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NI 43-101 Technical Report
Paris Hills Phosphate Project
Bloomington, Idaho, USA

Restated Date: 08 July 2013

Effective Date: 18 January 2013

Prepared for

STONEGATE

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AMENDED AND RESTATED
NI 43-101 TECHNICAL REPORT
PARIS HILLS PHOSPHATE PROJECT
BLOOMINGTON, IDAHO
USA

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1.0 SUMMARY

Stonegate Agricom Ltd. (Stonegate) is a Toronto, Ontario, Canada-based mining development company. Stonegate is a Toronto Stock Exchange (stock symbol TSX:ST) listed company in the business of acquiring, exploring, and developing mineral resource properties to production in Canada, the United States of America (USA), and internationally. Agapito Associates, Inc. (AAI) was commissioned by Stonegate to provide an independent Qualified Person's (QP) review and National Instrument (NI) 43-101 Technical Report (TR) on behalf of their subsidiary, Paris Hills Agricom Inc. (PHA), on the wholly owned Paris Hills Phosphate Project (the Property) located near the town of Bloomington in Bear Lake County, Idaho, USA.

PHA acquired rights to the Property from RMP Resources Corp. (RMP), a wholly owned subsidiary of Rocky Mountain Resources Corp., on 04 November 2009 by the acquisition of 3 patented lode claims and 21 contiguous fee parcels. Stonegate has since acquired additional mineral leases.

This report incorporates information from a maiden NI 43-101 report prepared for RMP, and four subsequent NI 43-101 reports prepared for Stonegate (AMEC Americas Limited [AMEC] 2010; AAI 2011; AAI 2012a; AAI 2012b). PHA originally developed plans for room-and-pillar mining in the Lower Phosphate Zone (LPZ), the principal mining target, as part of a Preliminary Feasibility Study (PFS) published in March 2012 (AAI et al. 2012a). LPZ Mineral Reserves were identified in the PFS and published in an associated TR (AAI 2012a). In December 2012, Stonegate completed a Feasibility Study (FS) (AAI et al. 2012b), enhancing economic projections and expanding Mineral Reserves for room-and-pillar mining in the LPZ.

The purpose of this report is to update the LPZ Mineral Resource and Mineral Reserve based on (1) exploration information through 04 October 2012 and (2) the results of the December 2012 FS. The Mineral Resource in the Upper Phosphate Zone (UPZ) and other mineralized Exploration Targets on the Property remain unchanged from the August 2012 TR (AAI 2012b). No plans currently exist for mining in the UPZ.

This report was originally issued on 18 January 2013 (AAI 2013) and was amended and restated on 08 July 2013 to update the standing of QPs responsible for the report.

The December 2012 FS encompasses the exploration, geologic modeling, resource and reserve estimation, mine planning and design, mining methodology and equipment, hydrogeology modeling, surface infrastructure requirements, labor, beneficiation test work results, fertilizer processing pilot plant test work results, phosphate rock ore handling, environmental and permitting, mine closure, marketing, royalty agreements, project economics, project development schedule, and risks in support of the direct shipping run-of-mine (ROM) ore (phosphate rock concentrate) averaging greater than 29 percent (%) phosphorus pentoxide (P_2O_5). An option to truck the ore to a Montpelier, Idaho, rail loadout facility located on the Union Pacific Railroad (UP) is also evaluated.

Stonegate's objective is to become a leading low-cost producer of high-quality phosphate concentrate to supply regional and international markets with long-term supply deficits. The Paris Hills Project is considered to be in the feasibility planning stage.

1.1 Location, Access, and Infrastructure

The Property is located in Bear Lake County, Idaho, 3.2 kilometers (km) west of the towns of Paris and Bloomington.

Adequate surface rights have been obtained to support mining operations on the Property, but additional rights may be required for various infrastructure. Sources for water and electric power have been locally developed, but rights or agreements will need to be secured. The Union Pacific Railroad (UP) provides freight services to Bear Lake County from an office located in Montpelier. The track through Montpelier connects into the UP system at Pocatello, Idaho and Green River, Wyoming.

Paris Hills is located in the State of Idaho, USA, a state with a reputation of being a “business friendly” jurisdiction. Idaho was ranked 33rd out of 79 jurisdictions evaluated in the 2010/2011 Fraser Institute report on ranking of political policy towards mining, suggesting that new mining projects can be built in Idaho.

All costs are expressed in fourth quarter 2012 United States Dollars (USD or US$) unless otherwise noted. Numbers stated in tables are rounded such that differences may appear between individual and total values, or between tables.

1.2 Tenure and Surface Rights

The Property encompasses an area of approximately 1,010.5 hectares (ha). The Property consists of 3 patented lode mining claims and 21 contiguous fee parcels (some with federal mineral reservations) covering portions of Sections 8, 9, 10, 15, 16, 17, 21, and 22 in Township 14 South, Range 43 East (T14S, R43E) in Bear Lake County. The Property is located within surveyed townships and boundaries using aliquot parts and private surveys of segregated fee parcels.

PHA has secured the rights to conduct exploration for phosphate and metalliferous minerals on all parcels comprising the Property through federal and state exploration permits and private agreements. Reasonable prospects exist for PHA to obtain the required permits and approvals to conduct mine operations.

1.3 Geology, Hydrogeology, and Geochemistry

1.3.1 Geology

The Property is located near the center of the Western Phosphate Field which constitutes the most extensive phosphorite beds in the USA and extends across Montana, Idaho, Utah, and Wyoming. Phosphate beds of the Western Phosphate Field occur within the Meade Peak Member of the Permian Phosphoria Formation. The Phosphoria Formation of the Western Phosphate Field outcrops along a series of imbricate thrusts in an area tens of kilometers wide within the Rocky Mountain Fold- and Thrust-Belt. Extensive block faulting associated with Basin and Range deformation during Tertiary time formed the north-trending graben valleys in southeastern Idaho and adjacent parts of Utah and Wyoming. The Property is located along the west side of the Bear Lake Graben and is bounded on the west by a segment of the Paris Thrust.

The primary lithologic units present within the Property are, in order from youngest to oldest, the Wasatch Formation, Dinwoody Formation, Phosphoria Formation (Retort Member, Rex Chert Member, and Meade Peak Phosphatic Shale Member) and the Wells Formation.

Phosphorite is a general term for sedimentary rock containing significant amounts of phosphate minerals as well as other constituents such as quartz, feldspar, clay minerals, and organic matter. Fluorapatite, $Ca_5(PO_4)_3F$, is the primary phosphate mineral.

Phosphate and vanadium-rich mineralized beds occur in the horizontal and upturned to overturned limb of the Paris Syncline. The mineralized beds plunge northwest between 7 degrees (°) and 22° along the west-dipping, north-plunging horizontal limb of the syncline. The horizontal limb contains the principal resource target and additional mineralization is contained in the steeply dipping, upturned to overturned limb of the syncline. Phosphate mineralization similar in character to PHA ore is currently mined in open pits 50 km to the north near Soda Springs by the three major Idaho phosphate producers.

The target phosphate mineralization contained in the LPZ ranges in depth from outcrop to more than 1,000 meters (m) deep. The LPZ occurs about 1 m above the Meade Peak Member contact with the underlying Wells Formation. This bed ranges from 1.1 to 2.9 m thick and averages about 29 percent (%) to 30% phosphorus pentoxide (P_2O_5).

1.3.2 Hydrogeology

A preliminary hydrogeologic investigation was completed for the Project in 2011 and 2012. The investigation involved packer permeability testing and installation of eight pairs of nested vibrating wire piezometers (VWPs). Slug testing and monitoring of field water quality parameters were completed in six wells. Laboratory analytical data are currently available for one well. Analytical data for the other wells are expected to be available during the first quarter of 2013. In addition, a numerical groundwater model was prepared to predict groundwater flows, dewatering in advance of mining, and mine dewatering requirements. The regional hydrogeologic setting of the Southeast Idaho Phosphate District has been described in numerous reports and was relied upon to supplement the site-specific investigation.

Intermediate- to regional-scale groundwater flow systems occur in all geologic formations throughout the Property with the exception of the Wasatch Formation, Thaynes Limestone, and Meade Peak Member. The Wasatch Formation and Thaynes Limestone have limited areal extent and host perched, local-scale groundwater systems. The Meade Peak Member is a regional aquitard, and except where faulted or fractured, separates regional groundwater flow in the Wells Formation from the intermediate scale system in the Rex Chert Member.

The Wells Formation occurs below the LPZ and is the most significant source of potential groundwater inflow for underground mining. The Rex Chert Member also has moderate to high permeability and is also expected to be a source of inflow. Results of mine dewatering simulations completed for the FS mine plan indicate that pumping from up to 17 extraction wells will be required to adequately depressurize the LPZ for mining.

Predicted mine inflow increases with increasing depth of submergence as mining moves downdip to the north. The maximum submergence of the underground workings below the regional water level will be more than 700 m. The peak predicted pumping rate for the FS mine plan is about 1,043 liters per second (lps). Fractured areas including the West Bear Lake Fault Zone, Consolidated Fault Zone, Sage Hills Fault Zone, Spring Wash Faults, and hinge of the syncline are considered to have potential for mine inflow.

1.3.3 Geochemistry

Geochemical characterization studies to support mine permitting are currently in progress with an expected completion date in the second quarter of 2013. The studies include thin-section and scanning electron microscope (SEM) analysis of minerals, whole rock geochemistry, acid base accounting (ABA), synthetic precipitation leaching procedure (SPLP) testing, column leaching tests, and batch adsorption tests. Preliminary results indicate the sulfate, antimony, cadmium, iron, manganese, molybdenum, nickel, and selenium are likely to be mobile in seepage from the mined rock and underground workings. Selenium, and to a lesser extent cadmium, are the principal elements of regulatory concern in the district.

1.4 History

Historical work on the Property area began with location of a claim in Little Canyon in 1903 at the future site of the Consolidated Mine. The property changed ownership several times before being acquired by Solar Development Company, Ltd. (Solar) in 1930. Solar sunk a 61-m decline and ran two lateral drifts totaling 1,066 m of underground development. A total of 3,175 tonnes (t) of phosphate ore were shipped. The Property was optioned to Wyodak Coal Manufacturing Company (Wyodak) in 1942, after which little activity occurred until Earth Sciences, Inc. (ESI) acquired the holdings from the remaining landowners in 1973.

The Paris Canyon Mine was formed by two homestead patents granted by the United States General Land Office (GLO) in 1901 and 1913. Up to 54,000 t of phosphate was produced by 1919. By 1925, the total underground workings comprised 915 m of tunnels, drifts, winzes, and crosscuts.

Early work in the Consolidated and Paris Canyon Mines noted the presence of vanadium along with the phosphate. Vanadium became an important strategic material during World War II. The United States Geological Survey (USGS) began exploration work in the Paris-Bloomington area in 1942 focusing in Paris, Bloomington, and Little Canyons.

