persons having an interest in the structure that damage to the structure is to be compensated by the operator.	Section 5.6.15

Table 1.1-1: South Dakota Codified Law (Continued)

Statute	Information Required	Permit Application Reference
SDCL 45-6B-32 (5)	The mining operation would be in violation of any county zoning or subdivision regulations.	Section 2.1; Appendix 2.1-A
SDCL 45-6B-32 (6)	The proposed mining operation and reclamation plan cannot be carried out in conformance with § 45-6B-35.	See permit application references for SDCL 45-6B-35
SDCL 45-6B-32 (7)	The operator is currently found to be in violation of the provisions of this chapter with respect to any mining operation in this state.	Powertech (USA) has submitted an affidavit certifying that Powertech (USA) is not in violation of the provisions of 45-6B.
SDCL 45-6B-32 (8)	The land is unsuitable for a mining operation, as determined pursuant to § 45-6B-33.	See permit application references for SDCL 45-6B-33
SDCL 45-6B-33 (1)	Unsuitable land – No permit issued if reclamation is not physically or economically feasible.	Section 6; Appendix 4.0-A
SDCL 45-6B-33 (2)	Unsuitable land – No permit issued if sediment deposition cannot be prevented.	Section 5.3.9
SDCL 45-6B-33 (3)	Unsuitable land – No permit issued if includes special, exceptional, critical, or unique lands.	Section 2.3; Appendix 2.3-A
SDCL 45-6B-33 (4)	Unsuitable land – No permit issued if loss or reduction of aquifer production, public or domestic water wells, watershed, aquifer recharge areas or significant agricultural areas.	Sections 5.6 and 3.3.3
SDCL 45-6B-33 (5)	Unsuitable land – No permit issued if jeopardize threatened or endangered species.	Sections 3.7.3 3.9.3, 3.10.3, 5.6.11.1.11 and 5.6.11.2
SDCL 45-6B-33 (6)	Unsuitable land – No permit issued if adverse socioeconomic impacts.	Appendix 4.0-A
SDCL 45-6B-33.1 (1) through (6)	Socioeconomic impact study.	Appendix 4.0-A
SDCL 45-6B-33.2	Permit application for small-scale mining.	Not applicable
SDCL 45-6B-33.3	Special, exceptional, critical, or unique land.	Section 2.3 and Appendix 2.3-A
SDCL 45-6B-33.4	List of special, exception, critical or unique lands.	Section 2.3 and Appendix 2.3-A
SDCL 45-6B-33.5(1) through (3)	Alternative restrictions on special, exceptional, critical, or unique land.	The board determined the lands described do not constitute special, exceptional, critical, or unique lands (Section 2.3).
SDCL 45-6B-33.6	Determination of classification for special, exceptional, critical, or unique lands.	The board determined the lands described do not constitute special, exceptional, critical, or unique lands (Section 2.3).
SDCL 45-6B-33.7	Appeal of special, exceptional, critical, or unique lands determination.	Noted
SDCL 45-6B-33.8	Underground mining beneath special, exceptional, critical, or unique lands.	Noted
SDCL 45-6B-34	Notice to county commissioners.	Noted

Table 1.1-1: South Dakota Codified Law (Continued)

Statute	Information Required	Permit Application Reference
SDCL 45-6B-35	Applicable laws for mining operations.	See permit application references for SDCL 45-6B-36 through 46
SDCL 45-6B-36	Annual filing of map and fee.	Powertech (USA) understands that an annual filing map and $50,000 fee will be due within 60 days prior to the anniversary date of the permit.
SDCL 45-6B-37	Grading final topography appropriate to final land use.	Sections 6.4.1 and 6.4.3.1; Plate 6.4-1
SDCL 45-6B-38	Disposal of refuse.	Section 5.4
SDCL 45-6B-39	Revegetation	Sections 6.4.2 and 6.4.3; Appendices 6.4-A, 6.4-B and 6.4-D
SDCL 45-6B-40	Overburden removal and topsoil storage and protection.	Section 5.3.7
SDCL 45-6B-41	Minimize disturbance to prevailing hydrologic balance.	Sections 5.3.9, 5.6.3, 5.6.3.1.4 and 5.6.4
SDCL 45-6B-42	Protection of areas outside of affected land.	Provisions specific to highwalls are not applicable since the ISR operation will not have high walls. Subsidence is addressed in Section 5.6.3.1.5.
SDCL 45-6B-43	Stabilization of affected land, control erosion, noxious weeds, air pollution, and water pollution.	Sections 5.3.7, 5.3.9 and 6.4.3; Appendix 6.4-C
SDCL 45-6B-44	Reclamation Plan developed by the operator, department, and landowner.	Section 6.4.1; Appendix 6.4-A; a copy of the reclamation plan has been provided to all adjacent surface owners
SDCL 45-6B-45	Choices of reclamation.	Sections 6.4.1 and 6.4.3.4; Appendix 6.4-A; pre-submission meeting held on May 10, 2012
SDCL 45-6B-46	Time for completion of reclamation and plantings not required under certain conditions.	Sections 6.4 and 6.5
SDCL 45-6B-47	Transfer of permit.	Noted
SDCL 45-6B-48	Notice to operator of violation.	Noted
SDCL 45-6B-49	Cease and desist order for violation.	Noted
SDCL 45-6B-50	Violation hearing.	Noted
SDCL 45-6B-51	Modification, suspension, or revocation of permit due to violation.	Noted
SDCL 45-6B-52	Action for temporary restraining order or injunction due to violation.	Noted
SDCL 45-6B-53	Special permit laws applicable for small-scale operations.	Not applicable
SDCL 45-6B-54	Application for permit for small-scale operations.	Not applicable
SDCL 45-6B-55	Surety for small-scale operation.	Not applicable
SDCL 45-6B-56	Annual notice of intent to continue for small-scale operation.	Not applicable
SDCL 45-6B-57	Notice of completion of reclamation for small-scale operation.	Not applicable
SDCL 45-6B-58	Permit application for new small-scale operation.	Not applicable
SDCL 45-6B-59	Laws applicable to procession and action on applications.	Not applicable

Table 1.1-2: Administrative Rules of South Dakota

Regulation	Information Required	Permit Application Reference
ARSD 74:29:01:01	Definitions	Reviewed
ARSD 74:29:01:02	Computation of time	Noted
ARSD 74:29:01:03	Presubmission meetings	Noted
ARSD 74:29:01:04	Proof of submission of application to Register of Deeds, DENR, SDGF&P, Department of Agriculture, Department of Education and Cultural Affairs, BLM, and Department of Health.	To be provided separately
ARSD 74:29:01:05	Interested persons mailing list.	Noted
ARSD 74:29:01:06	Request for a copy of mining permit application.	Noted
ARSD 74:29:01:07	Determination of procedural completeness.	Noted
ARSD 74:29:01:08	Notice of filing	Noted
ARSD 74:29:01:09	Intervention in application proceeding.	Noted
ARSD 74:29:01:10	Summary document	Noted
ARSD 74:29:01:11	Information added after filing.	Noted
ARSD 74:29:01:12	Notice to agencies of filing.	Noted
ARSD 74:29:01:13	Hearing date	Noted
ARSD 74:29:01:14	Notice of hearing	Noted
ARSD 74:29:01:15	Department recommendation	Noted
ARSD 74:29:01:16	Permit changes	Noted
ARSD 74:29:01:17	Permit area boundaries.	Figure 2.0-1
ARSD 74:29:01:17 (1)	County Conditional Use Permit (CUP) area boundary.	Section 2.1; Appendix 2.1-A
ARSD 74:29:01:17 (2)	Legal right to mine.	Section 2.2
ARSD 74:29:01:17 (3)	Location of permit boundary in relation to scenic and unique land.	Section 2.3
ARSD 74:29:01:17 (4)	Ratio of proposed permit area to affected land.	Based on an affected area of 2,528 to 3,792 acres (without or with land application) and a permit area of 10,580 acres, the ratio is 0.24 to 0.36.
ARSD 74:29:01:18	Contested and uncontested recommendations and notice of decision.	Noted
ARSD 74:29:01:19	Report following issuance of uncontested permit.	Noted
ARSD 74:29:02:01	Procedural completeness requirements.	Section 1.1
ARSD 74:29:02:02	Local zoning requirements.	Section 2.1; Appendix 2.1-A
ARSD 74:29:02:03	Surface and mineral owners.	Section 2.2; Plates 2.2-1 and 2.2-2; Appendix 2.2-A
ARSD 74:29:02:04 (1)	Mining and milling methods.	Section 5 (Mine Plan)

Table 1.1-2: Administrative Rules of South Dakota (Continued)

Regulation	Information Required	Permit Application Reference
ARSD 74:29:02:04 (2)	Description and maps of premining and postmining contours.	Sections 3.5.2.1, 5.3, 6.4.1 and 6.4.3.1; Plate 6.4-1
ARSD 74:29:02:04 (3)	Description of proposed depth and direction of mining and representative cross sections.	Sections 5.3.3.1.1 and 5.3.3.2.2; Plates 5.3-15 and 5.3-16
ARSD 74:29:02:04 (4)	Map of proposed waste facilities.	Figures 5.3-1 and 5.3-2; Plates 5.3-1 and 5.3-2
ARSD 74:29:02:04 (5)	Stability analysis for all critical earth structures.	Appendix 5.3-A
ARSD 74:29:02:04 (6)	A description of proposed blast procedures.	Not applicable since blasting will not be conducted.
ARSD 74:29:02:05	Timetable with narrative description of existing plans for future exploration and mining in the area of the proposed operation.	Sections 5.1, 5.2 and 6.5; Figure 6.5-1
ARSD 74:29:02:06	Historic or archaeological significance.	Section 3.11; Appendices 3.11-A and 3.11-B
ARSD 74:29:02:07	Water quality and water level data.	Sections 3.4 and 3.5; Figures 3.4-18 through 3.4-21
ARSD 74:29:02:08	Reclamation costs	Section 6.7; Appendix 6.7-A
ARSD 74:29:02:09	Permit area boundary - map requirements.	Figure 2.0-1
ARSD 74:29:02:10	Revegetation	Sections 6.4.2 and 6.4.3; Appendices 6.4-A, 6.4-B and 6.4-D
ARSD 74:29:02:11	Effect of hydrologic balance on surface and groundwater.	Section 5.3.9 and 5.6.3.1.4
ARSD 74:29:02:11 (1)	Baseline geology, surface, and groundwater reports.	Sections 3.2, 3.4 and 3.5
ARSD 74:29:02:11 (2)	Representative geologic cross sections.	Plates 3.2-12 through 3.2-22
ARSD 74:29:02:11 (3)	Surface water inventory map.	Plate 5.5-1; Figures 3.5-1 and 3.5-8 through 3.5-12; Appendix 3.5-A
ARSD 74:29:02:11 (4)	Well location inventory map.	Figures 3.2-7 and 3.4-17; Plate 3.4-1
ARSD 74:29:02:11 (5)	Potentiometric surface map.	Figures 3.4-2 through 3.4-5
ARSD 74:29:02:11 (6)	Geochemical characterization of ore and waste rock.	Section 3.2.4
ARSD 74:29:02:11 (7)	Surface and groundwater monitoring plan for life of mine.	Sections 5.5.2 and 5.5.3
ARSD 74:29:02:11 (8)	Meteorological monitoring plan.	Section 5.5.10
ARSD 74:29:02:11 (9)	Drainage, erosion, and sedimentation control plan.	Section 5.3.9; Plates 5.3-6 through 5.3-12
ARSD 74:29:02:11 (10)	Chemicals in the milling process, leak mitigation, and a spill contingency plan.	Sections 5.3.1, 5.3.5 and 5.6.5
ARSD 74:29:02:11 (11)	Estimate of project water requirements.	Section 5.3.3.5.3 and 5.6.3.1.1

Table 1.1-2: Administrative Rules of South Dakota (Continued)

Regulation	Information Required	Permit Application Reference
ARSD 74:29:02:11 (12)	Chemical characteristics of process solutions.	Sections 5.1 and 5.3
ARSD 74:29:02:11 (13)	Pollution control facilities.	Appendix 5.3-B
ARSD 74:29:02:12 (1)	Maps must show the name of the applicant.	The figures and plates indicate that Powertech (USA) Inc. is the applicant.
ARSD 74:29:02:12 (2)	Maps must be prepared and signed by a person qualified in the preparation of maps.	The figures and plate include a signature of the preparer.
ARSD 74:29:02:12 (3)	Maps must give the date prepared.	The figures and plates list the date the map was prepared.
ARSD 74:29:02:12 (4)	Maps must identify the requirement the map is intended to fulfill.	The figures and plates include ARSD or SDCL references.
ARSD 74:29:02:12 (5)	Maps must include a legend indicating the items shown on the particular map.	The figures and plates include legends.
ARSD 74:29:02:12 (6)	Maps must clearly indicate township, range, and section boundaries.	The figures and plates indicate township, range and section boundaries where applicable.
ARSD 74:29:02:12 (7)	Maps must identify scale.	The figures and plates include scale bars or labeled scales except for schematic drawings.
ARSD 74:29:03	Permit amendments	Section 1.0; Appendix 1.0-B
ARSD 74:29:04	Permit transfers	Noted
ARSD 74:29:05:01	Reclamation of millsites.	Section 6.3
ARSD 74:29:05:02	Choice of reclamation.	Section 6.4; Appendix 6.4-A
ARSD 74:29:05:03	Process pond reclamation.	Section 6.3.1.4
ARSD 74:29:05:04	Removal of equipment and buildings.	Section 6.3.1.3
ARSD 74:29:05:05	Reclamation of tailings impoundments.	Not applicable since the ISR facility will not have tailings.
ARSD 74:29:05:06	Treatment of tailings -- Initial sampling and chemical characterization.	Not applicable since the ISR facility will not have tailings.
ARSD 74:29:05:07	Treatment of tailings -- Monitoring during treatment process.	Not applicable since the ISR facility will not have tailings.
ARSD 74:29:05:08	Treatment of tailings.	Not applicable since the ISR facility will not have tailings.
ARSD 74:29:05:09	Retreatment of tailings.	Not applicable since the ISR facility will not have tailings.
ARSD 74:29:05:10	Treatment of tailings -- Final sampling program.	Not applicable since the ISR facility will not have tailings.
ARSD 74:29:05:11	Treatment and disposal of tailings from on/off load pads.	Not applicable since the ISR facility will not have tailings.
ARSD 74:29:05:12	Reclamation of tailings which cannot meet treatment standards.	Not applicable since the ISR facility will not have tailings.