During the 1970s, ESI assembled a project area of approximately 1,660 ha which included the old Consolidated Mine, the Paris Canyon Mine, the Bloomington Mine, and the Bear Lake Mine. From 1973 through 1977, ESI conducted exploration and development work, consisting of rotary and core drill holes, surface trenches, and two test mines.

In 1972, ESI drove a test drift 45 m on an outcrop in Bloomington Canyon. In 1973, the drift was extended to the west and north until a major fault was encountered at approximately 215 m from the portal. An offset drift was driven 60 m east to intercept the Vanadium Zone (VZ). In 1975, 825 m of workings were developed in the UPZ for bulk metallurgical testing. Approximately 38,000 t of phosphate ore and waste were mined. ESI activity continued through the late-1970s. ESI held much of the property package until it was relinquished in the early 1990s.

In August 2008, RMP assembled a property position comprising 856 ha which included the sites of the former Consolidated, Bloomington Canyon, and Paris Canyon Mines. RMP completed six reverse circulation (RC) drill holes on the southern end of the Property. The purpose of the drilling was to confirm the results reported by ESI to form the basis for an NI 43-101 TR.

A total of 53 historical exploration holes were drilled by ESI and RMP, comprising 15 RC holes (3,594 m), 15 core holes (3,031 m), 10 undefined holes (1,888 m), and 13 holes with no records.

PHA and RMP finalized an agreement on 24 September 2009 where PHA acquired the collective interests of RMP, including all federal, state, and private agreements. The agreement was executed on 04 November 2009 granting PHA control of the core Property. PHA subsequently expanded the Property to include additional private properties.

Vanadium mineral reserves on the Property were reported as early as 1944 by Wyodak in conjunction with the USGS and United States Bureau of Mines (USBM). ESI reported vanadium and phosphate reserves in 1976–77 following their exploration drilling program. The historical reserves, while technically important, are not compliant with NI 43-101 standards.

1.5 Exploration

PHA acquired the holdings from RMP in September 2009 which included the interests to all Mineral Lease Agreements, rights to the State of Idaho exploration permits, a federal lease, and rights to a federal prospecting permit application. Since acquiring these holdings, PHA has secured the transfer of the Mineral Lease Agreements and reissued the State of Idaho exploration permits. PHA applied for approval to drill on the federal phosphate lease and was granted permission in September 2011. PHA applied for and was granted approval for a federal prospecting permit and a federal exploration license in October 2011. Also, PHA entered into five mineral lease agreements expanding the original RMP property boundary in 2011 and 2012.

PHA commenced a drilling program in September 2010 and continued to drill and assay through 04 October 2012 for this report.

Drilling was contracted to Major Drilling Group International Inc. (Major) who were mobilized out of Salt Lake City, Utah, for both RC and core drilling activities. Exploration drilling on the federally controlled (United States Bureau of Land Management [BLM]) portion of the Property occurred in October and November 2011, following approval by the BLM and issuance of exploration permits.

A combined total of 25,985 m have been drilled in 85 holes, approximately 8,405 m of which were cored. A total of 39 holes were used in the current LPZ resource estimate and 29 holes were in the UPZ resource estimate. The criteria for holes used in the resource estimate are (1) greater than 85% core recovery through the phosphate zone and (2) assays completed by one of the two reliable, independent, and industry-recognized laboratories.

Based on a review of the exploration program, the QPs are confident that the exploration dataset meets the criteria for resource estimation use under NI 43-101. PHA's quality assurance/quality control (QA/QC) program is designed with aggressive duplication and insertion. Procedures are well documented and have been followed accordingly.

Five trade seismic lines were acquired for reprocessing to assist in interpretation of regional structure. RPS Boyd PetroSearch (Boyd) reprocessed two-dimensional seismic trade lines, one on a north-south line and four on east-west lines. Structure on top of the Rex Chert Member, LPZ, and the Wells Formation was mapped and tied into historical fault trends. The preliminary analysis confirms the structural dip of the strata previously identified from the drill holes and shows various faults crossing the Property, including major normal faults which bound the deposit near the eastern property line. The age and quality of the raw data precluded detailed depth or structural mapping.

PHA's exploration plan going forward includes infill and step-out drilling to upgrade some remaining portions of the LPZ and UPZ classified as Inferred Mineral Resources in the horizontal limb to Measured and Indicated Mineral Resources (M&I), and drilling along the western margin of the deposit to define the LPZ and UPZ Mineral Resource contained in the upturned limb. The upturned limb is presently identified as an Exploration Target.

1.6 Metallurgical and Processing

Preliminary metallurgical testing was conducted by Jacobs Engineering S.A. (Jacobs) in 2011 and 2012, an independent, industry-recognized Florida-based process engineering firm. Tests were conducted on composite core samples from the LPZ and UPZ. Jacobs' phosphoric acid pilot plant demonstrated that merchant grade phosphoric acid (MGA) and granular fertilizers could be produced from the LPZ material without beneficiation, supporting the potential for producing direct ship phosphate ore (DSO) from the LPZ if targeted grades can be achieved during mining. Both monoammonium phosphate (MAP) and diammonium phosphate (DAP) granular fertilizers were produced from concentrated phosphoric acid. Testing of the UPZ determined that some beneficiation would be required to produce marketable phosphate rock. No testing was completed for the VZ. Additional ore characterization and fertilizer test work is planned.

1.7 Mineral Resource and Mineral Reserve Estimates

Mineralization on the Property occurs in the LPZ, UPZ and VZ, which together cover a plan area of 778 ha within the 1,010.5-ha Property. The Mineral Resource estimate for the principal mineralized target, the LPZ, is based on core drilling and chemical analyses on core from 39 exploration holes drilled by PHA in 2010–2012. The Mineral Resource estimate for the secondary mineralized target, the UPZ, is based on chemical analyses on core from 29 of the exploration holes. The UPZ and LPZ contained in the upturned limb and the VZ are characterized as Exploration Targets for which estimates of mineralization are based on historical, NI 43-101 non-compliant exploration data collected prior to PHA's exploration program.

The Mineral Resource estimate was prepared by Leo J. Gilbride, P.E., Senior Consultant with AAI, member of the Society for Mining, Metallurgy, and Exploration, Inc., and a QP for this TR.

1.7.1 Mineral Resources

Mineral Resources were estimated using a kriged gridded-seam computer geologic model constructed with Carlson Mining 2011 Software™. Mineral Resource classifications are based on the technical methodology of the Sedimentary Phosphate Resource Classification System of the USBM and the USGS (Geological Survey Circular 882, 1982). The Mineral Resource calculations are compliant with Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Best Practice Guidelines for Industrial Minerals (2003).

Table 1-1 summarizes the LPZ phosphate Mineral Resource for the Property. The Mineral Resource assumes a minimum LPZ composite cutoff grade of 24.0% P_2O_5 and a minimum bed thickness of 0.5 m, targeting a DSO concentrate in excess of 29.5% P_2O_5. Drill holes show that the LPZ thickness[1] ranges from 0.8 to 2.9 m with composite grades ranging from 24.5% to 34.2% P_2O_5. The LPZ typically ranges between 1.6 and 2.0 m thick in the area of interest for mining, and averages 1.7 m thick across the entire Property. Phosphate resource tonnages are based on an average dry bulk density of 2.6 tonnes per cubic meter (t/m^3) derived from 91 laboratory bulk density tests on representative LPZ core.

Table 1-1. Paris Hills Lower Phosphate Zone Mineral Resource (Effective Date 10 December 2012)

	Bed	Location	Average Thickness (m)	Resource Area (km^2)	In-Place Tonnes[1,2] (millions)	P_2O_5 (wt %)	MER[3]	$CaO:P_2O_5$[4]
MEASURED[5]	Lower Phosphate Zone	Horizontal limb of Paris Syncline	1.8	3.30	15.4	30.4	0.060	1.51
INDICATED[6]	Lower Phosphate Zone	Horizontal limb of Paris Syncline	1.7	3.27	14.4	29.6	0.061	1.55
TOTAL M&I			**1.7**	**6.57**	**29.8**[8]	**30.0**	**0.061**	**1.53**
INFERRED[7]	Lower Phosphate Zone	Horizontal limb of Paris Syncline	1.6	1.10	4.6	29.9	0.063	1.53

1 Average dry bulk density of 2.6 t/m^3.
2 Zone thickness cutoff 0.5 m, composite grade cutoff 24.0% P_2O_5, excludes out-of-seam dilution.
3 Minor Element Ratio, MER = $(Fe_2O_3 + Al_2O_3 + MgO)/P_2O_5$, <0.10 desirable for phosphate rock.
4 CaO to P_2O_5 ratio; <1.60 desirable for phosphate rock.
5 Measured Resource located within 200-m radius from an exploration hole.
6 Indicated Resource located between 200-m and 400-m radius from an exploration hole.
7 Inferred Resource located between 400-m and 800-m radius from an exploration hole.
8 Mineral Resource includes Mineral Reserves.

[1] Bed thickness stated as true vertical thickness as applied to the volumetric calculations of the Mineral Resource.

Table 1-2 summarizes the UPZ phosphate Mineral Resource for the Property. The Mineral Resource assumes a minimum UPZ composite cutoff grade of 20.0% P_2O_5 and a minimum bed thickness of 1.5 m. In 29 core holes, the UPZ thickness ranges from 2.6 to 5.7 m with composite grades ranging from 20.2% to 31.4% P_2O_5. Phosphate resource tonnages are based on an assumed average dry bulk density of 2.6 t/m^3. If mined, the UPZ will require beneficiation to produce a saleable product.

Table 1-2. Paris Hills Upper Phosphate Zone Mineral Resource (Effective Date 15 December 2012)

	Bed	Location	Average Thickness (m)	Resource Area (km^2)	In-Place Tonnes[1,2] (millions)	P_2O_5 (wt %)	MER[3]	CaO:P_2O_5[4]
MEASURED[5]	Upper Phosphate Zone	Horizontal limb of Paris Syncline	3.8	2.92	28.4	22.8	0.129	2.36
INDICATED[6]	Upper Phosphate Zone	Horizontal limb of Paris Syncline	3.7	3.34	31.8	22.6	0.125	2.40
TOTAL M&I			**3.7**	**6.26**	**60.3**	**22.7**	**0.127**	**2.38**
INFERRED[7]	Upper Phosphate Zone	Horizontal limb of Paris Syncline	3.5	1.05	9.4	22.6	0.122	2.38

1 Average dry bulk density of 2.6 t/m^3.
2 Zone thickness cutoff 1.5 m, composite grade cutoff 20.0% P_2O_5, excludes out-of-seam dilution (OSD).
3 Minor Element Ratio, MER = (Fe_2O_3 + Al_2O_3 + MgO)/P_2O_5, in-place quality before beneficiation.
4 CaO to P_2O_5 ratio, in-place quality before beneficiation.
5 Measured Resource located within 200-m radius from an exploration hole.
6 Indicated Resource located between 200-m and 400-m radius from an exploration hole.
7 Inferred Resource located between 400-m and 800-m radius from an exploration hole.

1.7.2 Mineral Reserves

Mineral Reserves were estimated for the LPZ via the December 2012 FS which established economic viability for the Paris Hills Phosphate Project. The Project consists of an underground mine and supporting surface infrastructure to produce approximately 1 million tonnes per annum (Mtpa) DSO concentrate from the LPZ. The crushed DSO concentrate will be transported by haulage truck to local markets or by rail to distant markets. The underground mine will use the room-and-pillar mining method with partial pillar extraction. The ramp-up of mining production will take 2 years to reach the designed production rate.

Reserves were calculated using a gridded-seam geologic model combined with a room-and-pillar mine projection layout to develop timing maps, tonnage, and ore grade estimates in the horizontal limb. Mining was not considered in the UPZ, although mining in the UPZ may be evaluated in the future. No Mineral Reserves are stated for the UPZ.

Table 1-3 summarizes the LPZ phosphate Mineral Reserves. The mine's production life is estimated to be 19 years, producing a total of 16.7 million tonnes (Mt) of phosphate rock ore at an average grade of 29.5% P_2O_5. The Mineral Reserves represent a mineable subset of the 29.8-Mt LPZ M&I Resource stated in Table 1-1. The QP's consider the December 2012 FS to be reasonable in its methodology and conclusions to justify Proven and Probable Reserves.

Controlling ore dilution (out-of-seam material) is critical to achieving the DSO objective. Mine modeling was undertaken to predict ore grades based on the geologic data and mining constraints. Ground control, mining height, and groundwater management will be primary factors influencing mine performance.

1.7.3 Exploration Targets

Table 1-4 summarizes the Exploration Targets for the Property.

Insufficient exploration information is available to support the estimation of an NI 43-101 Mineral Resource in the upturned limb of the Paris Syncline, although it is expected to contain significant mineralization. Historical trenching along outcrop and historical test mining confirm the persistence of mineralization in the upturned limb; however, no exploration drill holes penetrate the upturned limb and no information is available at depth.

While copious historic data exist for demonstrating the presence of mineralization in the VZ in the horizontal limb of the Paris Syncline, the quality of those data is substandard for application to NI 43-101 Mineral Resource estimation, and all estimates of mineralization are classified as Exploration Targets until sufficient data can be acquired.

The potential quantity and grade of the Exploration Targets, as stated, are conceptual in nature and there has been insufficient exploration to define them as Mineral Resources, and it is uncertain if further exploration will result in the determination of a Mineral Resource under NI 43-101. The Exploration Targets are not being reported as part of any Mineral Resource or Mineral Reserve.

1.8 Conclusions

The Paris Hills Property contains significant phosphate mineralization in sufficient quantities and of sufficient grade to be attractive for mining under current market conditions, notwithstanding the risk inherent to proving and developing any mining property. Vanadium represents upside mining potential. Geologic continuity in the mineralized beds is strong throughout the Property.

The Property is suited to underground mining because of the depth to mineralization. Limited mineralization near outcrop has the potential to be surface mined. Room-and-pillar and/or longwall mining are considered the best prospective methods for mining the beds in the relatively flat-lying horizontal limb. The upturned limb of the syncline is likely best suited to cut-and-fill mining, shrinkage stoping, or another similar method, considering its high-angle geometry and providing that geomechanical conditions prove favorable for economic extraction.

Table 1-3. Mineral Reserve of the Lower Phosphate Zone—Horizontal Limb (Effective Date 10 December 2012)

	Tonnes†,‡ (millions)	Mining Thickness (m)	Grade (wt %)	Fe_2O_3 (wt %)	Al_2O_3 (wt %)	MgO (wt %)	MER	Na_2O (wt %)	K_2O (wt %)	CaO (wt %)	$CaO:P_2O_5$	Acid Insoluble (wt %)	Organic Carbon (wt %)
Proven	7,956,329	1.57	29.89	0.53	0.95	0.41	0.06	0.89	0.29	45.53	1.52	6.70	2.46
Probable	8,747,371	1.55	29.20	0.53	0.87	0.50	0.07	0.84	0.27	45.54	1.56	6.50	2.91
Reserves	**16,703,700**	**1.56**	**29.53**	**0.53**	**0.91**	**0.46**	**0.06**	**0.86**	**0.28**	**45.54**	**1.54**	**6.59**	**2.69**

† Average *in situ* bulk density of 2.6 t/m³.

‡ Minimum mining height of 1.5 m + 0.15 m dilution.

Table 1-4. Paris Hills Exploration Targets

Bed	Location	Cutoff (wt %)	In-Place Tonnes (millions)	V_2O_5 (wt %)	P_2O_5 (wt %)
Upper Phosphate Zone	Upturned limb of Paris Syncline	20.0% P_2O_5	14 to 20	—	21.0 to 25.0
Vanadium Phosphate Zone	Horizontal and upturned limbs of Paris Syncline	0.50% V_2O_5	32 to 44	0.70 to 0.80	8.0 to 11.0
Lower Phosphate Zone	Upturned limb of Paris Syncline	24.0% P_2O_5	7 to 10	—	28.0 to 32.0

The Paris Hills Phosphate Project FS concludes that room-and-pillar mining in the eastern horizontal limb of the LPZ is feasible and economic. Table 1-5 summarizes the economic analysis for the Project.

Table 1-5. Lower Phosphate Zone Room-and-Pillar Mine Plan—Net Present Value, Internal Rate of Return, and Payback Without Rail

Discount rate	8%
NPV pre-tax	US$477.5 million
NPV after-tax	US$360.1 million
IRR pre-tax	45.9%
IRR after-tax	40.2%
Payback pre-tax from start of construction	4.9 years
Payback after-tax from start of construction	5.1 years
Payback pre-tax from start of production	2.9 years
Payback after-tax from start of production	3.1 years

Notes:
Start of construction begins in Project Year –2
Start of production begins in Project Year 1

Cash flow analysis concludes that the Project is economic with or without the rail option. Required Initial Project Capital (IPC) excluding the rail option totals US$121 million to construct the mine infrastructure and acquire all major mining equipment by the end of Project Year 2. Required sustaining capital (Project Years 3–21) totals US$134 million. Required life-of-mine Project capital totals US$255 million. Cash flow reaches negative US$94 million in Project Year 1, which is the maximum negative annual cash flow for the Project.

Operating costs average US$69.49/t life-of-mine. At an 8% discount rate, the project has a Net Present Value (NPV) of US$477.5 million pre-tax and US$360.1 million after tax and an Internal Rate of Return (IRR) of 45.9% pre-tax and 40.2% after tax.

Project risks include permitting, economics, mining, and project implementation, with groundwater, ground control, and ore dilution being the major technical mining risks. Project opportunities include conversion of additional Resources to Reserves, resource and reserve development of the UPZ and upturned limb, capital costs, marketing, and mining.

Ground conditions during mining are anticipated to be similar to coal mining, which can vary considerably. The phosphate material and surrounding strata are comprised of phosphorite, mudstones, shales, and limestones of varying strength and weatherability. Potential exists for weak roof, rib, and/or floor conditions. This can be exacerbated by groundwater. Groundwater exists throughout the mining horizon and over much of the Property, and will be controlled through a series of dewatering wells. While weak and wet conditions are not necessarily outside the range of ordinary bedded deposit mining conditions, risk arises from the potential for out-of-seam rock diluting the LPZ DSO product. Depending upon degree, dilution can result in lower product prices and exclusion from some markets unless beneficiation is incorporated.

The LPZ ore shows characteristics well within market specifications for P_2O_5, minor element ratio (MER), and calcium oxide (CaO)/P_2O_5. Fertilizer testing confirmed the ability to make DAP and MAP. Blending to control quality parameters will likely be necessary to control specifications for a consistent product to the market.

Deleterious trace elements, including uranium (U), arsenic (As), selenium (Se), and cadmium (Cd), were preliminarily reviewed for possible effects to marketability and cost of mitigation. Bed composite uranium levels in the LPZ vary between approximately 60 and 100 parts per million (ppm), which, even without beneficiation, is low by comparison with the Moroccan and domestic benchmarks which typically range between 120 and 140 ppm. Arsenic, selenium, and cadmium levels vary widely from well below to well above benchmark levels. Where higher levels of these trace elements are encountered in the LPZ, the DSO phosphate rock may or may not incur some pricing penalty. Beneficiation of the UPZ phosphate rock is expected to improve trace element levels.

The Project implementation schedule will begin with permitting and final engineering design in Project Year –2. Project construction begins with regulatory approval to proceed with Project development. Activities ongoing prior to Project implementation include the acquisition of property for facilities beyond the currently controlled Property, acquisition of water rights, environmental baseline studies, permitting activities, marketing, and ongoing exploration. Formal Project kickoff activities include the final engineering and design, procurement, and construction management of the mine facilities.

Site development includes the construction of ponds, pipelines, dewatering wells, injection wells, mine water treatment plant, portal facilities, main access road, buildings, mechanical installation and electrical/communication distribution. Site development is estimated to take 2 years.

Mine development begins with a 6-month development mining phase during which mains are developed with mining Unit 1, a continuous miner supersection. The initial phase allows time for the Project's mining and ore grade control assumptions to be tested before multiple units are commissioned. Subsequent development phases include the startup of Unit 2, 6 months after Unit 1 and Unit 3 startup, and 1 year after Unit 2. Lead times for key mining equipment are currently 12 to 14 months.

A fourth quarter 2013 timeframe is estimated for State of Idaho initial mine permit approval.

1.9 Recommendations

PHA should continue with permitting activities, marketing of the phosphate ore, and detailed engineering design for the Paris Hills Underground Mine Project. The following recommendations are mutually independent activities aimed at advancing the Project to development and production. Recommendations are not phased:

- **Geology/Exploration—**Infill and step-out drilling should be completed to elevate remaining areas of the LPZ horizontal limb to the status of an M&I resource. Step-out drilling is necessary to define the western limits of the horizontal limb. Definition drilling is recommended to evaluate or confirm anomalous results from past exploration drilling, primarily related to LPZ thickness. Definition drilling ahead of mining is recommended to define the geometry and location of faults.

Long-term drilling plans should include angled drilling through the upturned limb to define resource potential. The UPZ and VZ should be sampled and evaluated for upside production potential in conjunction with principal mining in the LPZ. The phosphate resource remains open to the north at potentially mineable depths. Future exploration to the north is warranted. Additional mapping and analysis to improve characterization of major fault and fracture zones is also recommended. The estimated cost is US$500,000 to US$1.5 million.

- **Seismic Surveying** (structural geology)**—**Two- or three-dimensional high-resolution seismic surveying is recommended for identifying faulting and other structural features of significance to mining in the LPZ. The seismic survey program is recommended prior to final mine planning and development. The estimated cost is US$1.5 million to US$2 million.

- **Mining Management, Design, and Equipment—**Based on geologic knowledge and drilling experience gained to date, PHA should reevaluate Sigra oriented horizontal stress testing in zones of higher quality rock. Stress levels were assumed for the geotechnical feasibility design. Measurements are useful for design validation and improving detailed mine design. The estimated cost is US$80,000 to US$150,000.