Table 1.1-2: Administrative Rules of South Dakota (Continued)

Regulation	Information Required	Permit Application Reference
ARSD 74:29:05:13	Uranium tailings	Not applicable since the ISR facility will not have tailings.
ARSD 74:29:05:14 (1)	Land application of solution – plans and specifications prior to installation or construction.	The GDP application contains preliminary plans. As-constructed plans and specifications will be provided prior to operation (GDP Section 5.0)
ARSD 74:29:05:14 (2)	Land application of solution – chemical characterization of the solution.	Sections 5.4.1.1.4.1 and 5.7.2.6
ARSD 74:29:05:14 (3)	Land application of solution – compliance with § 74:29:05:08	Powertech (USA) anticipates that the GDP will include effluent limits that incorporate South Dakota groundwater standards and consider ambient water quality.
ARSD 74:29:05:14 (4)	Land application of solution – hydraulic loading rates	GDP Section 8.2
ARSD 74:29:05:14 (5)	Land application of solution – minimize erosion and disturbance of vegetation	GDP Sections 8.2 and 8.4
ARSD 74:29:05:15	Land application of solution – Sampling requirements.	Section 5.5.4; 5.5.6.1; 5.5.7.1
ARSD 74:29:05:16 (1)	Land application site evaluation – vegetation and wildlife.	Sections 5.4.1.1.2 and 5.5.6.2; GDP Section 6.5
ARSD 74:29:05:16 (2)	Land application site evaluation – geology.	Section 5.6.4.1.1,2; GDP Sections 3.6 and 8.1
ARSD 74:29:05:16 (3)	Land application site evaluation – groundwater and surface water.	Sections 5.6.4.1.1.2, 5.6.3 and 5.6.4
ARSD 74:29:05:16 (4)	Land application site evaluation – soils and depth to bedrock.	Section 5.4.1.1.2; GDP Sections 3.2 and 3.6
ARSD 74:29:05:16 (5)	Land application site evaluation – slopes.	Section 5.4.1.1.2
ARSD 74:29:05:16 (6)	Land application site evaluation – erodibility.	Section 5.4.1.1.2
ARSD 74:29:05:16 (7)	Land application site evaluation – distance to flowing streams.	Section 5.4.1.1.2
ARSD 74:29:05:16 (8)	Land application site evaluation – adjacent land use.	Section 5.4.1.1.2
ARSD 74:29:05:16 (9)	Land application site evaluation – weather monitoring.	Sections 5.4.1.1.2 and 5.5.10
ARSD 74:29:05:17 (1)	Land application of solution – Plan for operational monitoring – Methods for soil and soil water monitoring and sampling.	Section 5.5.6.1; GDP Sections 6.1.3 and 6.4
ARSD 74:29:05:17 (2)	Land application of solution – Plan for operational monitoring – Vegetation.	Section 5.5.7.1; GDP Section 6.5
ARSD 74:29:05:17 (3)	Land application of solution – Plan for operational monitoring – Soil characteristics and parameters.	Section 5.5.6.1; GDP Sections 6.4 and 8.3
ARSD 74:29:05:17 (4)	Land application of solution – Plan for operational monitoring – Analytical techniques.	Section 5.5.4.1; GDP Section 6
ARSD 74:29:05:17 (5)	Land application of solution – Plan for operational monitoring – Sampling frequency.	Section 5.5.4.1; GDP Section 6

Table 1.1-2: Administrative Rules of South Dakota (Continued)

Regulation	Information Required	Permit Application Reference
ARSD 74:29:05:17 (6)	Land application of solution – Plan for operational monitoring – Criteria for determining if and when land application should be initiated or discontinued.	GDP Sections 8.1.1 (based on alluvial monitoring results), 8.4 (based on soil sampling results), and 8.5 (based on vegetation sampling results)
ARSD 74:29:05:17 (7)	Land application of solution – Plan for operational monitoring – Surface and groundwater.	GDP Sections 6.1 and 6.2
ARSD 74:29:05:17 (8)	Land application of solution – Plan for operational monitoring – Maximum allowable metals accumulation values.	GDP Sections 8.3 and 8.4
ARSD 74:29:05:17 (9)	Land application of solution – Plan for operational monitoring – Sampling and analytical quality assurance and quality control plan.	Section 6.3.4.4
ARSD 74:29:05:18	Land application of solution –Notice of intent to implement.	Section 5.7.2.6
ARSD 74:29:05:19	Land application of solution –Revegetation of site -- Inspection.	Section 6.4.4
ARSD 74:29:05:20	Land application of solution – Written report.	Section 5.7.2.6
ARSD 74:29:06:01	Presubmission conference for postmine land use.	Section 6.4.1; Appendix 6.4-A; presubmission conference was held May 10, 2012
ARSD 74:29:06:02 (1)	Demonstrate that the affected land has the capability of meeting reclamation criteria.	Section 6.4.1; Appendix 6.4-A
ARSD 74:29:06:02 (2)	Demonstrate that the postmining land use is compatible with surrounding land uses.	Section 6.4.1
ARSD 74:29:06:02 (3)	Support and maintenance activities required for successful implementation.	Sections 6.4.2, 6.4.3 and 6.6
ARSD 74:29:06:02 (4)	Assurance that the proposed postmining land use meets the following requirements: (a) Is obtainable according to data on expected market and need. (b) Is supported by commitments from public agencies where appropriate. (c) Is practicable on the basis of private financial capability for completion of the proposed operations. (d) Is planned pursuant to a schedule attached to the reclamation plan that integrates the mining operations and reclamation with the postmining land use. (e) Is consistent with existing state and local land use plans and programs. Is of a beneficial use.	Section 6.4.1
ARSD 74:29:06:03	Economic study for future mineral exploration.	Noted

Table 1.1-2: Administrative Rules of South Dakota (Continued)

Regulation	Information Required	Permit Application Reference
ARSD 74:29:06:04	Alternative postmining land use.	Noted
ARSD 74:29:06:05	Approval for future mineral exploration.	Noted
ARSD 74:29:06:06	Confidential information.	Noted
ARSD 74:29:07:01	General requirements for all reclamation types.	Section 6.4
ARSD 74:29:07:02	Minimizing of adverse impacts.	Section 5.6
ARSD 74:29:07:02 (1)	Design of facilities to minimize surface disturbance.	Sections 5.3, 5.6.2.2 and 5.6.14.2
ARSD 74:29:07:02 (2)	Clearing of land in small sections.	Sections 5.3.3 and 5.3.7
ARSD 74:29:07:02 (3)	Visual screening	Section 5.6.14
ARSD 74:29:07:02 (4)	Minimize impacts to surface and groundwater.	Sections 5.3.3, 5.3.9, 5.6.3, 5.6.4 and 6.2
ARSD 74:29:07:02 (5)	Control of access.	Section 5.7.6
ARSD 74:29:07:02 (6)	Preventative measures to minimize harmful impacts to wildlife.	Sections 5.6.11.1.2 and 5.6.11.2
ARSD 74:29:07:02 (7)	Location of waste facilities, spoil piles, and topsoil stockpiles to facilitate implementation of reclamation and to minimize environmental impacts.	Section 5.3
ARSD 74:29:07:02 (8)	Minimizing the production of mine waste and spoil.	Section 5.4.3
ARSD 74:29:07:02 (9)	Design and location of facilities so they are compatible with surrounding land uses (i.e. waste facility and haul road).	Section 5.3
ARSD 74:29:07:02 (10)	Integration of mine operations planning with the Reclamation Plan.	Sections 5.3 and 6.4
ARSD 74:29:07:03	Grading and Backfilling - Necessity	Section 6.4.3.1
ARSD 74:29:07:04 (1)	Reclaimed slopes must be visually and functionally compatible with surrounding area, suitable for the postmining land use, structurally stable, and not exceed the angle of repose for fill slopes or other slopes composed of unconsolidated material.	Section 6.4.3.1; Plate 6.4-1
ARSD 74:29:07:04 (2)	Erosion and sedimentation control during final grading.	Section 5.3.9
ARSD 74:29:07:04 (3)	Grading and backfilling timetable.	Sections 6.4.3.1 and 6.5; Figures 5.2-1 and 6.5-1
ARSD 74:29:07:04 (4)	Depressions not allowed.	Section 6.4.3.1
ARSD 74:29:07:04 (5)	Drainages preserved.	Section 6.4.3.1
ARSD 74:29:07:04 (6)	Highwall reduction.	Not applicable, since highwalls will not be used.
ARSD 74:29:07:04 (7)	Landforms must blend in with and complement the visual continuity of the surrounding area.	Section 6.4.3.1
ARSD 74:29:07:05	Disposal of refuse.	Section 5.4
ARSD 74:29:07:06 (1)	Vegetative species and composition postmining land use.	Section 6.4.3.4

Table 1.1-2: Administrative Rules of South Dakota (Continued)

Regulation	Information Required	Permit Application Reference
ARSD 74:29:07:06 (2)	Vegetative success - reference areas.	Section 6.4.3.4; Appendix 6.4-D
ARSD 74:29:07:06 (3)	Reference areas.	Appendix 6.4-D; Plate 6.4-2
ARSD 74:29:07:06 (4)	Seeding and planting.	Section 6.4.3.4; Appendix 6.4-B
ARSD 74:29:07:07 (1)	Salvageable topsoil.	Section 5.3.7
ARSD 74:29:07:07 (2)	Interim reclamation.	Section 6.4.2
ARSD 74:29:07:06 (3)	Topsoil analyzed to determine if fertilizer .is required.	Section 6.4.3.2
ARSD 74:29:07:07 (4)	Signing of topsoil stockpiles.	Section 5.3.7
ARSD 74:29:07:07 (5)	Estimate of topsoil to complete reclamation.	Sections 5.3.7 and 6.4
ARSD 74:29:07:07 (6)	Use of excess topsoil for reclamation purposes elsewhere.	Section 6.4.3.2
ARSD 74:29:07:07 (7)	Separation of rocks and trees from topsoil.	Section 5.3.7
ARSD 74:29:07:07 (8)	Segregation of topsoil and subsoil stockpiles.	Section 5.3.7
ARSD 74:29:07:08 (1)	Compliance with South Dakota water rights laws and regulations.	Section 5.6.3.1.2
ARSD 74:29:07:08 (2)	Compliance with South Dakota water quality laws and regulations.	Sections 5.6.3.2 and 5.6.4.2
ARSD 74:29:07:08 (3)	Compliance with dredge and fill laws in Sections 401 and 404 of the Clean Water Act.	Sections 5.6.4.1.3 and 5.6.4.2
ARSD 74:29:07:08 (4)	Removal of temporary or large sedimentation, erosion, or drainage control structures.	Section 5.3.9
ARSD 74:29:07:08 (5)	Permanent diversion structure design.	Section 5.3.9.1
ARSD 74:29:07:08 (6)	Diversion of unchannelized surface water.	Section 5.3.9
ARSD 74:29:07:09 (1)	Surface runoff diversions - side slopes and erosion protection.	Section 5.3.9
ARSD 74:29:07:09 (2)	Surface runoff diversions - stable sides in rock.	Section 5.3.9
ARSD 74:29:07:09 (3)	Surface runoff diversions - erosion protection.	Section 5.3.9
ARSD 74:29:07:09 (4)	Surface runoff diversions - culverts or bridges where necessary.	Section 5.3.9
ARSD 74:29:07:09 (5)	Surface runoff diversions - minimize hazards to humans, wildlife or livestock.	Section 5.3.9
ARSD 74:29:07:09 (6)	Surface runoff diversions - diversions around milling or processing facilities must be capable of carrying the flow from the 6-hour PMP event.	Section 5.3.9
ARSD 74:29:07:09 (7)	Surface runoff diversions - all other diversions must be capable of carrying a minimum of the 2-year, 6-hour event.	Section 5.3.9
ARSD 74:29:07:09 (8)	Surface runoff diversions - may not discharge on topsoil storage areas, spoil, or other unconsolidated material.	Section 5.3.9

Table 1.1-2: Administrative Rules of South Dakota (Continued)

Regulation	Information Required	Permit Application Reference
ARSD 74:29:07:10	Diversion of intermittent and perennial streams.	Not applicable; no diversions of intermittent or perennial streams are planned.
ARSD 74:29:07:11	Permanent impoundments	Powertech (USA) does not plan to leave any impoundments constructed for the ISR facility as a permanent feature.
ARSD 74:29:07:12 (1)	Roads and railroad spurs - avoid construction within riparian zones.	Section 5.3.8
ARSD 74:29:07:12 (2)	Roads within riparian zones - minimize negative impacts on streams.	Section 5.6.4.1.2
ARSD 74:29:07:12 (3)	Roads or railroad spurs within riparian zone of a coldwater permanent fishery.	Not applicable; there are no coldwater permanent fisheries within the permit area.
ARSD 74:29:07:12 (4)	Stream crossings.	Section 5.6.4.1.2
ARSD 74:29:07:12 (5)	Drainage control structures.	Section 5.6.4.1.2
ARSD 74:29:07:12 (6)	Culverts.	Section 5.6.4.1.2
ARSD 74:29:07:12 (7)	Minimize clearing width of trees and vegetation.	Section 5.6.4.1.2
ARSD 74:29:07:12 (8)	Access and haul road drainage structure maintenance.	Sections 5.3.8 and 5.6.4.1.2
ARSD 74:29:07:12 (9)	Transport facilities and utilities.	Section 5.6.4.1.2
ARSD 74:29:07:12 (10)	Unreclaimed roads subject to surface landowner request.	Section 6.4.3.3
ARSD 74:29:07:13	Buildings and structures.	Section 6.3.1
ARSD 74:29:07:14 (1)	Spoil piles located to avoid blocking intermittent or perennial drainages.	Section 5.3.7
ARSD 74:29:07:14 (2)	Permanent spoil dumps.	Not applicable; no permanent spoil dumps are planned.
ARSD 74:29:07:14 (3)	Analysis of spoil material to determine if it will be a source of water pollution.	Section 5.3.7
ARSD 74:29:07:14 (4)	Disposal of spoil material that is determined to be toxic or acid-forming.	Section 5.3.7
ARSD 74:29:07:15	Noxious weed control plan.	Section 6.4.3.5; Appendix 6.4-C
ARSD 74:29:07:16	Subsidence from mining activities - prevent or minimize.	Section 5.6.3.1.5
ARSD 74:29:07:17	Underground mines - sealed during reclamation.	Sections 3.2.5.2 and 5.3.3.7
ARSD 74:29:07:18	Requirements for specific types of reclamation.	Sections 6.1 and 6.4; Appendix 6.4-D
ARSD 74:29:07:19	Forest planting	Noted
ARSD 74:29:07:20	Rangeland	Section 6.4.1.1; Appendix 6.4-D
ARSD 74:29:07:21	Agriculture crops	Sections 6.4.1.2 and 6.4.3.4; Appendix 6.4-D
ARSD 74:29:07:22	Wildlife habitat	Noted
ARSD 74:29:07:23	Recreation	Noted

Table 1.1-2: Administrative Rules of South Dakota (Continued)

Regulation	Information Required	Permit Application Reference
ARSD 74:29:07:24	Industrial Use	Noted
ARSD 74:29:07:25	Homesites	Noted
ARSD 74:29:07:26	Future mineral exploration or development.	Noted
ARSD 74:29:07:27	Permanent surface impoundment.	Noted
ARSD 74:29:07:28	Changes in approved reference area.	Noted
ARSD 74:29:08:01	Requirements for concurrent reclamation.	Section 6.4
ARSD 74:29:08:02	Requirements for interim reclamation.	Section 6.4.2
ARSD 74:29:08:03	Requirements for final reclamation.	Section 6.4
ARSD 74:29:08:04	Disturbance to avoid requirements.	Noted
ARSD 74:29:09	Temporary cessation	Noted
ARSD 74:29:10	Special, exceptional, critical, or unique lands.	Section 2.3 and Appendix 2.3-A

at any time with a written notice 30 days prior to termination and reimbursement of the annual compensation.

Prior to commencement of operations, Powertech (USA) will work with BLM, SDGF&P and private landowners to limit hunting within the permit area to the extent practicable. Temporary fencing, signage, gates and other means of restricting public access will be installed in areas of active ISR operations such as well fields, processing plants and other facility areas in order to protect the public, protect workers, prevent damage to facilities, and provide security.