- **Processing—**Additional metallurgical testing is recommended to test variability of key quality parameters throughout the deposit. Testing samples should include material to represent roof/floor dilution and identify characteristics of weathering. Key parameters for testing include P_2O_5, MER constituents (aluminum oxide [Al_2O_3], iron/ferric oxide [Fe_2O_3], magnesium oxide [MgO]), and organic carbon. A particle size distribution analysis is recommended for the LPZ ore to identify particle size versus key quality parameters (primarily P_2O_5 grade). The evaluation should be conducted on both run-of-mine (ROM) and crushed ore material. This analysis would be most valuable with a bulk sample from initial mining. The estimated cost is up to US$275,000.

- **Project Permitting and Regulatory Agencies—**Proceed with environmental and other regulatory requirements, collect baseline data, and consult with key agencies. The estimated cost is US$1.5 million to US$3 million.

- **Hydrogeologic, Groundwater, and Rock Geochemistry Analysis—**Continue hydrogeologic characterization program and groundwater monitoring with the following activities:

    - Continue bi-monthly (every other month) monitoring of groundwater levels and water quality in the six project area monitoring wells.
    - Continue monthly monitoring of water levels for the eight pairs of nested VWPs.

- Conduct a 72-hour constant-discharge pumping test in the Consolidated Fault Zone in the central part of the Property.
- Continue hydrogeologic characterization of the potential injection site for mine dewatering discharge of groundwater. The hydrogeologic characterization program will include coring and packer permeability testing of the targeted injection horizon in two boreholes, and installation and sampling of two monitoring wells to develop baseline water quality data.
- Continue to refine the hydrogeologic model for determination of mine dewatering estimates and optimal placement of dewatering wells.
- Complete column tests for the geochemical characterization program.
- Continue to refine the numerical groundwater model of contaminant fate and transport.

The estimated cost is $2 million to $3 million.

- **Marketing—**Continue marketing development via negotiations with potential PHA phosphate consumers to define and pinpoint phosphate rock marketing and sales alternatives. Determine the preferred transportation method and required infrastructure. If rail transport is required, update the rail loadout option to align with the UP's engineering design requirements and commence negotiations if necessary. The estimated cost is US$50,000 to US$100,000.

- **Community and Government Relations—**Continue to foster stakeholder support for development of the Paris Hills Project. Specifically, continue with community meetings to inform the public at local and state levels of project development and plans.

- **Upper Phosphate Zone Preliminary Economic Assessment—**Prepare a NI 43-101 compliant TR Preliminary Economic Assessment of the UPZ, including an analysis of beneficiation options. Conduct a second phase of beneficiation testing and fertilizer testing (variability testing) for the UPZ. The estimated cost is US$200,000 to US$400,000.

- **Upturned Limb Phosphate Resource Estimate—**Conduct an exploration drilling program on the upturned limb and generate an NI 43-101 compliant TR resource estimate of the upturned limb. The estimated cost is US$1 million.

- **Land—**Continue to acquire control of key properties that are needed for the surface facilities and infrastructure. The estimated cost is up to US$3 million.

The total estimated cost of the above recommended tasks ranges from US$6 million to US$14 million.

Additional recommendations for exploration and development are identified below. These tasks are forward-looking and remain independent of the LPZ FS:

- **Vanadium Zone—**Analyze the VZ to evaluate the upside potential of vanadium pentoxide (V_2O_5) coproduction with phosphate mining.

- **Northern Exploration—**The phosphate resource remains open to the north at potentially mineable depths. Future exploration to the north off the Property is warranted. Numerical modeling is recommended for evaluating mining potential under deep cover exceeding 1,000 m.

2.0 INTRODUCTION

The subject of this report is the 1,010.5 hectares (ha) Paris Hills Phosphate Property (Property) located near the town of Bloomington in Bear Lake County, Idaho, United States of America (USA). The Property is owned by Paris Hills Agricom Inc. (PHA), a wholly owned subsidiary of Stonegate Agricom Ltd. (Stonegate). Stonegate is a Toronto, Ontario, Canada-based mining development company listed on the Toronto Stock Exchange (stock symbol TSX:ST). Stonegate is in the business of acquiring, exploring, and developing mineral resource properties to production in the United States of America (USA or US) and overseas. Stonegate was formed on 18 August 2008 through the amalgamation of two privately held Canadian companies. Stonegate completed an Initial Public Offering (IPO) on 28 April 2010. The registered and head office of Stonegate is located at 401 Bay Street, Suite 2010, Toronto, Ontario, Canada M5H 2Y4.[2]

PHA acquired rights to the Property from RMP Resources Corp. (RMP), a wholly owned subsidiary of Rocky Mountain Resources Corp., on 04 November 2009 by the acquisition of 3 patented lode claims and 21 contiguous fee parcels (some with federal mineral reservations) in Bear Lake County, Idaho, and referred to as the Paris Hills Project for consideration of $4 million Canadian dollars (CAD) with $3 million CAD paid through the issuance of 6 million Common Shares and $1 million CAD paid in cash. Stonegate has since acquired additional mineral leases which are described in *Item 4.1—Mineral Surface and Land Tenure.*

Stonegate's objective is to become a leading low-cost producer of high-quality phosphate concentrate to supply regional and international markets with long-term supply deficits. The Project is considered to be in the feasibility planning stage.

Agapito Associates, Inc. (AAI) was commissioned by Stonegate on behalf of PHA to provide an independent Qualified Person's (QP) review and National Instrument (NI) 43-101 Technical Report (TR). This report incorporates information from a maiden NI 43-101 report prepared for RMP, and four subsequent NI 43-101 reports prepared for Stonegate (AMEC Americas Limited [AMEC] 2010; AAI 2011; AAI 2012a; AAI 2012b).

PHA originally developed plans for room-and-pillar mining in the Lower Phosphate Zone (LPZ) as part of a Preliminary Feasibility Study (PFS) published in March 2012 (AAI et al. 2012a). LPZ Mineral Reserves were identified in the PFS and published in an associated TR (AAI 2012a). In December 2012, Stonegate completed a Feasibility Study (FS) (AAI et al. 2012b), enhancing economic projections and expanding Mineral Reserves for room-and-pillar mining in the LPZ.

The purpose of this report is to update the LPZ Mineral Resource and Mineral Reserve based on (1) exploration information through 4 October 2012 and (2) the results of the December 2012 FS. The Mineral Resource in the Upper Phosphate Zone (UPZ) and other mineralized Exploration Targets on the Property remain unchanged from the previous (15 August 2012) TR. No plans currently exist for mining in the UPZ.

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[2] Except as otherwise required by the context, Stonegate and PHA are used interchangeability in this report.

The LPZ FS encompasses the exploration, geologic modeling, resource and reserve estimation, mine planning and design, mining methodology and equipment, surface infrastructure requirements, labor, beneficiation test work results, fertilizer processing pilot plant test work results, phosphate rock ore handling, environmental and permitting, mine closure, marketing, royalty agreements, project economics, project development schedule, and risks in support of a direct shipping run-of-mine (ROM) ore (phosphate rock concentrate) averaging greater than 29 percent (%) phosphorus pentoxide (P_2O_5) by truck. The FS also considers the option to construct a Montpelier, Idaho, rail loadout facility on the Union Pacific Railroad (UP) and ship via rail.

PHA retained the following consulting companies to assist PHA with the development of the FS:

- Agapito Associates, Inc. (AAI), Grand Junction, Colorado: resource and reserve analysis, mine design, mining equipment, mine capital and operating costs, geotechnical testing, and overall FS report compilation
- Sunrise Engineering, Inc. (Sunrise), Smithfield, Utah: analysis of transportation logistics, surface infrastructure, and ore-handling facilities costs
- Whetstone Associates (Whetstone), Gunnison, Colorado: groundwater hydrogeology and rock geochemistry
- Brown and Caldwell (B&C), Boise, Idaho: environmental support and permitting
- CRU Strategies (CRU), London, England: early-2012 phosphate rock marketing analysis (subsequently updated by PHA)
- RPS Boyd PetroSearch (Boyd), Calgary, Alberta, Canada: analysis of five two-dimensional seismic trade lines that cross the Property
- Jacobs Engineerings S.A. (Jacobs), Lakeland, Florida: metallurgical testing and density determinations
- Bruno Engineering, P.C. (Bruno), Price, Utah: mine electrical engineering

Technical personnel from AAI and Sunrise are the QP authors of this report, as summarized in Item 2.1 and identified in *Appendix A—Certificates of Qualified Persons*.

2.1 Terms of Reference

The authors obtained information and data during multiple meetings during 2011 and 2012 at PHA's Paris Hills Project office located in Bloomington, Idaho, and at various other off-site locations, including AAI's Golden and Grand Junction, Colorado offices and Sunrise's Draper, Utah office. Additional information was collected on-site during visits to the Property in 2011 and 2012. PHA provided the authors with the following information:

- Overall project scope
- Property ownership and location
- Mineral lease agreements
- Site survey and boundary data
- Regional and local geology
- Historical phosphate and vanadium resource, reserve, and production data
- 2010–12 exploration program quality assurance/quality control (QA/QC) protocol documents
- 2010, 2011, and through 04 October 2012 exploration drilling and chemical analysis data
- 2011 and 2012 mineral processing testing reports
- 2011 seismic analysis report
- Permit documents

Key reference texts are included in References, Item 27, of this report.

Relevant data were reviewed in sufficient detail for preparation of the FS and this TR. The following personnel provided QP review:

- Leo J. Gilbride, P.E., AAI, acted as project manager, reviewed technical data, conducted geological modeling, developed the Mineral Resource estimate, and reviewed the Project environmental, permitting, and health and safety evaluation (Items 1–6, 13, 14, 19, 20, 23, 24, and 25–27). Mr. Gilbride visited the site on 06–07 January 2011 and again on 23–25 May 2011.

- Vanessa Santos, P.G., AAI, reviewed exploration activities, sampling methods, preparation, analyses, security, and data verification (Items 1, 6–12, and 25–27). Ms. Santos visited the site on 23–27 May 2011, 05–08 July 2011, 29–30 August 2011, and 20–22 June 2012.

- Gary L. Skaggs, P.E., P.Eng., AAI, reviewed technical data and oversaw the design of the room-and-pillar mine plan and underground operations economic parameters (Items 1, 15–17, 21, 22, and 25–27). Mr. Skaggs visited the site on 06–07 January 2011, 23–25 May 2011, 05–07 July 2011, 06–08 September 2011, 05 October 2011, and 12 June 2012.

- Susan B. Patton, Ph.D., P.E., AAI, analyzed the underground mining schedule, productivity, and economics, and calculated the overall FS economics with input from the respective QPs (Items 1, 15, 16, 21, 22, and 25–27).

- Eric Dursteler, P.E., C.F.M., Sunrise, reviewed technical data and oversaw the design of the project surface infrastructure, product crushing and transportation, and surface operations economic parameters (Items 1, 17, 18, 21, and 25–27). Mr. Dursteler visited the site on 17 August 2012, 21 August 2012, 06 September 2012, 26 September 2012, 11 October 2012, 02 November 2012, and 07 November 2012.

2.1.1 Units

Units used in this report are expressed in the metric system unless otherwise noted. As the project is located in the USA, unless otherwise indicated, currencies are expressed in fourth quarter 2012 USA dollars.

2.1.2 Acronyms and Abbreviations

above mean sea level	amsl
acid base accounting	ABA
acid generating potential	AGP
acid rock drainage	ARD
acid neutralizing potential	ANP
Adobe Portable Document Format	PDF
Agapito Associates, Inc.	AAI
ALS Chemex	ALS
aluminum oxide	Al_2O_3
AMEC Americas Limited	AMEC
arsenic	Ar
Association of American Plant Food Control Officials	AAPFCO
Association of Fertilizer and Phosphate Chemists	AFPC
Association of Official Analytical Chemists	AOAC
below ground surface	bgs
below top of casing	btoc
Best Management Practices	BMP
Brown and Caldwell	B&C
Bruno Engineering, P.C.	Bruno
cadmium	Cd
calcium	Ca
calcium oxide	CaO
Canadian dollars	CAD
Canadian Institute of Mining, Metallurgy and Petroleum	CIM
Canadian Institute of Mining’s Definition Standards	CIMDS
carbon	C
carbon trioxide	CO_3
carbonate fluorapatite	CFA
centimeters	cm
centimeters per second	cm/s
Certificate of Convenience and Necessity	COCN
chlorine	Cl

chromium	Cr
Code of Federal Regulations	CFR
Conditional Use Permit	CUP
constituents of potential concern	COPC
Construction General Permit	CGP
counters per second	cps
Criteria Continuous Concentration	CCC
Criteria Maximum Concentration	CMC
CRU Strategies	CRU
cubic meters per second	cms
cubic meters	m^3
degree	°
degrees Celsius	°C
diammonium phosphate	DAP
diesel particulate matter	DPM
direct application	DA
direct application phosphate rock	DAPR
direct ship phosphate ore	DSO
Earth Sciences, Inc.	ESI
Emergency Medical Technician	EMT
Engineering, Procurement, and Construction Management	EPCM
Environmental Assessment	EA
Envionmental Impact Statement	EIS
Feasibility Study	FS
filtration rate	$t\ P_2O_5/(m^2 \bullet d)$
fluorapatite	$Ca_5(PO_4)_3F$
fluorine	F
Finding of No Significant Impact	FONSI
freight on board	FOB
Geographic Information System	GIS
grams	g
grams per cubic centimeter	g/cm^3
Groupe Chimique Tunisien	GCT
hectares	ha
Human Health Criteria	HHC
Idaho Administrative Procedures Act	IDAPA
Idaho Department of Environmental Protection	IDEP
Idaho Department of Environmental Quality	IDEQ
Idaho Department of Fish and Game	IDFG
Idaho Department of Water Resources	IDWR

Idaho Transportation Department	ITD
inductively coupled plasma-atomic emission spectrometry	ICP-AES
inductively coupled plasma-mass spectrometry	ICP-MS
Initial Project Capital	IPC
Initial Public Offering	IPO
Internal Rate of Return	IRR
International Directional Services	IDS
International Fertilizer Development Center	IFDC
inverse distance squared	ID^2
iron/ferric oxide	Fe_2O_3
Israel Chemicals Ltd.	ICL
Jacobs Engineering S.A.	Jacobs
kilogram	kg
kilometer	km
kilotonne	kt
kilovolt	kv
Licensed Professional Surveyor	LPS
liter	l
liters per minute	lpm
liters per second	lps
load-haul-dump	LHD
Lower Phosphate Zone	LPZ
magnesium oxide	MgO
Major Drilling Group International Inc.	Major
Measured & Indicated Mineral Resources	M&I
Measured, Indicated, and Inferred Reserves	MII
megavoltampere	MVA
megawatt	MW
merchant grade phosphoric acid	MGA
Metals Reserve Company	MRC
meters	m
meters per meter	m/m
micrograms per liter	µg/l
microns	µm
micro-siemens per centimeter	µS/cm
milligrams per liter	mg/l
millimeter	mm
million tonnes	Mt
million tonnes per annum	Mtpa
mine drainage water	MDW
mine facilities building	MFB

Minerals Revenue Management	MRM
minor element ratio	MER
mobile roof support	MRS
Modified acccelerated cost recovery system	MACRS
monoammonium phosphate	MAP
Multi-Sector General Permit	MSGP
National Environmental Policy Act	NEPA
National Instrument	NI
National Pollution Discharge Elimination System	NPDES
net neutralizing potential	NNP
Net Present Value	NPV
Net Smelter Return	NSR
nickel	Ni
North American Datum of 1983	NAD83
North American Vertical Datum of 1988	NAVD88
Occupational Safety and Health Administration	OSHA
Office Chérifien des Phosphates	OCP
Office of Natural Resources Revenue	ONRR
out-of-seam dilution	OSD
Paris Hills Agricom Inc.	PHA
Paris Hills Phosphate Project	Property
parts per million	ppm
percent	%
permit to construct	PTC
phosphate	PO_4
phosphorus	P
phosphorus pentoxide	P_2O_5
point of compliance	POC
polyvinyl chloride	PVC
potassium	K
potassium oxide	K_2O
potential hydrogen	pH
Preliminary Feasibility Study	PFS
Professional Land Surveyor	PLS
proportional integral derivative	PID
Proven, Probable, and Possible Reserves	PPP
Qualified Person	QP
quality assurance/quality control	QA/QC
radium	Ra
radius of influence	ROI
Reconstruction Finance Corporation	RFC

Resource Conservation and Recovery Act	RCRA
reverse osmosis	RO
reverse circulation	RC
revolutions per minute	rpm
Riparian Conservation Areas	RCA
RMP Resources Corp.	RMP
rock quality designation	RQD
RPS Boyd PetroSearch	Boyd
run-of-mine	ROM
scanning electron microscope	SEM
selenium	Se
selenite	Se^{4+}
silica dioxide	SiO_2
single superphosphate	SSP
sodium	Na
sodium oxide	Na_2O
Solar Development Company, Ltd.	Solar
specific gravity	SG
square meters per day	m^2/day
standard reference materials	SRM
State of Idaho Department of Lands	IDL
static water level	SWL
Stonegate Agricom Ltd.	Stonegate
strontium	Sr
sulfate	SO_4
sulfuric acid	H_2SO_4
Sunrise Engineering, Inc.	Sunrise
supervisory control and data acquisition	SCADA
Surface Water Pollution Prevention Plan	SWPPP
synthetic precipitation leaching procedure	SPLP
Technical Report	TR
thorium	Th
Thornton Laboratories Testing & Inspection Services, Inc.	Thornton
threatened, endangered, and sensitive	TES
tonne	t
tonnes calcium carbonate per kilotonne	t $CaCO_3$/kt
tonnes per cubic meter	t/m^3
tonnes per day	tpd
tonnes per hour	tph
Toronto Stock Exchange	TSX

total dissolved solids	TDS
total maximum daily load	TMDL
triple superphosphate	TSP
Underground Injection Control	UIC
Union Pacific Railroad	UP
United States Army Corps of Engineers	USACE
United States Bureau of Land Management	BLM
United States Bureau of Mines	USBM
United States Department of the Interior	USDOI
United States Dollars	USD or $
United States Environmental Protection Agency	EPA
United States Fish and Wildlife Service's	USFWS
United States Forest Service	USFS
United States General Land Office	GLO
United States Geological Survey	USGS
United States of America	USA or US
United States Highway 89	US 89
United States Mine Safety & Health Administration	MSHA
Universal Transverse Mercator	UTM
Upper Phosphate Zone	UPZ
uranium	U
vanadium	V
vanadium pentoxide	V_2O_5
Vanadium Zone	VZ
vibrating wire piezometer	VWP
volt	V
water quality	WQ
Western Co-op Fertilizers Ltd.	WCFL
Western United States Phosphate Field	Western Phosphate Field
Whetstone Associates	Whetstone
Wyodak Coal Manufacturing Company	Wyodak
zero-base budget	ZBB
zinc	Z

3.0 RELIANCE ON OTHER EXPERTS

The authors of this Technical Report (TR) state they are Qualified Persons (QPs) for those areas as identified in the appropriate QP "Certificate of Qualified Persons" attached to this report. The authors have relied upon the following expert reports described below pertaining to mineral tenure, surface rights, access, processing, seismic interpretation, marketing, hydrogeology, geochemistry, environmental, and permitting as allowed under Item 3 of Form 43-101F1.

This TR carries forward the principal body of information reported in the following documents:

- National Instrument (NI) 43-101 TR titled *Paris Hills Phosphate Project, Idaho, USA*, dated 1 February 2010, prepared by AMEC (2010).
- NI 43-101 Technical Report titled *Paris Hills Phosphate Project, Bloomington, Idaho, USA*, dated 17 November 2011, prepared by Agapito Associates, Inc. (AAI) (2011).
- NI 43-101 Technical Report titled *Paris Hills Phosphate Project, Bloomington, Idaho, USA*, dated 26 March 2012, prepared by AAI (2012a).
- NI 43-101 Technical Report titled *Paris Hills Phosphate Project, Bloomington, Idaho, USA*, dated 15 August 2012, prepared by AAI (2012b).
- AAI, Stonegate Agricom Ltd. (Stonegate), Brown and Caldwell (B&C), DcR Engineering Services, Inc., Whetstone Associates (Whetstone), and Bruno Engineering, P.C. (Bruno) (AAI et al. 2012a), "Preliminary Feasibility Study Paris Hills Phosphate Rock Underground Mine Project," prepared for Stonegate, effective date March 26.
- AAI, Stonegate, Sunrise Engineering, Inc. (Sunrise), Whetstone, B&C, and Bruno (AAI et al. 2012b), "Feasibility Study Paris Hills Phosphate Rock Underground Mine Project," prepared for Stonegate, effective date December 21.

3.1 Mineral Tenure

AAI QPs' have not reviewed mineral tenure, nor independently verified the legal status or ownership of the mineral title, and underlying property agreements. AAI has relied upon and disclaims responsibility for information supplied by Paris Hills Agricom Inc. (PHA) and independent experts retained by PHA, which is represented in Item 4.1 of this report, including information derived from the following documents:

- David B. Lincoln (2009), PHA's legal counsel, email titled "Reid Letter" including an unpublished Adobe Portable Document Format (PDF) file to AMEC, dated 17 December.
- James Geyer (2011), President, PHA, email to AAI titled "Exploration Plan Approval" including a PDF scan of the United States Bureau of Land Management (BLM) exploration plan approval letter, dated 13 September.

- James Geyer (2011), President, PHA email to AAI titled "Phosphate Prospecting Permit" including a PDF scan of the BLM prospecting permit approval letter, dated 15 September.