Table 3.1-3 lists the distances from nearby residences to the proposed affected area boundary. Residences are depicted on Figure 3.1-1. There are five residences within the permit area, including seasonal residences.

Aesthetics

The permit area is located within the Great Plains physiographic province on the edge of the Black Hills Uplift. The vegetation is a mix of short grasses and shrubs typical of semi-arid steppe land along with Ponderosa Pine forest toward the Black Hills. The color of the landscape varies from light brown and green to dark green with wildflowers in the springtime to light brown to golden during the later, drier months. With the exception of historical open mine pits in the eastern portion of the permit area, the visual aspects of human influence on the area are minor with most of the area used for grazing activities and associated facilities (e.g., fences and stock wells). The area's infrastructure includes the BNSF railroad that runs north through Edgemont to Newcastle, Wyoming, Country Road 6463 that parallels the railroad between Edgemont and the town of Dewey, overhead power lines and several gravel access roads.

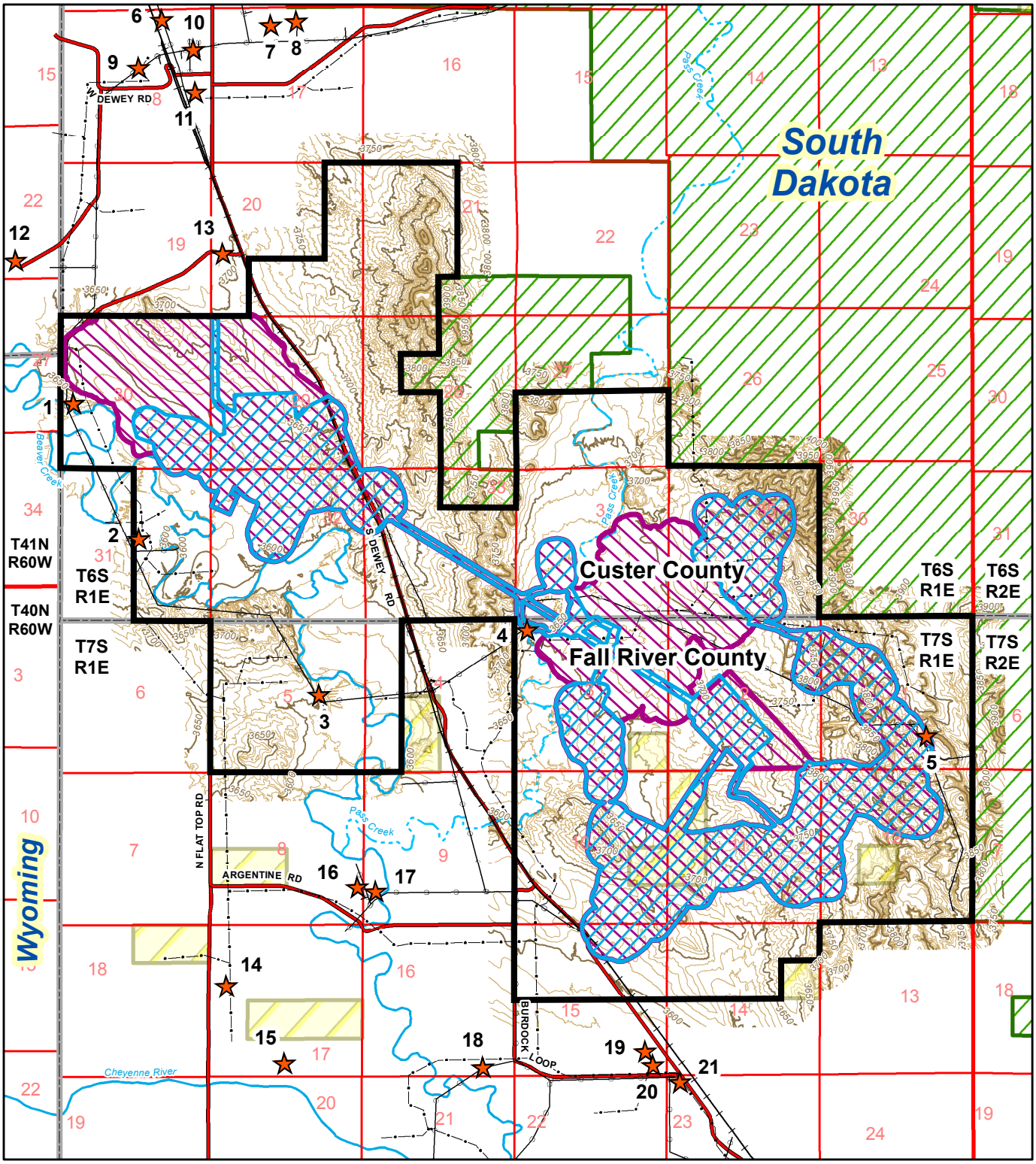
Transportation and Utilities

The permit area generally will be accessed north from Edgemont along County Road 6463. To the east, U.S. Highway 18 connects Edgemont with Hot Springs and to the north, State Highway 89 and U.S. Highway 385 connect Edgemont with Pringle and Custer City. The 2011 annual average daily traffic (AADT) on U.S. Highway 18 between Edgemont and the junction with State Highway 89 was 1,782 vehicles (SDDOT, 2012). The 2011 AADT on State Highway 89 between Pringle and the junction with U.S. Highway 18 was 659 vehicles (SDDOT, 2012).

Table 3.1-3: Distance from Nearby Residences to Proposed Affected Area Boundary

Residence[1]	Distance from Proposed Affected Area Boundary (miles)	
	Deep Disposal Well Option	Land Application Option
1	0.4	0.1
2	0.5	0.5
3	0.9	0.9
4	0.0	0.0
5	0.0	0.0
6	2.0	1.9
7	1.9	1.9
8	2.0	2.0
9	1.7	1.6
10	1.8	1.7
11	1.5	1.5
12	1.3	0.6
13	0.4	0.4
14	2.4	2.4
15	2.1	2.1
16	1.5	1.5
17	1.4	1.4
18	1.0	1.0
19	0.6	0.6
20	0.7	0.7
21	0.9	0.9

[1] Refer to Figure 3.1-3 for the residence designations.



This figure is provided to fulfill the requirements of ARSD 74:29:02:12 and SDCL 45-6B-10(4).

Legend

- Permit Boundary
- Black Hills National Forest
- BLM Land
- Ephemeral Streams
- Perennial Streams
- BNSF Railroad
- County Roads
- Residences
- BHEC Powerlines
- Golden West Telephone Lines
- Proposed Affected Area Boundary, Deep Disposal Well Option
- Proposed Affected Area Boundary, Land Application Option

Feet: 0 2,500 5,000
Meters: 0 1,000 2,000

N

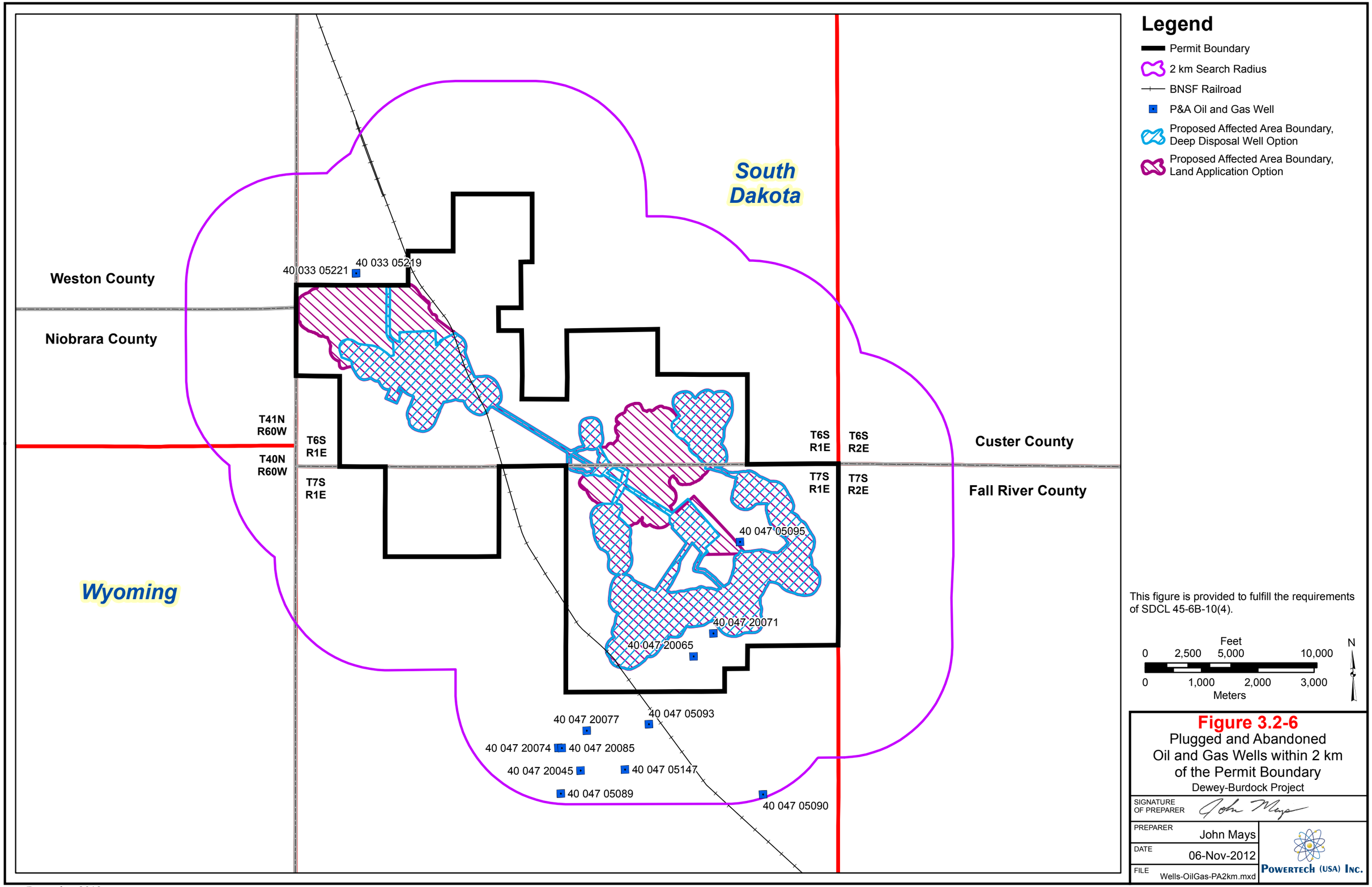
Figure 3.1-1

Residences in the Vicinity of the Permit Area

Dewey-Burdock Project

SIGNATURE OF PREPARER	Mark J. Hollenbeck
PREPARER	Mark J. Hollenbeck
DATE	02-Nov-2012
FILE	PermitResVicinity.mxd

POWERTECH (USA) INC.


Legend
Permit Boundary
2 km Search Radius
BNSF Railroad
P&A Oil and Gas Well
Proposed Affected Area Boundary, Deep Disposal Well Option
Proposed Affected Area Boundary, Land Application Option
South Dakota
Wyoming
Weston County
Niobrara County
Custer County
Fall River County
T41N R60W
T40N R60W
T6S R1E
T7S R1E
T6S R2E
T7S R2E
40 033 05221
40 033 05219
40 047 05095
40 047 20071
40 047 20065
40 047 05093
40 047 20077
40 047 20074
40 047 20085
40 047 20045
40 047 05147
40 047 05089
40 047 05090
This figure is provided to fulfill the requirements of SDCL 45-6B-10(4).
Feet
0 2,500 5,000 10,000
0 1,000 2,000 3,000
Meters
N
Figure 3.2-6
Plugged and Abandoned Oil and Gas Wells within 2 km of the Permit Boundary
Dewey-Burdock Project
SIGNATURE OF PREPARER
PREPARER John Mays
DATE 06-Nov-2012
FILE Wells-OilGas-PA2km.mxd
POWERTECH (USA) INC.

requirements. The projected construction, operation, restoration and decommissioning schedule is provided in Figure 5.2-1.

5.3 Description of Facilities

Following is a description of the proposed facilities, including CPP and Satellite Facility processing equipment, well fields, wastewater disposal systems, ponds, roads, diversion channels, and sediment control features. Figures 5.3-1 and 5.3-2 depict the general locations of proposed facilities and potential initial well fields in the land application and deep disposal well liquid waste disposal options, respectively. Plates 5.3-1 and 5.3-2 depict the proposed facilities in each disposal option in greater detail and present the proposed affected area boundary. These plates also provide the contour basis for mining in accordance with SDCL 45-6B(6)(8)(a). The only significant change in the premining contours depicted on these plates will be the construction of ponds and diversion channels, the locations of which are depicted on these plates. Following is a narrative description of the premining contours in accordance with ARSD 74:29:02:04(2).

The premining topography within the proposed permit area is described in Section 3.5.2.1. The elevation ranges from approximately 3,600 to 3,900 feet, and the average slope is approximately 6 percent. Within the proposed affected area, the elevation ranges from approximately 3,590 feet near D-WF1 along Beaver Creek to approximately 3,930 feet at a spoil pile associated with the historical Darrow Mine. The slope within the proposed affected area ranges from nearly flat along the Beaver Creek and Pass Creek floodplains to vertical slopes in portions of the historical surface pits. The average slope in the proposed affected area is approximately 5 percent.

Near the proposed CPP and associated ponds, the premining elevation ranges from approximately 3,690 to 3,780 feet. The slope ranges from approximately 1 to 12 percent and averages approximately 5 percent. In the vicinity of the Satellite Facility and associated ponds, the elevation ranges from approximately 3,630 to 3,680 feet. The slope ranges from approximately 0 to 6 percent and averages approximately 2 percent.

Refer to Section 5.4.1.1.2 for a description of the slopes within the proposed land application areas. Plates 3.2-23 through 3.2-27 depict cross sections through the proposed land application areas.

Cross Sections AA-AA' through HH-HH', provided on Plates 5.3-15 and 5.3-16, depict cross sections through the processing facilities and ponds. These cross sections depict the premining

topography, postmining topography and the approximate finished ground topography during ISR operations. The postmining topography will approximate premining topography.

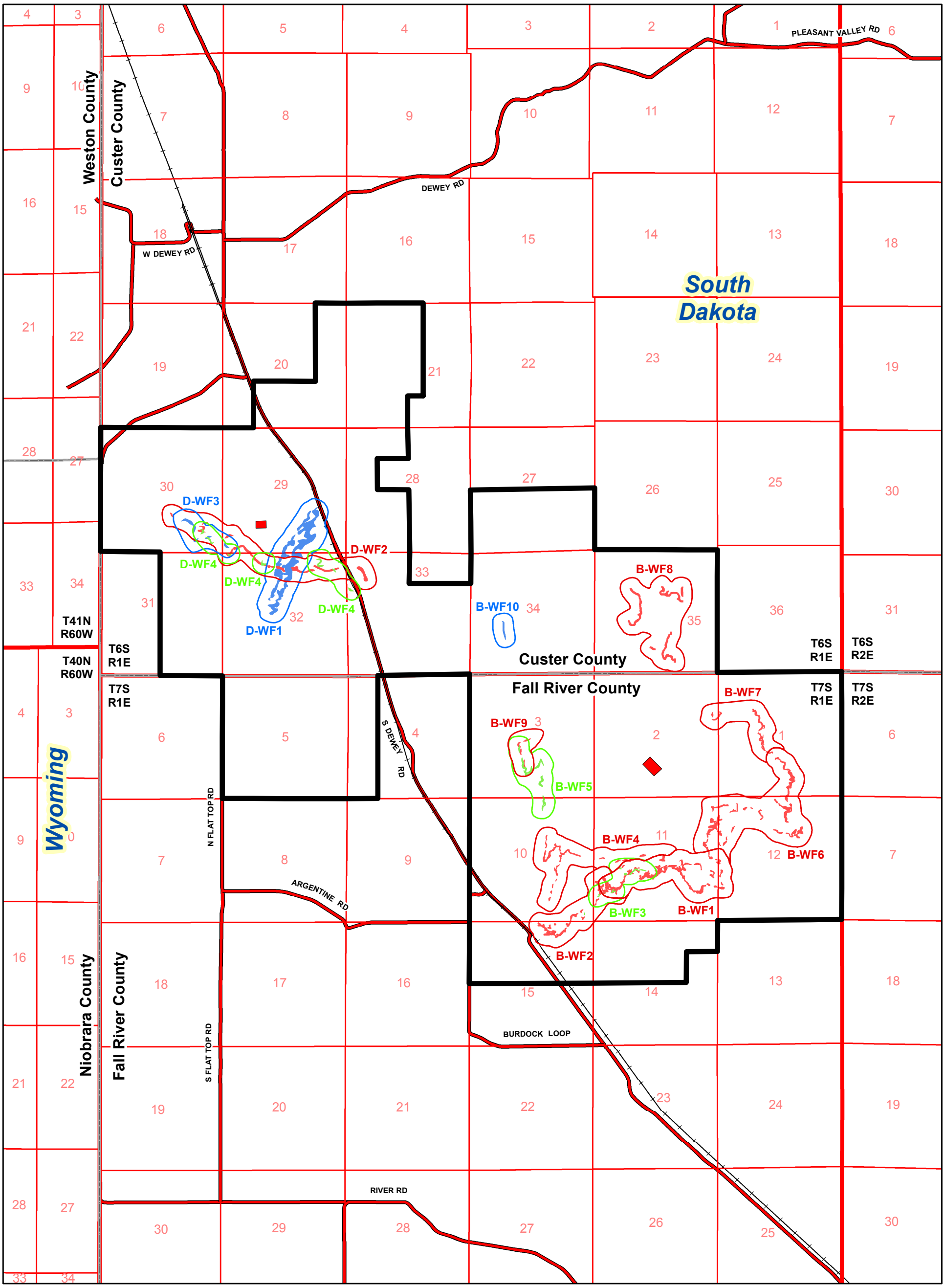
5.3.1 CPP Equipment and Chemical Storage Facilities

The CPP will be located in the Burdock portion of the permit area (Figures 5.3-1 and 5.3-2). Uranium recovery from the solution by IX, subsequent processing of the loaded IX resin to remove the uranium (elution), the precipitation of uranium, thickening of the uranium slurry, and the dewatering, drying, and packaging of solid uranium oxide (yellowcake) will be performed at the CPP.

The site for the CPP has been designed to provide security and ease of access for operating purposes. The site is designed with ample areas for access by resin transfer trucks as well as truck transports for chemical delivery and shipment of product and byproduct materials. Figure 5.3-3 shows the site layout of the CPP, including the placement of an office building, a maintenance shop and the CPP building. Traffic routes and truck turning radii are indicated on this figure. The processing equipment within the CPP is regulated by the NRC, and the chemical storage facilities are regulated by OSHA and NRC. The following discussion is provided for informational purposes in this permit application and is a summary of the discussion provided in the NRC license application.

5.3.1.1 CPP Equipment

The processing facilities will be housed in a pre-engineered metal building. The equipment layout within the CPP building is shown in Figure 5.3-4. The CPP will include the following systems:



This figure is provided to fulfill the requirements of ARSD 74:29:02:04 and SDCL 45-6B-6(8).

Feet: 0, 2,000, 4,000, 8,000
Meters: 0, 1,000, 2,000

Legend

- Permit Boundary
- Processing Plants
- BNSF Railroad
- County Roads

Potential Well Field Areas
- Lower Fall River
- Upper Chilson
- Middle/Lower Chilson

Ore Bodies
- Lower Fall River
- Upper Chilson
- Middle/Lower Chilson

N

Figure 5.3-9

Potential Well Field Areas

Dewey-Burdock Project

SIGNATURE OF PREPARER	John Mays
PREPARER	John Mays
DATE	09-Nov-2012
FILE	WF-PotentialConfig.mxd

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is identified and corrected. The system then will be manually restarted by an operator when operating parameter compliance is verified.

5.3.6 Backup Power

Loss of power to the project site will cause production wells to stop operating, resulting in shutdown of all production and injection flows. This condition avoids flow imbalance within the well fields, but a well field bleed would not be maintained during the power failure. The time span for the aquifer to recover from operational drawdown back to its natural groundwater gradient is much longer than the duration of a typical power outage. Since ISR solutions would not begin to travel to the monitoring ring until the cone of depression caused by the bleed had recovered and groundwater had returned to its natural gradient, excursions are very unlikely within the short time period of a typical power outage.

Power outages in the permit area would not likely last more than a few days or weeks under most conceivable scenarios. Powertech (USA) will use generators onsite and may also contract for temporary generators to operate well field pumps sufficiently to maintain a cone of depression within the well field if unforeseen power outages occur with expected duration of more than a few weeks. Backup generators will be installed to maintain continuous instrumentation, monitoring and alarms in the CPP, Satellite Facility, and well fields. Backup power also will be provided for lights and emergency exits.

5.3.7 Topsoil and Spoil Handling

Topsoil will be salvaged from building sites, permanent storage areas, primary and secondary access roads, ponds and chemical storage areas prior to construction in accordance with SDCL 45-6B-7(11). Typical earth moving equipment such as rubber tired scrapers and front-end loaders will be used for topsoil stripping. Trees, large rocks, and other waste materials which may hinder redistribution of topsoil will be separated from the topsoil before stockpiling.

Plates 5.3-1 and 5.3-2 show the proposed locations of topsoil and spoil stockpiles for the processing facilities and ponds in the land application and deep disposal well option, respectively. Topsoil and spoil stockpile locations for the well fields will be designated during final well field design, and Plates 5.3-1 and 5.3-2 will be updated accordingly. Topsoil and spoil stockpiles will be located in a manner to facilitate reclamation by placing the piles near the locations where they will be used. Topsoil and spoil piles associated with the CPP, Satellite Facility and associated ponds will be placed near the processing facilities. Topsoil and spoil piles

for the access roads and well fields will be placed near the roads and well fields to minimize the haul distance.

The estimated topsoil stockpile volumes for the processing facilities and ponds are 100,000 to 200,000 cubic yards in the Burdock area and 50,000 to 100,000 cubic yards in the Dewey area. In the initial Burdock well field, the anticipated topsoil salvage depth is estimated to range from 0 to 3 feet and average approximately 1.0 foot (from the baseline soil survey in Appendix 5.3-A). In the initial Dewey well field, the anticipated topsoil salvage depth is estimated to range from 0 to 1.67 feet and average approximately 0.15 foot. The total anticipated topsoil stripping area over the life of the Dewey-Burdock Project is estimated to be approximately 250 acres in the deep disposal well option and 440 acres in the land application option. The maximum area of construction disturbance and associated topsoil stripping at any one time will be approximately 100 acres in the deep disposal well option and 300 acres in the land application option.

Salvaged topsoil will be stored in designated topsoil stockpiles in accordance with SDCL 45-6B-40. These stockpiles will be located such that losses from wind erosion are minimized. Additionally, topsoil stockpiles will not be located in any drainage channels or other locations subject to flooding. Berms will be constructed around the perimeter of stockpiles and the stockpiles will be seeded with the approved seed mix to help minimize erosion. Additionally, all topsoil piles will be identified with highly visible signs.

During excavations of mud pits associated with exploration drilling and delineation drilling activities, topsoil will be separated from the subsoil with a backhoe. First the topsoil will be removed and placed at a separate location and then the subsoil will be removed and deposited next to the mud pit. Usually within 30 days of the initial excavation, use of the mud pit will be complete, the subsoil will be redeposited in the mud pit followed by replacing topsoil. During the construction of well fields and pipeline ditch construction, topsoil and subsoil will be temporarily accumulated near the excavation during construction, then redistributed after construction activities are complete. The temporary stockpiles will be marked in the field, constructed to minimize wind erosion, and placed outside of drainages.

In only limited instances will more material be excavated (spoil) than is required for facility construction. This will include pond and diversion channel construction. Spoil will be handled in accordance with ARSD 74:29:07:14 requirements. Spoil will be stockpiled separately from topsoil stockpiles and identified with highly visible signs. The footprint of the spoil stockpiles will have the topsoil stripped prior to placement of the spoil. The spoil stockpiles will be located

such that losses from wind and water erosion are minimized and will not be located in drainage channels. Berms will be constructed around the perimeter of the spoil stockpiles.

Spoil material is not anticipated to be acid forming, toxic, or a source of water pollution. The baseline soil sampling results in Appendix 3.3-A show that only in limited instances were the pH levels within sampled soil profiles deemed unsuitable as a plant growth medium according to the guideline used for comparison. If any spoil material is suspected of being acid forming, toxic, or capable of causing water pollution, Powertech (USA) will sample the material and have it analyzed for pH and other parameters deemed necessary by DENR. If the material is determined to have potential to cause water pollution, Powertech (USA) will prepare a plan for mitigating the condition in accordance with ARSD 74:29:07:14(3) and (4). Potential mitigation measures include disposing the spoil material in an appropriately permitted landfill and using suitable spoil material excavated from another area as a replacement during backfill. Since it is not anticipated that spoil material will be acid forming, toxic, or a source of water pollution, only minimal changes in the postmining topography are expected due to disposing unsuitable spoil material.

5.3.8 Roads

Roads in the permit area are classified as existing county roads, existing private roads, primary access roads, secondary access roads, and light-use roads (tertiary access roads). The roads are depicted on Plate 5.3-5. Construction of roads within the permit area will conform to ARSD 74:29:07:12.

Secondary Access Roads

Secondary access roads will be used for the transportation of personnel and equipment within the permit area. Parking areas and roads near the CPP and Satellite Facility and laydown areas also are classified as secondary access roads. Secondary access roads are shown on Plate 5.3-5.

Secondary access road construction, topsoil handling, drainage and surfacing will be the same as the primary access road. The travel width of secondary access roads will be narrower as shown in Figure 5.3-17 due to the lower traffic demands compared to primary access road. Secondary access road culverts will be designed to convey at a minimum the discharge from a 2-year, 6-hour precipitation event.

Light-Use Roads (Tertiary Access Roads)

These roads are essentially non-constructed, two-track trails. Existing ranch or private roads established by previous landowners will be used to the extent possible. The primary use of these roads will be to access monitoring sites using light trucks or other passenger vehicles. The locations of these roads are shown on Plate 5.3-5.

Light-use roads will be maintained as necessary to minimize erosion. Crossing of major drainages will be kept at a minimum and such crossings will be dry weather only crossings.

5.3.9 Water Management and Erosion Control

Pursuant to ARSD 74:28:02:11, a sediment control plan will be implemented during and after ISR operations to reduce soil loss within the permit area. Ditches, diversions, sediment traps/ponds, culverts, and other best management practices (BMPs) will be used to control surface water flow within the permit boundary. Plates 5.3-6 through 5.3-8 show the plan for water control. See Appendix 5.3-B for details on diversions in and around the facility areas.

Powertech (USA) has evaluated flood inundation boundaries and will construct facilities outside of these boundaries to avoid potential impacts to facilities from flooding and potential impacts to Beaver Creek and Pass Creek in the event of any potential spills or leaks. Where possible, facilities will be located outside of the 100-year flood inundation boundaries. Pipelines will be buried below the frost line and will not be subject to flooding. Pipeline valve stations will be located outside of the 100-year flood inundation boundaries. Facilities which must be located within flood inundation boundaries will be protected from flood damage by the use of straw bales, collector ditches, and/or berms. If it is necessary to place a well head within a flood inundation boundary, diversions or erosion control structures will be constructed to divert flow and protect the well head. The well head also will be sealed to withstand brief periods of

submergence. Figures 5.3-10 and 5.3-11 show that all ISR wells and monitor wells will be sealed.

Estimates of peak flood discharges and water levels produced by floods on Pass Creek, Beaver Creek and local small drainages are provided in Section 3.5.2.3 and Appendix 3.5-A. Plate 3.5-1 depicts the modeled flood inundation areas for all surface water features during the 100-year, 24-hour storm event in relation to proposed facilities and infrastructure. As described in Appendix 3.5-A, HEC-HMS models were used to calculate peak discharges, and HEC-RAS models were used to compute water-surface profiles and inundated areas for the respective runoff events.

Any disturbance to the prevailing hydrologic balance of the affected land and of the surrounding area and to the quality and quantity of water in surface water systems both during and after ISR operations and during reclamation will be minimized in accordance with SDCL 45-6B-41. No diversions will be constructed on perennial stream channels, and only relatively minor quantities of surface runoff will be captured in sediment ponds. Therefore, little or no impacts to the surface water hydrologic balance will occur. Surface water quality will be protected through erosion control BMPs and sediment control measures described below. Section 5.6.5 describes mitigation measures to protect surface and groundwater from potential leaks or spills.

5.3.9.1 Diversion Channels

Following is a description of the diversion channels that will be constructed within the permit area for the processing facilities and ephemeral stream channels.

Diversion channel designs for the processing facilities in the DDW option are provided on Plates 5.3-13 and 5.3-14. These supersede the diversion channel designs for the processing facilities in the DDW option in Appendix 5.3-B. In accordance with ARSD 74:29:07:09(6), the diversions around the CPP, Satellite Facility and associated radium settling ponds and central plant pond have been designed for the 6-hour PMP event. Diversions were not designed for the PMP event around the storage ponds or spare storage ponds, since these ponds are not part of uranium processing and will store only treated water. In the land application option, no diversions will be required around the processing facilities, radium settling ponds or central plant pond due to the small drainage area above these facilities.

With the exception of Beaver Creek, all stream channels within the permit area are ephemeral. Pass Creek above the permit area could be considered intermittent, but it is ephemeral within the permit area since there is no groundwater component and flows only occur in response to

precipitation or snowmelt events. No diversions are planned on Beaver Creek or Pass Creek, and no diversions are planned on perennial or intermittent streams.

Plates 5.3-6 and 5.3-7 provide the locations of planned ephemeral stream channels within the permit area. The designs for the diversions associated with the initial well fields and land application areas are presented on Plates 5.3-9 through 5.3-11. Diversion designs for future well fields, if needed, will be provided to DENR for review and verification prior to construction.

Diversions of ephemeral channels will be designed to maintain channel velocities equal to or less than 5 feet per second for the discharge from a 2-year, 6-hour precipitation event and have the ability to contain the discharge from a 100-year, 24-hour precipitation event.

Interim revegetation will be performed on the bottoms and side slopes of all diversions to reduce erosion. In instances where the diversion channel velocity during the design storm exceeds 5 feet per second, other erosion control measures will be implemented such as geosynthetic liners, geosynthetic filter media, or riprap. Diversions will be constructed with 3:1 or shallower side slopes to reduce the risk of slope failure, promote interim revegetation, and allow safe passage for humans, wildlife and livestock. Diversion bottom elevations will tie to undisturbed upstream and downstream channel elevations to eliminate increased erosion potential. Diversions will not discharge onto topsoil or spoil stockpiles or other unconsolidated material such as newly reclaimed areas. Culvert or bridge crossings over the diversions are not planned. If it becomes necessary to cross a diversion in the future, Powertech will submit design drawings to DENR for review and approval prior to construction.