- James Geyer (2011), President, PHA email to AAI titled "Other Land Lease" including an unsigned draft PDF version of the John R. and Linda M. Bee Agreement, dated 20 September.

- James Geyer (2011), President, PHA email to AAI titled "Exploration License Issued" including a PDF scan of the BLM exploration license approval letter, dated 27 September.

- James Geyer (2011), President, PHA email to AAI titled "Thomas Property" including a signed PDF scan of the Thomas Idaho Ranch Lease Agreement and Thomas Idaho Ranch check, dated 27 September.

- James Geyer (2012), President, PHA, email titled "Final Agreements" including signed PDF scan of the Christensen Mineral Lease Agreement dated 1 January.

- James Geyer (2012), President, PHA email to AAI titled "Gontarek Agreements" including a signed PDF scan of the Gontarek and Buck Mineral Lease Agreement, dated 30 January.

- James Geyer (2012), President, PHA email to AAI titled "FW: Title Insurance Ward.PDF", message "Title insurance reference on 40 acre Steve Gambling property," dated 8 March.

- James Geyer (2012), President, PHA email to AAI titled "Revised agreements," PDF and Word files of Steven J. Gambling's Memorandum of Mineral Lease Agreement, final version emailed to Geyer 16 March 2012 and Mineral Lease Agreement emailed to Geyer 16 March 2012, dated 17 March.

- James Geyer (2012), President, PHA email to AAI titled "Gambling Mineral Lease Agreement," dated 19 March.

3.2 Surface Rights and Access

PHA has agreements with local landowners that were negotiated directly by PHA and others negotiated originally by RMP Resources Corp. (RMP) and later transferred to PHA with landowner consent. AAI has relied upon and disclaims responsibility for surface rights, road access, and permit information supplied by PHA and independent experts retained by PHA, which is represented in Items 4, 18, and 20 of this report, including information derived from the following documents:

- David B. Lincoln (2009), PHA's legal counsel, email titled "Reid Letter" including an unpublished PDF file to AMEC, dated 17 December.

- James Geyer (2011), President, PHA, email to AAI titled "Exploration Plan Approval" including a PDF scan of the BLM exploration plan approval letter, dated 13 September.

- James Geyer (2011), President, PHA email to AAI titled "Phosphate Prospecting Permit" including a PDF scan of the BLM prospecting permit approval letter, dated 15 September.

- James Geyer (2011), President, PHA email to AAI titled "Other Land Lease" including an unsigned draft PDF version of the John R. and Linda M. Bee Agreement, dated 20 September.

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- James Geyer (2011), President, PHA email to AAI titled "Thomas Property" including a signed PDF scan of the Thomas Idaho Ranch Lease Agreement and Thomas Idaho Ranch check, dated 27 September.

- James Geyer (2012), President, PHA, email titled "Final Agreements" including signed PDF scan of the Christensen Mineral Lease Agreement dated 1 January.

- James Geyer (2012), President, PHA email to AAI titled "Gontarek Agreements" including a signed PDF scan of the Gontarek and Buck Mineral Lease Agreement, dated 28 February.

3.3 Processing

Phosphate beneficiation analyses and fertilizer manufacture testing were completed by Jacobs Engineering S.A. (Jacobs), an independent, industry-recognized processing expert retained by PHA. AAI has relied upon the results and conclusions produced by Jacobs in Item 13 of this report through the following documents:

- Jacobs (2011a), "Beneficiation Status Report—Paris Hills Phosphate Project, Lakeland, Florida," September.

- Jacobs (2011b), "Evaluation of Stonegate Paris Hills Phosphate Ore for Fertilizer Production from Jacobs Pilot Plant Testing, Lakeland, Florida," September.

- Jacobs (2012a), "Beneficiation Status Report 2—Paris Hills Phosphate Project, Lakeland, Florida," February.

- Jacobs (2011c), "Acidulation of Paris Hills Concentrate by Dihydrate Process from Jacobs Pilot Plant Testing, Lakeland, Florida," September.

- Jacobs (2012b), "Organic Carbon Procedural Modification Letter with Reference to Report Titled Acidulation of Paris Hills Concentrate by Dihydrate Process, Lakeland, Florida," November.

3.4 Seismic

PHA completed seismic analysis of five two-dimensional trade lines that cross the Paris Hills property with RPS Boyd PetroSearch (Boyd) of Calgary, Alberta, Canada, an independent, industry-recognized seismic specialist. AAI has relied upon this independent expert retained by PHA in Item 9 of this report through the document titled "2011 Paris Hills 2D Seismic Interpretation," Calgary, Alberta, Canada, 14 October 2011.

3.5 Marketing

An independent marketing analysis was completed for the Preliminary Feasibility Study (PFS) by CRU Strategies (CRU), an independent, industry-recognized marketing expert retained by PHA. PHA staff, with ad hoc input from CRU, provided an updated marketing summary in December 2012. AAI has relied upon the results and conclusions produced by CRU and those results as updated by PHA in Item 19 of this report through the document titled "Paris Hills Phosphate Rock Marketing Study," January (CRU 2012) and *Section 14.0—Marketing* published in the Feasibility Study (FS) (AAI et al. 2012b).

3.6 Hydrogeology and Geochemistry

An independent study of hydrogeology and geochemistry was completed by Whetstone Associates, Inc. (Whetstone), an independent, industry-recognized hydrogeology expert retained by PHA. AAI has relied upon the results and conclusions produced by Whetstone in Item 24.0 of this report through three technical reports produced by Whetstone (2012a, 2012b, and 2012c) and the December 2012 Feasibility Study (FS) (AAI et al. 2012b).

3.7 Environmental and Permitting

An independent environmental and socio-economic assessment, permitting schedule, and reclamation evaluation was completed for the Feasibility Study (FS) by B&C, an experienced, independent environmental firm retained by PHA. AAI has relied upon the results and conclusions produced by B&C in Item 20 of this report through *Section 11.0—Environmental/Permitting/Health and Safety* published in the FS (AAI et al. 2012b).

4.0 PROPERTY DESCRIPTION AND LOCATION

The Paris Hills Phosphate Project (the Property) is located in the Montpelier Mining District in southeastern Idaho, 3.2 kilometers (km) west of the towns of Paris and Bloomington, Idaho (Figure 4-1). The Property encompasses all, or parts of, Sections, 8, 9, 10, 15, 16, 17, 21, and 22 in T14S, R43E, Boise Meridian, Bear Lake County. The total area of the Property is approximately 1,010.5 hectares (ha) (based on the Geographic Information System [GIS]) (Figure 4-2).

4.1 Mineral and Surface Land Tenure

4.1.1 Mineral Rights

The Property consists of 3 patented lode mining claims and 21 contiguous fee parcels (some with federal mineral reservations) covering portions of Sections 8, 9, 10, 15, 16, 17, 21 and 22 in T14S, R43E. Taxes payable to the Bear Lake County Treasurer on patented lode mining claims and fee parcels are due annually by December 20th if paid in full, or the first half by December 20th and the second half by June 20th for the preceding tax year. A complete listing of all patented mining claims and fee parcels under agreement is provided in Table 4-1. Codes used in Table 4-1 are summarized in Tables 4-2 and 4-3.

Paris Hills Agricom Inc. (PHA) provided a summary of legal agreements in effect on the Property.

The Property is located within surveyed townships and boundaries using aliquot parts and private surveys of segregated fee parcels. The State of Idaho maintains a Geographic Coordinate Database that is used for referencing and orienting parcel boundaries in Universal Transverse Mercator (UTM) coordinates. The Property is located on the United States Geological Survey (USGS) Preston 1:100,000 scale topographic map and the USGS Paris 1:24,000 scale, 7.5 minute series quadrangle map. It is centered at UTM North American Datum of 1983 (NAD83) coordinates of zone 12 T 464,379 meters (m) east and 4,672,265 m north. The principal area of known mineralization on the Property is located within the eastern half of Section 21, western halves of Sections 15 and 22, and Section 16, T14S, R43E Boise Meridian.

The private mineral leases are subject to 10- or 20-year primary terms with elective 10-year extensions. Federal phosphate leases are granted for a 20-year primary term and are renewable. Exploration licenses and prospecting permits are for shorter terms and must be converted to mineral leases.

4.1.2 Agreements and Royalties

<u>ESI Agreement</u>

On 18 December 2007, RMP Resources Corp. (RMP) entered into a lease agreement and option to purchase with Earth Sciences, Inc. (ESI) for three patented lode mining claims and additional associated fee property in Idaho totaling approximately 116 ha of mineral and surface rights, a federal phosphate lease (IDI-012982) in Idaho containing 26.6 ha of mineral rights, and