5.3.9.2 Erosion Control

Powertech (USA) will minimize erosion of disturbed, reclaimed and native areas through proper land management and farming techniques. Typically, following ground disturbance, areas will be prepared and seeded as soon as possible to reduce the possibility of erosion. Also, erosion control measures will be used to reduce overland flow velocity, reduce runoff volume or trap sediment. Examples include rip-rap, vegetative sediment filters, check dams, mulches, cover crops, and other measures. Plates 5.3-6 through 5.3-8 show the sediment control measures that will be used in the permit area.

used (typically November through early March). Additional design information for the land application systems is presented in the GDP. Figure 5.3-1 depicts the proposed facilities in the land application option.

Each of the two land application systems will have up to 315 acres of irrigated area and an additional 65 acres of center pivots on standby. Each of the two land application systems is designed for an average annual application rate of 310 gpm and an instantaneous application rate of 297 to 653 gpm.

In the land application option, groundwater withdrawn during aquifer restoration will not be treated with RO. Instead, the aquifer restoration water will be disposed directly in land application systems following treatment to remove uranium and radium. The water balance for the land application option is presented in Section 5.3.3.5.3.

Following is a summary of how the proposed land application systems satisfy specific site evaluation and compatibility criteria in ARSD 74:29:05:16.

Potential Impacts to Wildlife Grazing in Land Application Areas (ARSD 74:29:05:16(1))

Potential impacts to wildlife grazing in the land application areas will be minimized through treating the land application effluent prior to application, monitoring vegetation within land application areas, and evaluating the monitoring results annually to detect potential increasing trends in constituent concentrations. As a condition of the GDP, the land application water quality will be required to meet effluent limits established by DENR that are protective of groundwater quality. Section 5.4.1.1.4.1 describes the anticipated land application water quality. Trace metal concentrations are anticipated to be at or below ARSD 74:54:01:04 human health standards. Radionuclide concentrations will be below 10 CFR Part 20, Appendix B, Table 2, Column 2 effluent limits for release of radionuclides to the environment. The suitability of land application vegetation to wildlife grazing will be verified through annual vegetation monitoring in the land application areas. Section 5.5.6.2 describe how vegetation in the land application areas will be sampled each year. Section 5.5.6.2 describes how this information will be evaluated annually and the results reported to DENR to determine whether there is any risk to wildlife.

Compatibility with Site Geology ((ARSD 74:29:05:16(2))

The site geology is well suited to land application. The depth to alluvial groundwater, where encountered, is greater than the maximum anticipated infiltration depth of the land application water. The Graneros Group shales will prevent the land application water from reaching bedrock

aquifers. The thickness of the Graneros Group is approximately 500 to 550 feet beneath the proposed Dewey land application area and approximately 25 to 250 feet beneath the proposed Burdock land application area. Refer to Cross Sections 3.2-23 through 3.2-27, which depict the thickness of the Graneros within the proposed land application areas.

Compatibility of Slopes with Land Application Systems (ARSD 74:29:05:16(5))

In the proposed Dewey land application area, the average slope is approximately 3.5 percent. The maximum slope is between 15 and 25 percent in a small area (approximately 5 acres) at the northern edge of one proposed land application area (refer to page 5.3-B-42 in Appendix 5.3-B). In the proposed Burdock land application area, the average slope is approximately 2 percent. Only about 2 acres of the proposed Burdock land application area has a slope greater than 15 percent (refer to page 5.3-B-43 in Appendix B). These slopes will be compatible with center pivot irrigation.

During final design of the land application systems and catchment areas, Powertech (USA) will evaluate any areas with slopes greater than 15 percent to determine whether they can be avoided or whether they require mitigation. The evaluation will consider the maximum manufacturer-recommended slope based on the center pivot climbing capability and ground clearance requirements. It also will consider whether regrading will be necessary to reduce the potential for runoff and erosion. It is currently anticipated that approximately 5 acres in the proposed Dewey land application area and 2 acres in the proposed Burdock land application area will be regraded to a maximum slope of 15 percent unless these areas are avoided during final design.

Potential for Erosion (ARSD 74:29:05:16(6))

The potential for erosion within the land application areas will be minimized through siting land application areas in relatively flat terrain, maintaining vegetation, optimizing the irrigation rate to avoid runoff, using low-impact sprinkler heads, and capturing any runoff in catchment areas. The average slopes in the proposed land application areas are 2 to 3.5 percent. Small areas with slopes greater than 15 percent are anticipated to be regraded to minimize the potential for erosion and to meet the maximum manufacturer-recommended slopes for the center pivots. Relatively flat slopes along with maintenance of the land application areas in a vegetated state will limit the potential for erosion. The land application water will be applied at an agronomic rate to prevent runoff into the catchment areas. Should runoff from precipitation or snowmelt occur, the runoff and sediment will be captured in the catchment areas and will not reach perennial or ephemeral stream channels.

Daily inspections of the land application areas and catchment berms during operation of the land application systems will determine whether there are any unplanned effects such as erosion.

Distance to Flowing Streams (ARSD 74:29:05:16(7))

Beaver Creek is the only flowing stream within the proposed permit area. The minimum distance from a proposed Dewey land application area to Beaver Creek is approximately 280 feet. The minimum distance from a proposed Burdock land application area to Beaver Creek is approximately 1.1 miles.

Potential Impacts to Adjacent Land Uses (ARSD 74:29:05:16(8))

Land uses adjacent to the proposed land application areas includes livestock grazing on rangeland and recreational use (primarily hunting) on private lands. No effects from land application on adjacent land uses are anticipated due to the operation of land application systems to minimize overspray and due to Powertech (USA)'s commitment to limit hunting within the proposed permit area. Section 3.1.2 describes how Powertech (USA) will work with BLM, SDGF&P and private landowners to limit hunting within the proposed permit area to the extent practicable.

Consideration of Weather Conditions (ARSD 74:29:05:16(9))

Prior to operation of the land application systems, Powertech (USA) will develop a standard operating procedure (SOP) for land application system operation that will include provisions to minimize overspray outside of the center pivot areas. The SOP will include using the results of meteorological monitoring (wind speed, wind direction and temperature) to modify operating parameters. It will include maximum wind speed/wind direction combinations for land application system operation. The SOP also will address precipitation thresholds to avoid land application during heavy or prolonged precipitation events. Temperature thresholds also will be included to avoid land application when water cannot infiltrate due to frozen ground.

5.4.1.1.3 Wastewater Treatment

Prior to discharge to the storage ponds, Powertech (USA) will treat all wastewater associated with ISR operations to meet the requirements of 10 CFR 20, Appendix B, Table 2, Column 2, which are the established limits for discharge of radionuclides to the environment and include limits for natural uranium, radium-226, lead-210 and thorium-230 (see Table 5.4-1). Powertech (USA) anticipates that the GDP will include effluent limits established according to ARSD 74:54:01:04 groundwater standards and ambient alluvial water quality. Treatment will be accomplished by ion exchange for uranium removal followed by radium removal through co-

precipitation with barium sulfate in radium settling ponds. It is not anticipated that thorium-230, lead-210 or other radionuclides will be present at concentrations above the limits. If concentrations in the storage ponds are above the release limits, the effluent will be treated as necessary to satisfy the GDP limits.

5.4.1.1.4 Treated Wastewater Quality

The types of wastewater that will be disposed in the DDWs or land application systems include production bleed, groundwater generated during aquifer restoration, affected groundwater generated during well development, and liquid process waste such as resin transfer water and the brine generated during uranium processing. Of these, the largest contributors will be the production bleed and groundwater generated during aquifer restoration.

Table 5.4-2 presents the estimated end-of-production water quality in the ISR well fields. This represents the untreated water quality extracted from the ore zone at the end of uranium recovery and at the beginning of aquifer restoration. This table represents the worst-case water quality

Table 5.5-3: Operational Stream Sampling Locations

Site ID	Name	Sample Type	Location in NAD 27, South Dakota State Plane South (feet)	
			Northing	Easting
BVC11	Beaver Creek Downstream	Grab	433,638	1,022,546
BVC14	Beaver Creek Upstream	Grab	446,829	1,012,976
CHR01	Cheyenne River Upstream	Grab	423,009	1,016,699
CHR05	Cheyenne River Downstream	Grab	405,925	1,047,227
PSC11	Pass Creek Downstream	Passive sampler	431,452	1,028,064
PSC12	Pass Creek Upstream	Passive sampler	446,470	1,031,222
BEN01	Bennett Canyon	Passive sampler	416,196	1,047,473
UNT01	Unnamed Tributary	Passive sampler	422,482	1,039,166
UNT02	Unnamed Tributary	Passive sampler	424,478	1,035,236
UNT03	Unnamed Tributary	Passive sampler	425,438	1,029,910

Table 5.5-4: Operational Surface Water Monitoring Parameter List and Analytical Methods

Parameter	Units	Analytical Method
pH	pH units	A4500-H B
Total dissolved solids (TDS)	mg/L	A2540 C
Total suspended solids (TSS)	mg/L	A2540 D
Hardness, total as $CaCO_3$	mg/L	A2340 B
Chloride	mg/L	A4500-Cl B; E300.0
Sulfate	mg/L	A4500-SO4 E; E300.0
Arsenic, dissolved	mg/L	E200.8
Cadmium, dissolved	mg/L	E200.8
Chromium, dissolved	mg/L	E200.8
Selenium, dissolved	mg/L	E200.8, A3114 B
Uranium, dissolved	mg/L	E200.8
Uranium, suspended	mg/L	E200.8
Ra-226, dissolved	pCi/L	E903.0
Ra-226, suspended	pCi/L	E903.0
Th-230, dissolved	pCi/L	E907.0
Th-230, suspended	pCi/L	E907.0
Pb-210, dissolved	pCi/L	E909.0M
Pb-210, suspended	pCi/L	E909.0M
Po-210, dissolved	pCi/L	RMO-3008
Po-210, suspended	pCi/L	RMO-3008

5.5.6 Soil Sampling

5.5.6.1 Land Application Systems

If land application is used to dispose treated wastewater, soil sampling will occur as described in the GDP. Baseline soil samples will be collected prior to operation of each land application system. During operation, soil samples will be collected each year from each land application pivot that was active during that year. Soil samples also will be collected from each catchment area each year.

Potential impacts will be mitigated by monitoring soil concentrations during operations and implementing a contingency plan if concentrations approach trigger values. The proposed trigger values for arsenic and selenium are the average baseline concentrations plus 2 standard deviations. In addition, Powertech (USA) will monitor additional constituents listed in Table 6.4-1 of the GDP. Powertech (USA) will analyze the annual monitoring results and propose additional trigger values if increasing trends are observed. This analysis will be completed annually and provided in the written report submitted to DENR each year that is described in Section 5.7.2.6.

5.5.6.2 General Permit Area Soil Sampling

During operation, Powertech (USA) will collect and analyze soil samples from the air particulate monitoring locations as required by the NRC license. The anticipated sample requirements include sampling surface soils (0-5 cm) annually from each air particulate monitoring location once per year and having the samples analyzed for natural uranium, radium-226, and lead-210. This sampling will provide detection of potential aerial deposition of radionuclides from the Dewey-Burdock Project.

In addition, as described in Section 6, Powertech (USA) will conduct radiological surveys during decommissioning to identify areas for cleanup operations. A pre-reclamation survey will be used to identify cleanup areas, and a post-reclamation survey will be used to ensure that radium and other radionuclides do not exceed NRC standards. The radiological surveys will use gamma-ray detectors that are calibrated to soil radium-226 concentrations.

5.5.6.3 Vegetable Garden Soil Sampling

In accordance with NRC license conditions, Powertech (USA) will sample vegetable garden soil within 2 miles (3.3 km) of the permit area prior to operations. Plant-to-soil concentration factors will be then be used to estimate the levels of radionuclide concentrations in locally grown

vegetables. Powertech (USA) anticipates modifying the NRC monitoring program to exclude vegetable garden soil sampling if the pre-operational sample results along with modeling potential radiological impacts demonstrate no significant exposure pathway from vegetable gardens to potential human receptors.

5.5.7 Vegetation Sampling

5.5.7.1 Land Application Systems

If land application is used to dispose treated wastewater, vegetation sampling will occur as described in the GDP. Vegetation samples will be collected annually from the land application areas. Vegetation samples also will be collected from each catchment area each year. Powertech (USA) will monitor for the potential buildup of metals, metalloids, and radionuclides in irrigated vegetation. The vegetation sampling parameters are listed in Table 6.5-1 of the GDP application. Metals and metalloids to be monitored include natural uranium, selenium and arsenic. Prior to operation, Powertech (USA) will develop trigger values for arsenic and selenium based on the preoperational concentrations and the variability in each parameter. Should routine operational monitoring indicate an increasing trend in constituent concentrations with potential to approach trigger values, a contingency plan will be implemented as described in Section 8.4 of the GDP application. The proposed trigger values will be provided to DENR for review and approval prior to initiating land application. The results of annual monitoring and evaluation of potential increasing trends will be provided in the written report submitted to DENR each year that is described in Section 5.7.2.6.

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5.6.3.1.5 Potential Subsidence in ISR Well Fields

There is no potential for subsidence in the ISR well fields due to limited drawdown in the ore zone and other aquifers and due to the nature of uranium ISR, which does not affect the structural integrity of the ore zone sands. Refer to Section 5.6.3.1.2 and Appendix 5.6-A, which describe how potential drawdown in the Inyan Kara aquifer will be limited, and the potentiometric water level is anticipated to recover to pre-ISR levels rapidly after the end of ISR activities. Section 5.6.3.1.2 also describes how potential drawdown in the Madison Limestone will be only a small portion of the confining pressure above the top of the Madison.

The following information from the ISR GEIS addresses subsidence potential in ISR well fields in the Nebraska-South Dakota-Wyoming Uranium Milling Region, which includes the proposed permit area (NRC, 2009, Section 4.4.3.2):

> "The removal of uranium mineral coatings on sediment grains in the target sandstones during the uranium mobilization and recovery process will result in a change to the mineralogical composition of uranium-producing formations. However, the uranium mobilization and recovery process in the target sandstones does not result in the removal of rock matrix or structure, and therefore no significant matrix compression or ground subsidence is expected. In addition, the source formations for uranium in the Nebraska-South Dakota-Wyoming Milling Region occur at depths of tens to hundreds of meters [hundreds of feet] … and individual mineralization fronts are typically 0.6 to 7.5 m [2 to 25 ft] thick … At these depths and thicknesses and considering that rock matrix is not removed during the uranium mobilization and recovery process, it is unlikely that collapse in the target sandstones would be translated to the ground surface. Therefore, impacts to geology from ground subsidence would be expected to be SMALL."

- Proper plugging and abandonment of all wells which do not pass MIT or that become unnecessary for use;
- Proper plugging and abandonment of exploration holes with potential to impact ISR operations; and
- Sampling monitor wells located within the overlying and underlying hydrogeologic units on a frequent schedule.

These controls work together to prevent and detect ISR solution migration. Plugging any exploration holes that pose the potential to impact the control and containment of ISR solutions prevents connection of the production zone to overlying and underlying units. The EPA UIC requirements for MIT assure proper well construction, which is the first line of defence for maintaining appropriate pressure without leakage. Sampling the monitor wells will enable early detection of any ISR solutions should an excursion occur.

Excursion Corrective Actions

Powertech (USA) will implement the following corrective action plan for excursions occurring during production or restoration operations. Corrective actions to correct and retrieve an excursion may include but will not be limited to:

- Adjusting the flow rates of the production and injection wells to increase the aquifer bleed in the area of the excursion;
- Terminating injection into the portion of the well field affected by the excursion;
- Installing pumps in injection wells in the portion of the well field affected by the excursion to retrieve ISR solutions;
- Replacing injection or production wells; and
- Installing new pumping wells adjacent to the well on excursion status to recover ISR solutions.

In the event of an excursion, the sampling frequency will be increased to weekly. NRC will be notified within 24 hours by telephone or email and within 7 days in writing from the time an excursion is verified. DENR will be notified in writing within 7 days from the time an excursion is verified. In addition, if the excursion has potential to affect a USDW, EPA will be notified verbally within 24 hours and in writing within 5 days. A written report describing the excursion event, corrective actions taken and the corrective action results will be submitted to all involved regulatory agencies within 60 days of the excursion confirmation.

If wells are still on excursion status when the report is submitted, the report also will contain a schedule for submittal of future reports describing the excursion event, corrective actions taken,

and results obtained. If an excursion is not corrected within 60 days of confirmation, Powertech (USA) will terminate injection into the affected portion of the well field until the excursion is retrieved, or provide an increase to the reclamation financial assurance obligation in an amount that is agreeable to NRC and that would cover the expected full cost of correcting and cleaning up the excursion. The financial assurance increase will remain in force until the excursion is corrected. The written 60-day excursion report will state and justify which course of action will be followed. If wells are still on excursion status at the time the 60-day report is submitted to NRC, and the financial assurance option is chosen, the well field restoration financial assurance obligation will be adjusted upward. When the excursion is corrected, the additional financial assurance obligations resulting from the excursion will be removed.

5.6.4 Surface Water

5.6.4.1 Potential Surface Water Impacts

Potential surface water impacts include increased sediment load due to surface disturbance, very limited stream channel disturbance, potential encroachment on wetlands, and potential water quality impacts from leaks or spills. Each of these is described below.

5.6.4.1.1 Potential Sedimentation

Construction activities within the well fields, along the pipeline corridors and roads, and at the CPP and Satellite Facility have the potential to increase the sediment yield of the disturbed areas. The potential impacts will be minimal due to the relatively small size of the disturbance areas relative to the watershed areas and due to the implementation of the sediment control plan described in Section 5.3.9 and the mitigation measures described in Section 5.5.4.2.

5.6.4.1.2 Potential Impacts to Stream Channels and Riparian Areas

As described in Section 5.3.9, Powertech (USA) has evaluated flood inundation boundaries and will construct facilities outside of these boundaries to avoid potential impacts to facilities from flooding and potential impacts to the stream channels. Some facilities must be located within stream channels, such as pipeline corridors and access roads. These will cross the stream channels perpendicular to the flow direction to minimize disturbance. Primary and secondary access road stream channel crossings will include culverts as described in Section 5.3.8.

Ephemeral stream channels also will be disturbed temporarily at the upstream and downstream ends of the diversion channels described in Section 5.3.9.1, which describes the erosion protection measures that will be used for diversion channels.

Facilities potentially constructed in the cottonwood gallery riparian zone along Pass Creek include a limited number of access roads, pipelines and utility corridors. Following is a discussion of potential impacts associated with these facilities.

To a limited extent, access roads will be constructed within the cottonwood gallery riparian zone. Most of these roads will be light-use roads (tertiary access roads), which are described in Section 5.3.8 as essentially non-constructed, two-track trails. To the extent possible, existing two-track roads will be used. The route for any new light-use roads that will be required within the cottonwood gallery riparian zone will be selected to minimize impacts to the riparian zone and to minimize erosion.

One secondary access road is planned through the cottonwood gallery riparian zone. This road is depicted on Plate 5.3-5 (Sheet 2) in the NWNW Section 3, T7S, R1E. It is an existing road near a dwelling that crosses Pass Creek and the riparian zone using a well-established route. Since the proposed secondary access road will be an upgrade to an existing road, potential impacts to Pass Creek will be minimized. Powertech (USA) intends to continue to use the existing low-water crossing and not install a bridge or culvert at this location. Erosion control measures described in Section 5.3.9 will be used for any disturbance areas that could contribute sediment to Pass Creek.

The plant-to-plant pipeline(s), if constructed, will cross the riparian zone near the existing low-water crossing. In addition, a utility corridor consisting of an overhead power line and buried pipeline is planned across the Pass Creek riparian zone in the SESW Section 34, T6S, R1E (refer to Plate 5.3-1, Sheet 2). The pipeline and utility routes through the riparian zone will be selected to minimize potential impacts. The Pass Creek pipeline crossings will be trenched or bored. Mitigation measures to minimize impacts will include use of sediment control measures, avoiding construction during early spring while runoff from snowmelt is occurring, and complying with applicable U.S. Army Corps of Engineers permitting requirements.

Disturbance to the cottonwood gallery riparian zone will be relatively small due to the limited number of utility crossings and use of existing roads. Special care will be taken in this area to control sediment. During construction, silt fences, straw beds, and other sediment control measures will be used to minimize any potential water quality impacts.

the emissions inventory, stationary source emissions of criteria pollutants are not expected to meet the minor or major source thresholds for air quality construction permitting. This includes NO_x, PM_{10}, CO, SO_2, and hazardous air pollutants (which exclude CO_2).

5.6.10.2 Mitigation of Potential Air Quality Impacts

Mitigation measures for potential air quality impacts, including potential impacts to areas defined as critical air quality resources by SDCL 45-6B-92(8) such as nearby residences and recreation areas, will include but will not be limited to the following:

- Reduce fugitive dust emissions via standard dust control measures (e.g., water application on roads and disturbed areas and implementation of speed limits).
- Encourage employee carpooling.
- Reduce fugitive dust by coordinating dust-producing activities during construction and minimizing disturbed areas.
- Promptly reclaiming and reseeding disturbed areas.
- Maintain vehicles to meet applicable EPA emission standards.
- Obtain a South Dakota air quality permit, if required. Powertech (USA) has submitted a permit application to the DENR Air Quality Program requesting an exemption from South Dakota air permitting as a minor source of emissions. The permit application includes a detailed emissions inventory that demonstrates that total stationary sources of emissions of criteria pollutants will be well below the 25 tons/year threshold.
- Maintain emission control systems to ensure that the annual TEDE is within the 10 CFR Part 20 public dose limit (refer to Sections 5.6.9.1 and 5.6.9.2).
- Model potential air quality impacts. Powertech (USA) currently is performing detailed ambient air quality modeling that is being coordinated with NRC and EPA. The modeling will evaluate the potential impacts of emissions from the Dewey-Burdock Project on ambient air quality to nearby residences and potential near-field impacts within 50 km of the proposed permit area (including Jewel Cave National Monument). In addition, the modeling specifically will address potential impacts on air quality related values (AQRVs) at the Wind Cave National Park, the nearest Class I area. The modeling results will be publicly available and will be submitted to DENR upon request.

5.6.11 Ecological Resources

5.6.11.1 Potential Ecological Resources Impacts

The following section discusses the potential ecological impacts of operations at the project site.

5.6.11.1.1 Vegetation

Well field and production facilities will be constructed within Big Sagebrush Shrubland, Greasewood Shrubland, Ponderosa Pine Woodland, and Upland Grassland vegetation communities. Potential direct impacts include the short-term loss of vegetation (modification of structure, species composition, and aerial extent of cover types). Potential indirect impacts include the short-term and long-term increased potential for non-native species invasion, establishment, and expansion; exposure of soils to accelerated erosion; shifts in species composition or changes in vegetative density; reduction of wildlife habitat; reduction in livestock forage; and changes in visual aesthetics.

Construction activities and increased soil disturbance could stimulate the introduction and spread of undesirable and invasive, non-native species within the permit area. Non-native species invasion and establishment has become an increasingly important result of previous and current

The seven SDNHP species recorded in or flying over the permit area could potentially experience the same type of direct and/or indirect impacts from construction and operation of the proposed operation as those described previously for other species: e.g., injury, mortality, avoidance, displacement and increased competition for resources. Those potential impacts will be minimized by the timing, extent, and duration of the proposed activities. Enforced speed limits during all phases of the project will further reduce potential impacts to wildlife throughout the year, particularly during the breeding season. Once facilities and infrastructure are in place, animals remaining in the permit area would demonstrate an acclimation to those disturbances.

5.6.11.2 Mitigation of Potential Ecological Resources Impacts

The following is a list of proposed mitigation measures for such potential impacts:

- Design fencing to permit big game passage to the extent practicable.
- Use existing roads when possible and limit construction of new access roads to provide for access to more than one well site or well field, if possible.
- Enforce speed limits to minimize collisions with wildlife, especially during the breeding season.
- Adhere to timing and spatial restrictions within specified distances of active raptor nests during the breeding season as determined by appropriate regulatory agencies.
- Develop a bald eagle mitigation/management plan for review and approval by the USFWS. The plan also will be provided to the SDGF&P for review and input, although the USFWS will have the final approval authority. The approved plan and any associated permits will be incorporated into the LSM permit. The bald eagle mitigation/management plan is anticipated to address the following:
    - Ensure that annual bald eagle monitoring and survey data for nest and winter roost sites are available within the permit area and buffer area for the life of mine to:
        - determine normal habitat use and movements,
        - determine the location and status of nests and winter roost sites, and
        - document the occurrence and outcome of nesting bald eagle pair(s).
    - Establish buffer zones protecting important bald eagle habitat where necessary and stipulating seasonal restrictions on ISR-related disturbances within buffer areas in order to avoid jeopardizing bald eagles during any project phase. Such buffer zones and their associated seasonal restrictions would be established:

        - in keeping with current USFWS recommendations,
        - around nest sites, and
        - around documented winter roost sites).
    - If necessary, obtain a USFWS-issued permit and any necessary State permits for eagle take and/or nest relocation or removal, the application for which would address the following:
        - demonstration that the proposed activity meets the requirements of 50 CFR § 22.26 or § 22.27, which contain the federal requirements for take and removal/relocation of eagle nests, respectively;
        - methods to relocate the nest(s) or construct an alternate nest and/or improve conditions at alternate nest sites, if mitigation measures are required around documented winter roost sites);
        - a demonstration that suitable nesting and foraging (including winter) habitat is available to the area nesting population of bald eagles that could accommodate any bald eagles displaced by the take or nest removal/relocation; and
        - implementation of monitoring and reporting procedures to determine the response of bald eagles to the take or nest relocation(s).
- If direct impacts to raptors or other migratory bird species of concern occur, a Monitoring and Mitigation Plan for those species will be prepared and approved by the USFWS, including one or more of the following provisions:
    - Relocation of active and inactive raptor nests that could be impacted by construction or operation activities in accordance with the approved raptor monitoring and mitigation plan.
    - Creation of raptor nests and nesting habitat through enhancement efforts such as nest platforms to mitigate other nest sites impacted by ISR operations.
    - Obtaining appropriate permits for all removal and mitigation activities.
    - Establishing buffer zones protecting raptor nests where necessary and restricting ISR-related disturbances from encroaching within buffers around active raptor nests from egg-laying until fledging to prevent nest abandonment, or injury to eggs or young.

5.6.12.2 Mitigation of Potential Cultural Resources Impacts

The following summary of protection of historic and cultural resources within the proposed permit area was obtained from the Draft Supplemental Environmental Impact Statement (Draft SEIS) for the Dewey-Burdock Project (NRC, 2012, p. xxxix):

> Within the area of potential effect at the proposed Dewey-Burdock site, 18 historic sites are either listed in the National Register of Historic Places (NRHP) or eligible for listing in the NRHP. Based on the proposed location of ISR facilities and infrastructure, avoidance of 12 of these sites is possible during the construction phase and, therefore, no impacts are anticipated. Avoidance and mitigation, such as fencing and data recovery excavations, are recommended for the remaining six NRHP-eligible sites. In addition, avoidance is recommended for two unevaluated historic burial sites located in proximity to proposed construction activities until their NRHP eligibility is determined. Avoidance and mitigation is also recommended for 4 unevaluated site[s] located within 76 m (250 ft) of proposed wellfields or land application areas.

The mitigation measures to protect historic and cultural resources will include but will not be limited to:

- Administering a historic and cultural resources inventory before engaging in any development activity not previously assessed by NRC or any cooperating agency.
- Any disturbances to be associated with such development will be addressed in compliance with the National Historic Preservation Act (NHPA), the Archeological Resources Protection Act, and their implementing regulations.
- Prior to construction, establishing an agreement between NRC, South Dakota State Historic Preservation Office (SHPO), BLM, interested Native American tribes, Powertech (USA) and other interested parties that outlines the mitigation process for each affected historic resource. As part of this agreement, Powertech (USA) will develop an Unexpected Discovery Plan that will outline the steps required if unexpected historic and cultural resources are encountered (Draft SEIS, p. xxxix).
- Avoidance, where possible, of eligible or potentially eligible sites.
- Fencing known historic properties in areas where construction, well field development, and ISR operations will occur so disturbance to these areas can be avoided.
- Making the location of historic properties known to employees in advance of ground disturbing activities.
- Addressing any disturbances in compliance with Powertech's (USA) Memorandum of Agreement (MOA) with the South Dakota State Archeologist and any future MOAs developed by Powertech (USA) or NRC under the NHPA. Powertech (USA) executed the MOA with the South Dakota State Archeologist in September 2008. The MOA, which is provided in Appendix 3.11-B, establishes procedures to avoid or mitigate

potential effects on archaeological and historic sites pursuant to SDCL 45-6D-14 and 45-6B. Provisions include:

- Investigating archeological or historic sites threatened or potentially threatened by proposed ground disturbing activity prior to disturbance to determine their significance or research potential.
- Notifying ARC at least 30 days in advance of surface disturbance that could potentially impact an archeological or historic site.
- Providing a quarterly report to ARC summarizing Powertech (USA)'s efforts to carry out the terms of the MOA.
- Temporarily halting surface disturbance activities if historic or archeological sites are discovered or unanticipated effects on historic or cultural sites are found during any phase of the project. Powertech (USA) will not resume activities until clearance to proceed is granted by ARC.

- Implementing mitigation measures if it becomes necessary to disturb an eligible or potentially eligible site, potentially including data recovery excavations coordinated with ARC.
- Immediately ceasing any work resulting in the discovery of previously unknown cultural artifacts to ensure that no unapproved disturbance occurs. Powertech (USA) will notify appropriate authorities per any license conditions and will not proceed with activities without appropriate approvals from NRC or other agencies as appropriate. Any such artifacts will be inventoried and evaluated, and no further disturbance will occur until authorization to proceed has been received. Powertech (USA) recognizes that the NHPA environment is not static, but rather is ongoing up to and through final financial assurance release following successful reclamation.

5.6.13 Noise

5.6.13.1 Potential Noise Impacts

Potential noise impacts will result from the operation of construction equipment, passenger vehicle and material shipment vehicle traffic, and, to a very limited extent, from the operation of ISR and wastewater facilities including center pivots if used for land application. The potential impacts to nearby receptors will be small due to the remote location, limited disturbance, and lack of nearby residences.