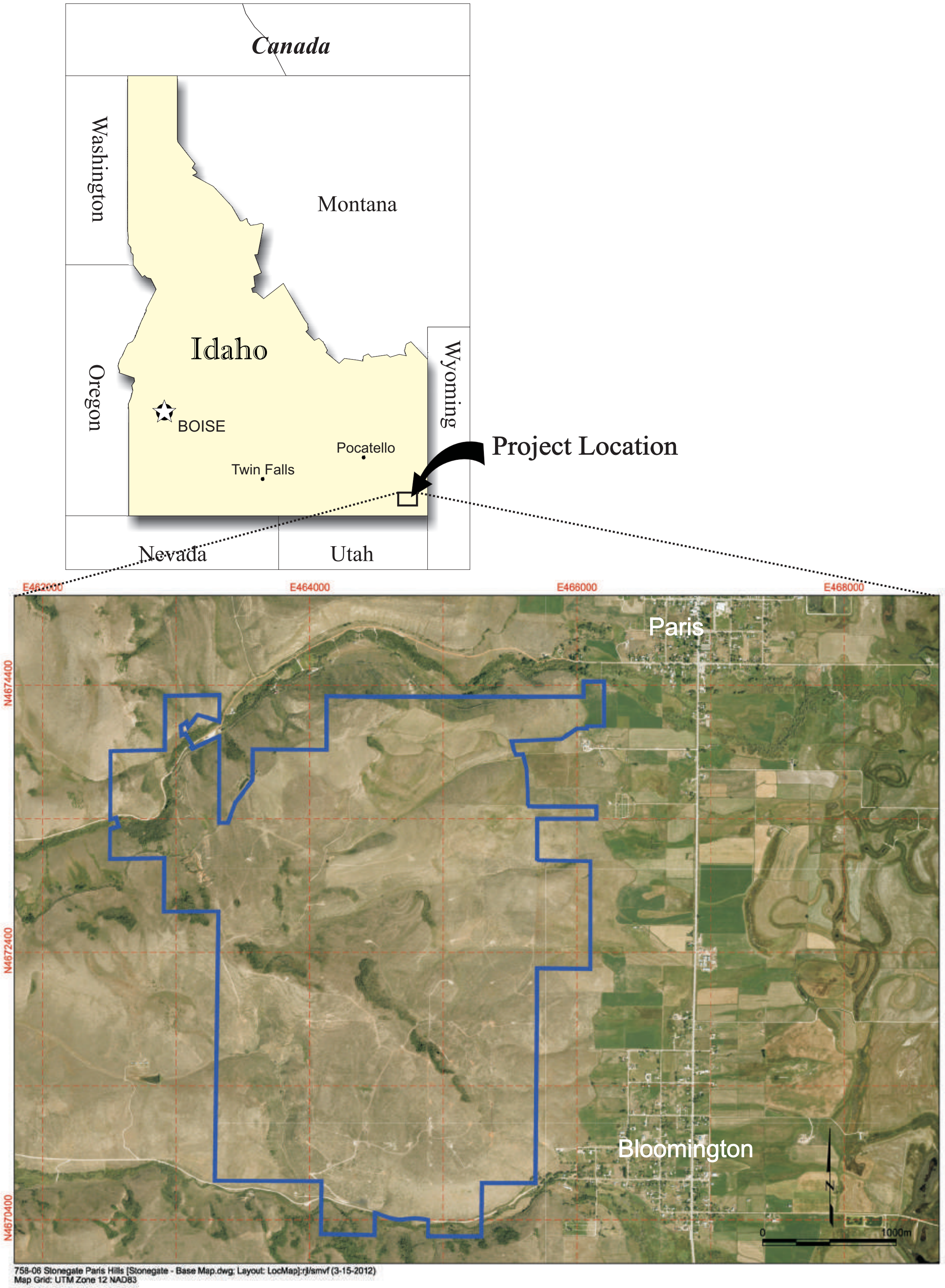
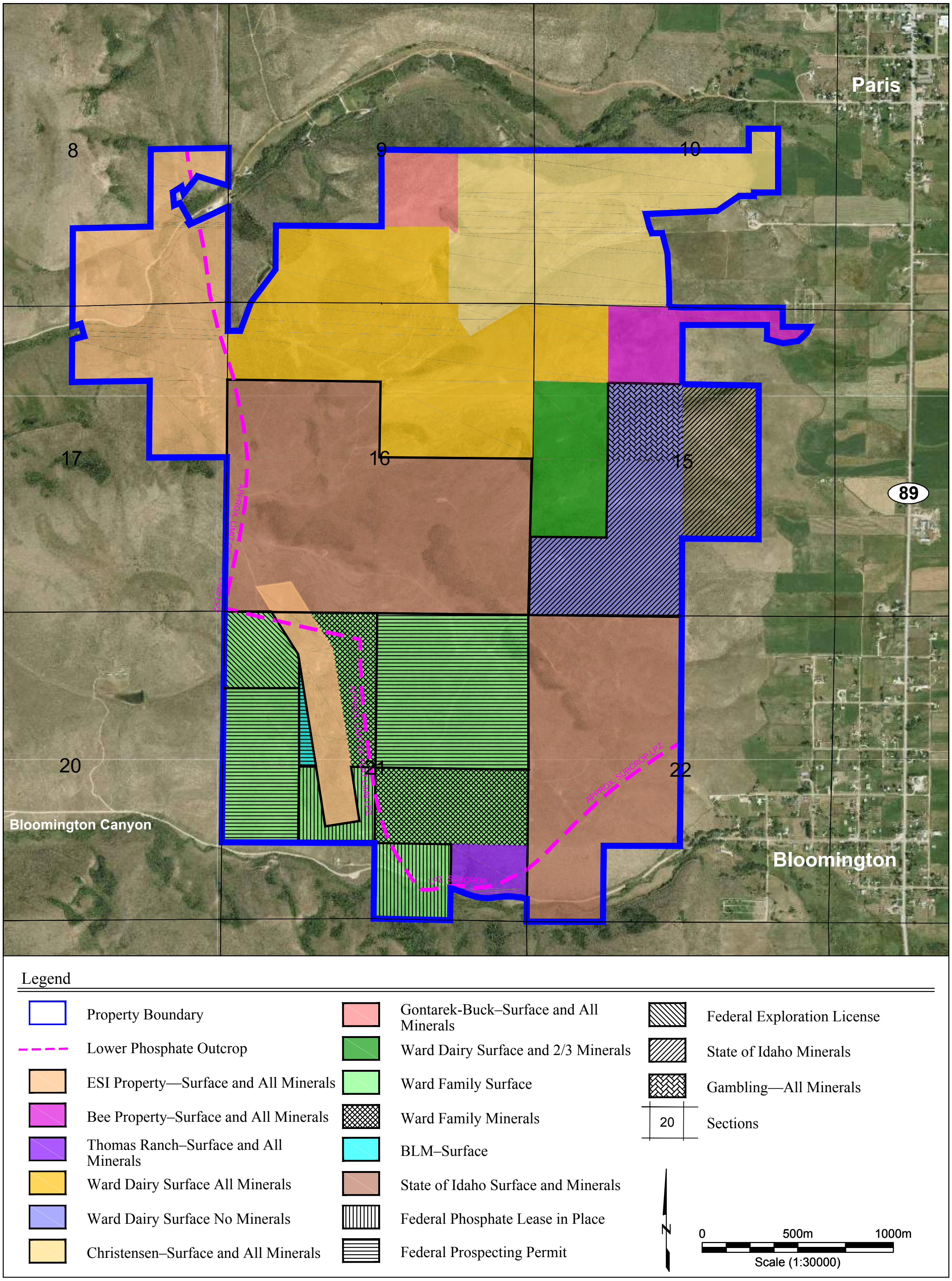


Figure 4-1. Paris Hills Property Location Map



758-06 Stonegate Agricom [Stonegate - Base Map.dwg; Layout: Mineral Rights_Land Status]:smvf (1-15-2013)

Figure 4-2. Paris Hills Land Tenure Map

Table 4-1. PHA Property List *(Source: PHA)*

Source	Rights	Section	Description	Gross Hectares
ESI	S, AM	8	S½SE¼, portions of NE¼SE¼	46.9
ESI	S, AM	17	N½NE¼ (fractional exceptions), SE¼NE¼	48.2
ESI	S, AM	16, 21	Star Nos. 1, 2, and 3 patented lode mining claims, M.S. 2765	20.9
ESI/BLM	P	21	Federal Phosphate Lease, IDI-12982 - Lot 4, SW¼SE¼	26.6
IDL	AM	15	TP-80-2176 - SW¼NE¼, NW¼SE¼, NE¼SW¼, S½SW¼	80.9
IDL	S, AM	16	TP-80-2177 - S½ (excluding Star No. 3 patented lode mining claim), S½NW¼	157.9
IDL	S, AM	22	TP-80-2178 - NW¼, NW¼SW¼, NE¼SW¼, SW¼SW¼	113.3
WBD	S, AM	9	S½SW¼ (excluding County Parcel #1878), SW¼SE¼	40.4
WBD	S, AM	15	NW¼NW¼	16.2
WBD	S, FM	15	SW¼NW¼, NW¼SW¼ (66.6% of all minerals)	32.4
WBD	S	15	SE¼NW¼, NE¼SW¼, S½SW¼	64.7
WBD	S, AM	16	NE¼ (excluding County Parcel #4770), N½NW¼ (excluding County Parcel #1928)	91.9
WF	S, AM	21	Lots 1 and 2, N½SE¼	49.8
WF	S, AEP	21	Lots 3 and 4, NE¼, SW¼NW¼	105.5
WF	S, AEP	21	NW¼SW¼	16.2
WF	S, AEP	21	That part of SW¼SE¼ lying north of Bloomington Canyon Road	6.6
BLM	P	21	Federal Prospecting Permit, IDI 036773 - Lot 5, SW¼NW¼, NW¼SW¼, NE¼	99.0
BLM	P	21	Federal Exploration License, IDI 037055 – Lot 3	14.1
TRLP	S, AM	21	That part of SE¼SE¼ lying north of Bloomington Canyon Road	10.6
BEE	S, AM	15	NE¼ of the NW¼, and adjoining parcels to the east defined by meets and bounds	22.7
GON	S, AM	9	NW¼SE¼	16.2
CHR	S, AM	9, 10, 15, 16	Parcels 1, 2, and 3 described by metes and bounds	110.8
GAM	AM	15	SE¼NW¼	16.2

Note: Some parcel fractions listed more than once to describe surface versus mineral ownership.

Table 4-2. Source Codes

Code	Description
ESI	Earth Sciences, Inc.
IDL	State of Idaho Department of Lands
WBD	Ward Bros. Dairy
WF	Ward Family
BLM	United States Bureau of Land Management
TRLP	Thomas Idaho Ranch Limited Partnership
BEE	John R. and Linda M. Bee
GON	Brian D. Gontarek and Gwendolyn S. Buck
CHR	Brent D. and Elita Christensen
GAM	Steven J. Gambling

Table 4-3. Property Rights Codes

Code	Description	Comment
S	Surface Only	Rights for access, construction, and operations
P	Federal Phosphate Only	Federal reservation of phosphate under the Act of 17 July 1914 (38 Stat. 509, as amended by the act of 20 July 1956 (70 Stat. 592) (codified at 30 USC § 121–123)
AM	All Minerals	All minerals, including phosphate (no federal reservation)
FM	Fractional Minerals	Percentage of 100 % of mineral ownership, as divided by grant or reservation of mineral interest
AEP	All Minerals Except Phosphate (Federal Reservation)	All other minerals on parcels subject to federal reservation of phosphate

four patented lode and placer mining claims in Montana for a series of annual payments as advances against a production royalty of 3.0 percent (%) Net Smelter Return (NSR). The federal phosphate lease and all 116 ha of the ESI fee property in Idaho are within the Property boundary. RMP's lease with ESI was transferred to PHA in 2009 as described in the PHA and RMP Agreement Item below.

The federal phosphate lease was granted in consideration of an annual advance rental in the amount of approximately US$2.50 per hectare due the anniversary date each year the lease is in effect. The federal phosphate lease is subject to the royalty provisions described in the subsection Phosphate Royalty Calculation. Should the burden of the federal royalty and overriding ESI royalty cause PHA to abandon the lease prematurely or prevent mining of a marginally economic or low-grade deposit, the United States Bureau of Land Management (BLM) may order ESI to suspend or reduce the overriding royalty to as low as 1%.

On 29 October 2010, PHA applied for approval to drill on the federal phosphate lease. In accordance with the National Environmental Policy Act (NEPA), the BLM prepared an Environmental Assessment (EA) to analyze the proposed exploration plan, referred to as the Paris Hills Prospecting and Exploration Drilling Environmental Assessment (EA# DOI-BLM-ID-I020-2011-0018-EA). The BLM approved the exploration plan and granted permission to begin exploration drilling activities under the lease on 13 September 2011.

Federal Prospecting Permit

On 19 May 2008, RMP applied for a federal phosphate prospecting permit (IDI-036172) covering portions of Section 21, T14S, R43E (99 ha). Upon issuance of a prospecting permit, the BLM must issue an EA or an Environmental Impact Statement (EIS) prior to commencement of exploration activities. Prospecting permits are granted in consideration of an escalating annual advance rental in the amount of US$0.50 per acre (approximately US$1.25 per ha), due the anniversary date each year the permit is in effect. The permit may be converted to a non-competitive mineral lease upon satisfactory showing of a valuable mineral during the life of the permit. Upon issuance, the prospecting permit is effective for 2 years, but may be extended up to an additional 4 years at the discretion of the BLM. The minimum bond amount required to hold a prospecting permit is US$1,000.