Section 3.12 describes how the minimum distance between a residence and the primary county road in the permit area (S. Dewey Road) is 3,700 feet. Based on the analysis in Section 3.12, the maximum anticipated noise from a heavy truck traveling on the S. Dewey Road at a residence within the permit area will be 41 dBA, which is well within the 55 dBA level identified by EPA as preventing activity interference and annoyance. Based on this analysis, increased vehicle

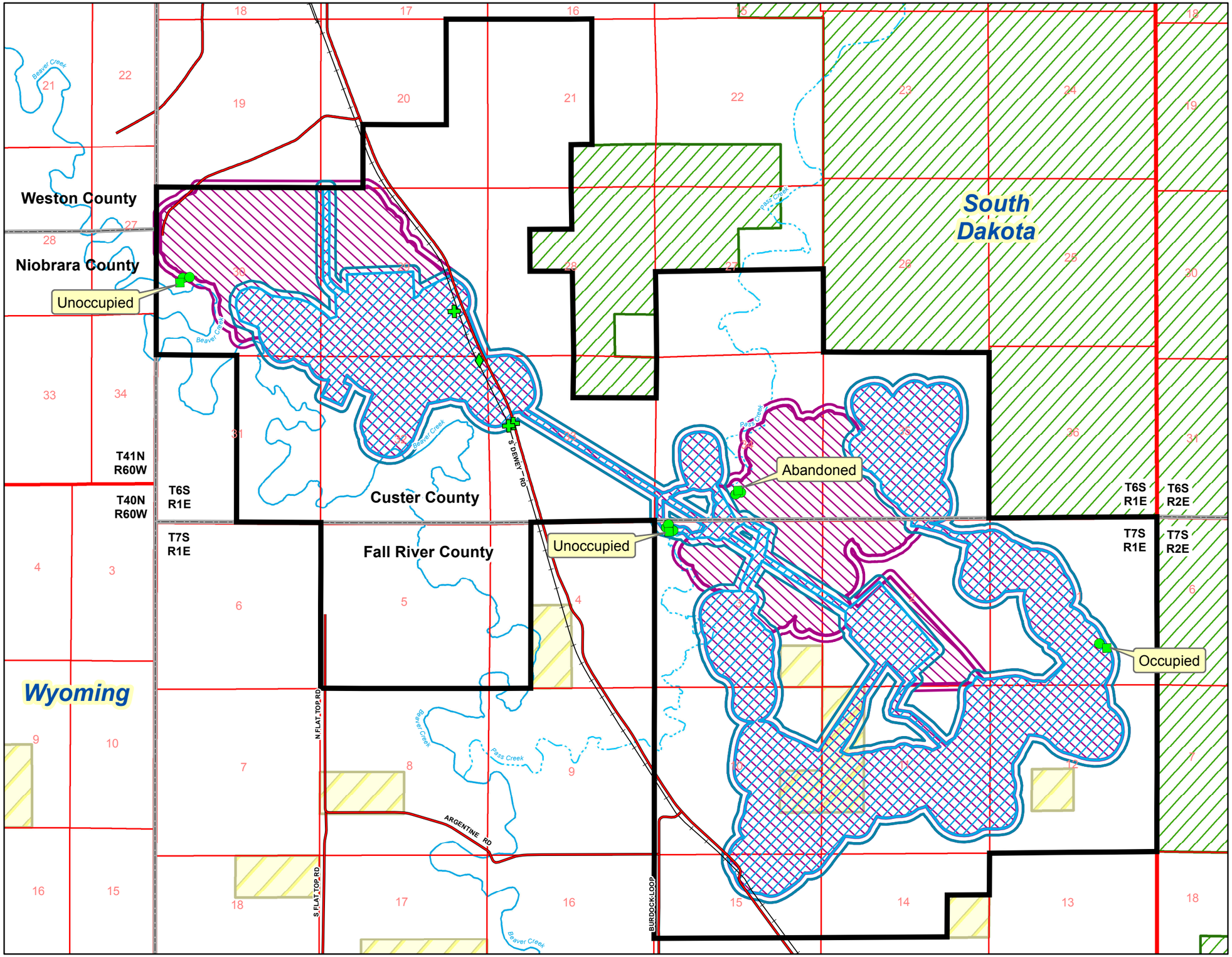
- Minimize access road construction through the use of existing roads.
- Locate access roads and utilities in common corridors where possible.
- Implement speed limit policies and dust control measures including routinely applying water spray to roads and construction areas to minimize fugitive dust.
- Promptly reclaim and reseed temporary disturbance areas.
- Promptly remove debris associated with construction activities.

5.6.15 Protection of Man-Made Structures

Figure 5.6-2 depicts man-made structures within 200 feet of the proposed affected area boundaries. These include dwellings, farm structures (e.g., barns and sheds), a railroad switch house, and concrete culverts. Following is a summary of how these structures will be protected in accordance with SDCL 45-6B-32(4).

Several dwellings and farm structures are within 200 feet of the proposed affected area boundaries. Currently these include one occupied dwelling, two unoccupied but habitable dwellings, and one abandoned dwelling that is not habitable. There are no habitable dwellings within potential well field pattern areas. It is anticipated that construction activities within 200 feet of dwellings or farm structures will be limited to the installation of perimeter monitor wells, pipelines and overhead power lines. Powertech (USA) does not anticipate drilling any wells within 50 feet or installing any pipelines within 25 feet of any habitable dwelling or any usable farm structures, except that Powertech (USA) may install small-diameter domestic water supply pipelines to replace domestic water supply wells as described in Section 5.6.3.2. Potential impacts will be minimized by avoiding these structures during facility design and construction.

The railroad, railroad switch house, and concrete railroad culverts will be protected by avoiding construction activities near the railroad. The only construction activity anticipated within 200 feet of the railroad is the installation of perimeter monitor wells in or near the railroad right-of-way in the vicinity of D-WF1 and B-WF2. Any perimeter wells inside the railroad right-of-way would be offset from the railroad a sufficient distance to allow the work to be performed safely and to protect the stability of the railroad. In addition, Powertech (USA) may install one or more plant-to-plant pipelines between the CPP and Satellite Facility. As depicted on Figures 5.3-1 and 5.3-2, such pipelines would cross the railroad right-of-way near the Satellite Facility. These pipelines, if installed, would be bored underneath the railroad, and the bored length would be encased in a protective material such as steel well casing. Any construction activities within the BNSF right-of-way would be coordinated with the railroad to avoid impacts.



Legend

- Permit Boundary
- BNSF Railroad
- County Roads
- Ephemeral Streams
- Perennial Streams
- BLM Land
- Black Hills National Forest
- Proposed Affected Area Boundary, Deep Disposal Well Option
- 200' from Proposed Affected Area Boundary, Deep Disposal Well Option
- Proposed Affected Area Boundary, Land Application Option
- 200' from Proposed Affected Area Boundary, Land Application Option

Structures within 200' of Proposed Affected Area Boundary

- Dwelling
- Farm Structure
- Railroad Switch
- Culvert - Concrete

This figure is provided to fulfill the requirements of SDCL 45-6B-32(4).

Feet: 0, 1,500, 3,000, 6,000
Meters: 0, 500, 1,000, 1,500, 2,000
N

Figure 5.6-2
Structures within 200' of Affected Area Boundary

Dewey-Burdock Project

SIGNATURE OF PREPARER	John Mays
PREPARER	John Mays
DATE	3-Dec-2012
FILE	StructsNearAffected.mxd

POWERTECH (USA) INC.

No significant disturbance will occur to the S. Dewey Road as a result of the Dewey-Burdock Project. Powertech (USA) will coordinate the construction of access road approaches with Custer and Fall River counties.

5.7 Operations

During operation of the facility, Powertech (USA) via the company's Safety and Environmental Review Panel (SERP) will ensure that the facility will apply to all applicable laws and regulations. Powertech (USA) will maintain the health and safety of the workers, general public, and the environment while the facility is in operation. This includes maintaining potential occupational and public exposures to ionizing radiation ALARA in accordance with NRC license conditions.

5.7.1 Corporate Organization and Administrative Procedures

This section provides functional positions within the Powertech (USA) organization that have direct responsibility to ensure corporate commitment to operating the facility in a manner that is protective of human health and the environment, including the principle of ALARA. The organizational accountability of these functional positions is also presented.

5.7.1.1 Corporate and Facility Organization

The organizational structure of Powertech (USA) and the facility is shown in Figure 5.7-1. The organization structure defines the Chief Operating Officer (COO) as having direct supervision over the Vice President of Environmental Health & Safety Resources and the Facility Manager of the Dewey-Burdock Project.

5.7.1.2 Chief Operating Officer

The COO is empowered by the Board of Directors to have the responsibility and authority for the radiation safety and environmental compliance programs at all Powertech (USA) facilities. The COO is directly responsible for ensuring that Powertech (USA) personnel comply with corporate industrial safety, radiation safety, and environmental protection programs. The COO is also responsible for company compliance with all regulatory license/permit conditions/stipulations, regulations, and reporting requirements. The COO has the responsibility and authority to terminate immediately any activity that is determined to be a threat to employees, public health,

integrates the mining operation and reclamation with the postmining land use; (e) consistent with existing state and local land use plans and programs; and (f) of a beneficial use. Following is a description of how the postmining land uses of rangeland and agricultural or horticultural crops meet all of the criteria listed above.

(a) Obtainable According to Data on Expected Market and Need

Appendix 6.4-D describes how for rangeland, two of the criteria to determine revegetation success will be usable forage production and revegetation sustainability. These two parameters will demonstrate that the reclaimed rangeland has at least the same livestock carrying capacity as reference areas. For agricultural or horticultural cropland, the final bond release criterion will be a demonstration that the productive capacity is equal to or exceeds that of similar crop production areas in nearby comparison areas. Powertech (USA) will maintain adequate financial assurance to ensure that areas can be reclaimed to the approved postmining land uses.

(b) Supported by Commitments from Public Agencies where Appropriate

Powertech (USA) is not aware of the need for any commitments from public agencies to support the postmining land uses of rangeland or agricultural or horticultural cropland.

(c) Practicable based on Powertech (USA)'s Financial Ability to Perform Reclamation

As described in Section 6.7.1, Powertech (USA) will maintain financial assurance instruments to cover the cost of all reclamation and decommissioning activities, including reclamation and revegetation of affected areas.

(d) Planned Pursuant to a Schedule that Integrates Mining and Reclamation with Each Postmining Land Use

Sections 6.5 and 6.6 present the schedules for reclamation and reclamation monitoring. Well field reclamation will be carried out concurrently with ISR operations. After uranium recovery is no longer economical in each well field, groundwater restoration will be completed followed by well field reclamation. The minimum period of vegetation establishment for rangeland and agricultural or horticultural cropland prior to evaluation for final financial assurance release will be 3 years.

(e) Consistent with Existing State and Local Land Use Plans and Programs

The postmining land uses of rangeland and agricultural or horticultural cropland are the same as the predominant premining land uses in the proposed permit area. Therefore, they are expected to be consistent with existing state and local land use plans and programs.

(f) Beneficial Use

The postmining land uses of rangeland and agricultural or horticultural cropland are the same as the predominant premining land uses in the proposed permit area. These uses will have economic value to the landowners and thus they meet the definition of "beneficial use" in ARSD 74:29:01:01.

The proposed postmining land uses within the permit boundary are presented on Plate 6.4-1, which also depicts the proposed postmining topography. Due to limited disturbance, the proposed postmining topography is the same as the premining topography and is consistent with the postmining land use.

6.4.1.1 Rangeland

In conformance with ARSD 74:29:06:02(1), rangeland reclamation will follow guidelines established in ARSD 74:29:07:20 including: the reclaimed rangeland will have the capability to support a livestock carrying capacity that is equivalent to that of the surrounding area or to that of the reference area, if used; reclaimed slopes will not exceed 3:1 unless steeper slopes are approved by DENR; newly seeded areas will be fenced if it is necessary to preclude livestock or wildlife from impairing establishment of the required vegetation; and reclamation will be considered complete when the reclaimed range is capable of withstanding proper stocking rates for 2 consecutive years prior to bond release. Powertech (USA) has developed reclamation practices through consultation with the Custer County and Fall River County conservation districts and DENR to ensure that the requirements for reclaiming the land to rangeland are accomplished. Monitoring per the recommendations outlined in Powertech (USA)'s Dewey-Burdock Project Reclamation Performance Criteria document (provided in Appendix 6.4-D) will determine rangeland reclamation success. The monitoring plan has been developed in accordance with ARSD 74:29:06:02(3), which requires support and maintenance activities documenting successful implementation of reclamation.

6.4.1.2 Agricultural or Horticultural Crops

In conformance with ARSD 74:29:06:02(1), agricultural or horticultural crops reclamation will follow guidelines established in ARSD 74:29:07:21. The reclaimed agricultural or horticultural land will have the capability of producing crops consistent with similar crop production areas in the surrounding region, and the reclamation will be considered complete when productive capability is equivalent to or exceeds similar crop production areas in the surrounding region for 2 consecutive crop years. Monitoring will be performed in accordance with ARSD 74:29:06:02(3), which requires support and maintenance activities documenting successful implementation of reclamation.

Alfalfa is the only crop currently proposed for reclamation of designated agricultural or horticultural cropland in the proposed permit area. Alfalfa is the only crop currently grown in the proposed permit area and is grown in several areas nearby, so comparative production figures from nearby areas will be readily available.

All disturbed areas with a delineated postmining land use of agricultural or horticultural crops will have an alternate postmining land use of rangeland. In the event that these agricultural or horticultural croplands are not desired by the landowner to be used as cropland following reclamation, the land will be designated as rangeland and will follow guidelines established in ARSD 74:29:07:20 for rangeland reclamation, as described above.

6.4.2 Interim Revegetation

Interim revegetation is the process of temporarily stabilizing grounds which are scheduled to be re-disturbed before the completion of mining. Portions of the permit area which will receive interim revegetation treatments include topsoil stockpiles, well fields, and pipelines. Because of the limited availability of salvageable topsoil material, some disturbed areas subject to interim reclamation will be directly seeded without the replacement of topsoil material. Straw mulch may be applied at the time of seeding to further improve and accelerate planting success; however, such applications will be site specific. Topsoil stockpiles which are to remain undisturbed for more than 2 years will be regraded to a stable configuration, bermed, and seeded in accordance with ARSD 74:29:08:02. Interim seeding will be done with the same seed mixture as the final seeding mixture shown in Table 6.4-1 to ensure that all interim reclamation is compatible with final reclamation when it occurs. The letter of concurrence with this seed mixture from the local NRCS office is provided in Appendix 6.4-B, and letters of concurrence with this seed mixture from landowners are presented in Appendix 6.4-A.

6.4.3 Surface Disturbance Reclamation

Due to the nature of ISR activities, minimal and intermittent surface disturbance will be associated with the project, and will be mainly associated with the CPP, Satellite Facility, and ancillary facilities such as ponds. Additional intermittent disturbance will occur in the well fields, including well drilling, pipe installations, and road construction.

Surface disturbances associated with the construction of the CPP, Satellite Facility, and ponds will be for the life of those activities. Topsoil will be stripped and stockpiled from these areas prior to construction. Disturbances associated with the well field drilling and pipeline installation are limited and will be reclaimed as soon as possible after these components are completed. The topsoil will be temporarily stripped and stockpiled from well field disturbance areas prior to well field construction. Surface disturbance associated with the development of

access roads also will occur; topsoil will be stripped from the road areas and stockpiled prior to construction.

The total anticipated topsoil stripping area over the life of the Dewey-Burdock Project is estimated to be approximately 250 acres in the deep disposal well option and 440 acres in the land application option.

Powertech (USA) will restrict grazing on newly seeded areas if it is necessary to preclude livestock or wildlife from impairing establishment of the required vegetation. Possible means to restrict grazing could include, but are not limited to, fencing and working with landowners to voluntarily withhold grazing from areas containing reclamation.

6.4.3.1 Spoil Replacement and Grading

Following is a description of the general spoil replacement and grading activities followed by specific methods for mud pits, processing areas, land application areas, and access roads.

General Methods

During reclamation, spoil will be replaced from areas previously excavated, including pond and diversion channels. Spoil will be replaced in lifts and compacted as necessary to match premining conditions.

Due to the nature of uranium ISR, there will be very few construction activities that will require significant grading or contouring during reclamation. Finish grading will be achieved with typical earth moving equipment such as motor graders. Disturbed areas will be contoured to blend in with the natural terrain. Reclaimed slopes will not exceed 3:1 unless DENR approves steeper slopes. The postmining contours will be approximately the same as premining contours, as shown on Plate 6.4-1.

The finished, contoured surface will be ripped as needed prior to topsoil replacement to relieve compaction, aid infiltration, promote root penetration, and prevent topsoil slippage and instability.

A sediment control plan will be implemented during all project phases, including final grading, to reduce soil loss within the proposed permit area. The sediment control measures discussed in Section 5.3.9 will be maintained and inspected until contributing areas are reclaimed. Sediment control structures are described in Section 5.3.9.3 and include silt fence, check dams, sediment

traps, and sediment ponds. During final grading, Powertech (USA) will identify potential sources of pollution and determine BMPs to be used, including erosion and sediment controls.

In accordance with ASD 74:29:07:04(4) and (5), all disturbed areas will be graded to eliminate depressions that could accumulate water and to match premining topography, and any altered drainages will be returned to original functionality during the final grading process.

Specific Methods

Following is a description of the spoil replacement and grading methods for well field mud pits, processing facilities, land application areas, and access roads.

Mud Pits

As described in Section 5.3.7, topsoil will be separated from subsoil during excavation of mud pits. When use of each mud pit is complete, the subsoil will be redeposited in the mud pit followed by replacing topsoil. Prior to topsoil replacement, the subsoil will be graded to match premining topography.

CPP and Satellite Facility

During reclamation, the CPP and Satellite Facility process buildings and equipment will be removed as described in Section 6.3.1.3. The processing facility areas will be regraded to approximate premining topography, and topsoil stockpiled near the facilities will be replaced. Section 6.5 describes how facility reclamation, including the CPP and Satellite Facility, will occur following well field reclamation. The expected duration of final grading and reclamation activities at the CPP and Satellite Facility is approximately 2 years, as shown in Figure 5.2-1.

Land Application Areas

The topography in the land application areas will remain unchanged except for minor areas of grading to reduce slopes. Prior to disturbance, topsoil will be stripped from these areas. Topsoil will be temporarily replaced in the areas of minor grading. Topsoil may be spread on the catchment areas and catchment berms, or it may be temporarily stockpiled near the catchment areas for replacement during final reclamation. Following groundwater restoration in all well fields and disposal of all wastewater via deep disposal wells and/or land application, land application areas will be reclaimed. Disturbed areas will be regraded to approximate premining contours, including areas of minor grading to reduce slopes or construct catchment areas and catchment berms. Topsoil will be stripped prior to regrading and replaced after regrading. The

anticipated duration of land application reclamation is 1 year. It will be done during the CPP and main facility decommissioning phase shown on Figure 5.2-1.

Access Roads

Access road reclamation is described in Section 6.4.3.3.

6.4.3.2 Topsoil Replacement

Refer to Section 5.3.7 for a description of topsoil handling during construction. In areas that will be disturbed for prolonged periods during the life of the project (i.e., more than one construction season), topsoil will be salvaged and stored in designated topsoil stockpiles. Topsoil will be removed by scrapers under most circumstances, although other mobile equipment may be used occasionally. The topsoil salvaged for pipeline construction corridors may be bladed to the side to permit pipeline construction and then bladed back after construction is complete. Field salvage operations will be monitored by qualified field personnel. Topsoil stripping depths will vary throughout the permit area, but are expected to average approximately 19.5 inches (refer to Appendix 3.3-A). During reclamation, topsoil temporarily stored in stockpiles will be redistributed over the originally disturbed area. The replacement depth will be calculated based on the stockpile volume and the area to be reclaimed. The amount of topsoil salvaged is estimated to be the same as the amount replaced, such that there is not anticipated to be excess or limited topsoil. Powertech does not anticipate using topsoil substitutes. The topsoil will be graded to blend with the adjacent topography.

In areas of temporary disturbance such as those affected by the installation of monitor wells and pipelines, topsoil will be separated from subsoil during construction and replaced following subsoil replacement. The topsoil will be replaced over the entire disturbed area using a uniform depth based on the amount of topsoil that was salvaged.

In areas of poor baseline vegetative cover, Powertech (USA) may analyze the topsoil to determine whether fertilizer or other amendments will be required to establish and sustain a vegetative cover on reclaimed areas. See also Section 6.4.3.4 for a discussion of areas with low vegetative cover densities that likely will have low revegetation potential if disturbed. These include the Darrow Mine surface pits/spoil piles and the “alkali area.” In only very limited areas, which are anticipated to include the historical mine pits and the alkali area, Powertech (USA) will sample the topsoil and subsoil prior to disturbance. If the evaluation demonstrates that its chemical or physical characteristics would seriously inhibit plant growth and that it is not feasible to remedy by chemical treatment, overburden replacement, or like measures, Powertech

(USA) will request that the revegetation performance criteria not apply for these limited areas as allowed by SDCL 45-6B-46(2).

6.4.3.3 Access Road Reclamation

All roads and portions of roads constructed and utilized for access to the facilities and well fields will be removed and reclaimed unless exempted from reclamation by the request of the landowner/lessee, in which case the landowner/lessee will accept the responsibility for their long-term maintenance and ultimate reclamation. In this case, Powertech (USA) will request in writing to the board that a road or portion of a road remain un-reclaimed in accordance with ARSD 74:29:07:12(10).

Prior to reclamation, any contamination which resulted from the ISR operation will be cleaned to NRC-approved standards and the contaminated material disposed offsite at an appropriately permitted facility.

Access roads will be reclaimed by removing imported road surfacing material and ripping road surfaces and shallow subsoil to loosen the subsoil. Culverts will be removed and premining drainages re-established. Any spoil temporarily stockpiled during access road construction will be replaced. Access road areas will be graded to approximate premining contours. Topsoil will be replaced in a uniform manner and the area revegetated.

Access roads will be reclaimed when they are no longer needed. Well field access roads will be reclaimed during reclamation of each well field unless they are used to access other well fields or monitoring locations. The primary access roads will be reclaimed during the CPP and main facility decommissioning phase shown on Figure 5.2-1. The expected duration of access road reclamation is less than 1 year for each access road, but may occur over several years due to phased well field decommissioning/reclamation.

6.4.3.4 Revegetation Methods and Final Seed Mix

The permanent seed mixture for the rangeland reclamation type is presented in Table 6.4-1. Per DENR regulations, the seed mix has been chosen to be compatible with the postmining rangeland use. The local conservation district, landowners and DENR were consulted when selecting the seed mix (Appendices 6.4-A and 6.4-B). To reduce wind and water erosion, topsoil stockpiles and other various temporary disturbances in the well field area will be seeded. The temporary seed mix is the same as the permanent seed mixture.

Based on existing cropland within the permit area, alfalfa is the only agricultural or horticultural crop currently proposed for reclamation of designated agricultural or horticultural cropland in the permit area.

Seeding may be done with a rangeland drill or with a broadcast seeder where practical. If broadcast, the seeding rate will be increased in accordance with NRCS recommendations. After topsoil preparation is completed affected lands will be seeded during the first normal period of favorable planting conditions unless an alternative plan has been approved. Areas seeded with the rangeland seed mixture will not be treated with any type of soil amendment or irrigated to improve reclamation success unless required to address problems resulting from the land application of treated wastewater (see Section 6.8.4). Any gullies or rills that would preclude the successful establishment of vegetation or achievement of the postmining land use will be removed or stabilized as part of the revegetation and reclamation process. Techniques utilized to monitor reclamation success are discussed in Section 6.6.

Some areas have low baseline vegetative cover densities and likely will have low revegetation potential if disturbed. These include the Darrow Mine surface pits/spoil piles and the "alkali area." The historical mine pits and spoil piles have low revegetation potential primarily due to the physical characteristics of the soil (i.e., lack of organic matter). The alkali area is an area of known discharge from the Fall River and/or Chilson through historical exploration holes. This area may have high levels of salinity and alkalinity that are currently devoid of vegetation and would continue to inhibit vegetation if disturbed. In accordance with SDCL 45-6B-46(2), planting may not be required on affected land with chemical and physical characteristics that are "toxic, deficient in plant nutrients, or composed of sand, gravel, shale, or stone to such an extent to seriously inhibit plant growth and such conditions cannot feasibly be remedied by chemical treatment, fertilization, replacement of overburden, or like measures." In only very limited areas, which are anticipated to include the historical mine pits and the alkali area, Powertech (USA) will sample the topsoil and subsoil prior to disturbance. If the evaluation demonstrates that its chemical or physical characteristics would seriously inhibit plant growth and that it is not feasible to remedy by chemical treatment, overburden replacement, or like measures, Powertech (USA) will request that the revegetation performance criteria in Appendix 6.4-D not apply for these limited areas as allowed by SDCL 45-6B-46(2).

6.4.3.5 Weed Control and Refuse Management

Powertech (USA) will maintain an active weed control program for noxious weeds occurring on the property in accordance with ARSD 74:29:07:15 and SDCL 45-6B-43. Objectives of the program will be:

- Conduct a yearly property inspection.
- Identify locations of weed growth.
- Treat weeds annually through chemical control.

Powertech (USA) has consulted with the local weed and pest boards in preparation of the weed control program for the Dewey-Burdock Project. The weed control plan is provided in appendix 6.4-C along with consultation letters.

Along with the weed control program, Powertech (USA) will manage refuse according to state and federal requirements in accordance with ARSD 74:29:07:05. Powertech (USA) is not proposing to use any of the land in the permit area for deposit or disposal of refuse.

6.4.3.6 Erosion Control Practices

Erosion control measures will be implemented during all phases of construction, operation, reclamation, and closure. Refer to Section 5.3.9 for details on erosion control measures. Temporary sedimentation, erosion control, and drainage control structures will be removed when

no longer needed. Sediment and erosion control structures will be inspected on a quarterly basis to ensure compliance with all applicable reclamation, design, and operating criteria. Maintenance and repair work needed to keep the structures in proper operating order will be performed as necessary. This work will include the removal and proper disposal of sediment captured by the structures and repair or replacement of old ASCM structures. If during the term of the postclosure period erosion and sedimentation becomes a problem in any area, new structures will be installed to adequately address any problems. Conversely, if the need for sediment and erosion controls in an area becomes unnecessary, the synthetics will be removed for aesthetic purposes.

6.4.4 Revegetation of Land Application Areas

The revegetation techniques for land application areas will depend on the vegetation grown in the land application areas. If native vegetation is irrigated and the species composition of the native vegetation does not change significantly during irrigation, then reseeding is not anticipated to be necessary to meet the reclamation performance criteria. However, if the species composition of the native vegetation significantly changes during the course of land application, Powertech (USA) will develop a plan that either demonstrates that after termination of land application a permanent, self-perpetuating ground cover at least equal in character and extent to the original will remain or detail a revegetation program that has been approved by SDGF&P and the local conservation district.

If crops such as alfalfa or wheatgrass are planted in the land application areas, Powertech (USA) will revegetate the land application areas during reclamation by preparing the topsoil and using the seeding mixture and methods described in Section 6.4.3.4.

6.5 Reclamation Timetable

Reclamation will be carried out in an ongoing process concurrent with ISR operations in accordance with NRC license conditions and ARSD 74:29:08. It is anticipated that groundwater restoration, including stability monitoring, will be completed for each well field in less than 2 years. Decontamination, decommissioning, and surface reclamation will follow after regulatory approval of successful groundwater restoration. The reclamation for each well field will be carried out with all reasonable diligence. Each phase of reclamation, including each well field and final facility reclamation, is expected to be completed within 5 years in accordance with SDCL 45-6B-46. Figure 6.5-1 depicts the proposed project schedule including phased

decommissioning/reclamation for each well field. Facility reclamation (CPP, Satellite Facility, and ponds) will occur following well field reclamation.

6.6 Reclamation Monitoring

Powertech (USA) will monitor revegetation success for compliance with ARSD 74:29:07:06. The goal of the reclamation program is to stabilizes the soil and return the disturbed areas to a function similar to undisturbed areas. Primary revegetation success will be determined using performance standards for current carrying capacity and vegetative ground cover. The Dewey-Burdock Project Reclamation Performance Criteria document is included as Appendix 6.4-D. The minimum period of vegetation establishment for rangeland and agriculture land prior to evaluation for final financial assurance release will be 3 years. The success of the final revegetation and final financial assurance release will be determined by DENR.

6.8.3 Vegetation Monitoring

Reclaimed land will be inspected on an annual basis, coinciding with the growing season, to ensure compliance with the final Reclamation Plan and postmining land use. If the vegetation is not achieving the goals of the final Reclamation Plan and postmining land use, steps will be taken to correct or mitigate the situation. If a change in the seed mixture is necessary to ensure vegetative success, these changes will be submitted to DENR for approval.

Monitoring methods used to document reclamation success are included in Powertech (USA)'s Dewey-Burdock Project Reclamation Performance Criteria (Appendix 6.4-D).

6.8.4 Land Application Monitoring

As discussed in Section 5.4.1.1.2, Powertech (USA) may use land application as a method of disposing treated wastewater. If land application is used, there could be potential impacts to the soil and vegetation from the buildup of salts, changes in SAR, buildup of radionuclides, buildup of metals and metalloids, and decrease in soil fertility.

In conformance with ARSD 74:29:05:19, Powertech (USA) has formulated a monitoring and mitigation plan to detect potential soil and vegetation impacts related to land application of treated wastewater. The specific monitoring and mitigation measures are addressed in Sections 5.5.6.1 and 5.5.7.1 and GDP Sections 6.4 and 6.5. Revegetation of land application areas is addressed in Section 6.4.4.

6.8.5 Sediment and Erosion Control Structures

Sediment and erosion control structures will be inspected on a quarterly basis to ensure compliance with all applicable reclamation, design, and operating criteria. Maintenance and repair work needed to keep the structures in proper operating order will be performed as necessary. This work will include the removal and proper disposal of sediment captured by the structures and repair or replacement of ASCMs as needed. If during the term of the postclosure period erosion and sedimentation becomes a problem in any area, new structures will be installed to adequately address any problems. Conversely, if the need for sediment and erosion controls in an area becomes unnecessary, the synthetics will be removed for aesthetic purposes.

6.8.6 Postclosure Financial Assurance

Prior to release of the reclamation financial assurance instrument by DENR, a portion of the reclamation financial assurance will be dedicated to the postclosure bond. A detailed financial

assurance estimate for postclosure activities will be submitted to DENR for approval prior to the beginning of the postclosure monitoring period.

6.8.7 Postclosure Monitoring Duration

Powertech (USA) will conduct postclosure monitoring for 30 years following operations, or until release of this requirement has been granted by DENR.

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