If the prospecting permit is converted into a mineral lease, then a royalty is paid on all minerals mined and removed from those areas. Royalty rates vary by commodity, and a description of the royalty calculation for phosphate and associated or related minerals is provided in the subsection Phosphate Royalty Calculation. In deposits or zones where vanadium is geologically classified within phosphate zones as an "associated or related mineral," federal royalty rates as applied to phosphate would also be calculated for vanadium. In deposits or zones where vanadium is geologically independent of phosphate and has not been otherwise reserved, royalties to private mineral owners would apply.

PHA acquired the rights to the federal phosphate prospecting permit application in 2009 as described in the PHA and RMP Agreement Item below. The BLM re-serialized the application as IDI-036773 and approved the prospecting permit effective 01 October 2011 for a period of 2 years.

Federal Phosphate Exploration License

On 07 June 2011, PHA applied for a federal exploration license (IDI-037055) to drill on a 14.1-ha tract of BLM land in Section 21, T14S, R43E. In accordance with NEPA, the BLM prepared an EA to analyze the environmental impacts of the proposed exploration plan. The BLM approved the exploration plan and granted the exploration license effective 01 October 2011 for a period of 2 years. There is no annual fee associated with the exploration license. A phosphate lease on this parcel requires acquisition through a competitive lease sale. The parcel is not expected to be leased as part of the Paris Hills Project because it lies west beyond the anticipated limit of mineralization and is not included in the Mineral Resource or Mineral Reserve.

Phosphate Royalty Calculation

Both the federal government under the Office of Natural Resources Revenue (ONRR)[3] and State of Idaho use the formula in Table 4-4 for calculating phosphate lease production royalties, as codified at 43 Code of Federal Regulations (CFR) §3504.21 and published in the Solid Minerals Payor Handbook—Royalty Management Program (United States Department of the Interior [USDOI] 1997). The "Unit Value" figure, provided annually by the ONRR, is multiplied by the percentage phosphorus pentoxide (P_2O_5) and the 5% royalty rate to obtain the rate applicable to each dry short ton of ore shipped during any given month of production. The current Unit Value (applicable through 01 August 2013) is US$1.6883.

Table 4-4. Phosphate Royalty Equation

Inputs	Unit Value ×	% P_2O_5 in each unit ×	0.05 ×	Units mined =	Royalty Paid
Details	Set yearly, effective August 1st	Monthly assay result for 1% of P_2O_5 in a ton of ore	Federal/State royalty		

[3] Formerly the Minerals Revenue Management (MRM) program. Effective 01 October 2010, the functions of MRM officially transferred to the ONRR, reporting to the Assistant Secretary for Policy, Management and Budget.

Idaho Exploration Permits

On 30 June 2008, RMP was granted three exploration permits by the State of Idaho Department of Lands (IDL), covering portions of Sections 15, 16 and 22 in T14S, R43E. The permits specifically provide for the mineral exploration of phosphate and metalliferous minerals (including silver, zinc, lead, nickel, cobalt, platinum, palladium, vanadium, gold and all other metalliferous minerals). Each of the permits is granted in consideration of an annual permit fee of US$500, due by January 31st of each year the permit is in effect. According to the terms of the permits, the permits may be converted to preferential-right mineral leases upon satisfactory showing of an economic mineral resource of paying quality and quantity. The IDL permits are due to expire on 31 December 2013.

If the exploration permits are converted to mineral leases, then a royalty is paid on all minerals mined and removed from the permit areas. Royalty rates vary by commodity, and a description of the royalty calculation for phosphate is provided in the subsection Phosphate Royalty Calculation. Upon mineral lease conversion, rental fees can be used as a credit against production royalty during a given lease year.

Ward Bros. Dairy Agreement

On 09 August 2008, RMP entered into a mineral lease agreement for surface and mineral rights covering portions of Sections 9, 15 and 16 in T14S, R43E from Ward Bros. Dairy, an Idaho general partnership, for a series of annual payments as advances upon a 5.0% gross production royalty. The payments and minimum expenditures required on the claims are shown in Table 4-5. PHA acquired the rights to the Ward Bros. Dairy agreement in 2009 as described in the PHA and RMP Agreement Item below. All payments under the agreement were current at the time this report was prepared.

Table 4-5. Payments for Properties under the Ward Bros. Dairy Agreement

Date Due (on or before)	**Payment** ($)	**Minimum Expenditures** ($)
09 August 2010	$85,000	$0
09 August 2011	$85,000	$0
09 August 2012	$105,000	$0
09 August 2013	$105,000	$0
09 August 2014	$105,000	$0
09 August 2015	$105,000	$0
09 August 2016	$105,000	$0
09 August 2017	$105,000	$0
Each August 9 thereafter	$125,000	$0

On an annualized basis, PHA has agreed to reimburse Ward Bros. Dairy for any damage to improvements on the property and if exploration activities prevent agricultural use of the surface. The agreement also prohibits open pit and strip mining activities without the prior written consent of the owners.

Ward Family Agreement

On 09 August 2008, RMP entered into a mineral lease agreement for surface and mineral rights covering portions of Section 21, T14S, R43E for a series of annual payments as advances upon a 5% gross production royalty. The agreement has been executed by members of the Ward Family representing 100% of the surface rights and 96.875% of the phosphate interest owned by the Ward Family. The payments and minimum expenditures required on the claims are shown in Table 4-6. PHA acquired the rights to the Ward Family agreement in 2009 as described in the PHA and RMP Agreement section below. All payments under the agreement were current at the time this report was prepared.

Table 4-6. Payments for Properties under the Ward Agreement

Date Due (on or before)	Payment (US$)	Minimum Expenditures (US$)
09 August 2010	$60,000	$0
09 August 2011	$60,000	$0
09 August 2012	$60,000	$0
09 August 2013	$80,000	$0
09 August 2014	$80,000	$0
09 August 2015	$80,000	$0
09 August 2016	$80,000	$0
09 August 2017	$80,000	$0
Each August 9 thereafter	$100,000	$0

On an annualized basis, PHA has agreed to reimburse the owners for any damage to improvements on the property and if exploration activities prevent agricultural use of the surface. The agreement also prohibits actual surface mining activities without the prior written consent of the owners.

PHA and RMP Agreement

PHA and RMP entered into an agreement on 24 September 2009 where PHA acquired the interests of RMP as stated in the Lease Agreement and Option to Purchase dated 18 December 2007 between ESI and RMP for the lease of approximately 116 ha within the Property area and the option to purchase a United States of America (USA) federal phosphate lease covering approximately 26.6 ha.

PHA also acquired the rights of RMP as the Permittee under three State of Idaho exploration permits with the IDL on approximately 352.1 ha of real property owned by the State of Idaho.

PHA also acquired the interests of RMP under a Mineral Lease Agreement dated 09 August 2008 between RMP and Ward Bros. Dairy, providing for the lease of approximately 245.6 ha owned by Ward Bros. Dairy.

PHA also acquired the interests of RMP under a Mineral Lease Agreement dated 09 August 2008 between RMP and John R. Ward and certain of his relatives ("Ward Family"), providing for the lease of approximately 178.1 ha owned by the Ward Family.

PHA also acquired the rights of RMP under a federal prospecting permit application submitted by RMP to the BLM, seeking prospecting rights to approximately 99.0 ha of real property owned by the USA.

The consideration paid at the closing, 03 November 2009, for the transfer of the above described real property was the gross amount of $4 million Canadian dollars (CAD), subject to certain prorations and deductions for delinquent rentals under certain of the assigned leases and certain holdbacks, with such consideration being paid at closing by the transfer of approximately $1 million CAD gross amount in cash and $3 million CAD through the issuance of 6 million common shares of Stonegate Agricom Ltd. (Stonegate) stock.

Ward Bros. Dairy and the Ward Family agreed to the transfer of leases and the transfer was completed in 2009. The State of Idaho has reissued the three State of Idaho exploration permits to PHA. Substitute bonds have been obtained. The transfer of the leasehold interests and optionee rights under the Lease Agreement and Option to Purchase with ESI was completed at closing, with the required notification to ESI of such assignment being heretofore made.

Thomas Idaho Ranch Agreement

On 07 September 2011, PHA entered into a mineral lease agreement for surface and mineral rights covering approximately 10.6 ha north of the Bloomington Canyon Road in Section 21, T14S, R43E for a series of annual lease payments as listed in Table 4-7. The agreement has been executed by members of the Thomas Idaho Ranch Limited Partnership representing 100% of the surface rights and 100% of mineral rights held by lessor, representing an unspecified proportion of the total mineral rights. On an annualized basis, PHA has agreed to reimburse the owners for any damage to improvements on the property, and to increase annual lease payments by US$500 if exploration activities prevent agricultural use of the surface. All payments under the agreement were current at the time this report was prepared.

Table 4-7. Payments for Properties under the Thomas Idaho Ranch Agreement

$7,500 upon execution of the Agreement (for year 1 of the Agreement)
$7,500 for year 2 of the Agreement
$7,500 for year 3 of the Agreement
$7,500 for year 4 of the Agreement
$7,500 for year 5 of the Agreement
$7,500 for year 6 of the Agreement
$7,500 for year 7 of the Agreement
$7,500 for year 8 of the Agreement
$7,500 for year 9 of the Agreement
$7,500 for year 10 of the Agreement
$9,500 for each year for years 11 through 20 of the Agreement, if Lessee elects to extend the Agreement to a second 10-year term
$11,500 for each year for years 21 through 30 of the Agreement, if Lessee elects to extend the Agreement to a third 10-year term
$11,500 for each year thereafter, if Lessee is still engaged in Mining Operations

Bee Property Agreement

On 05 August 2011, PHA entered into a mineral lease agreement with John R. and Linda M. Bee for surface and mineral rights covering approximately 22.7 ha in Section 15, T14S, R43E for a series of annual payments in the amount of US$14,000 as advances upon a 5.0% gross production royalty. The agreement has been executed by John R. and Linda M. Bee representing 100% of the surface rights and 100% of mineral rights held by lessor, representing an unspecified proportion of the total mineral rights. On an annualized basis, PHA has agreed to reimburse the owners for any damage to improvements on the property, and if exploration activities prevent agricultural use of the surface. All payments under the agreement were current at the time this report was prepared.

Christensen Agreement

On 01 January 2012, PHA entered into an agreement with Brent and Elita Christensen for surface and mineral rights covering approximately 110.8 ha located within T14S, R43E, Boise Meridian, Bear Lake County, Idaho, for a series of annual payments in the amount of US$68,350 as advances upon a 5.0% gross production royalty. The agreement has been executed by Brent and Elita Christensen, representing 100% of the surface rights and 100% of mineral rights held by lessor, representing an unspecified proportion of the total mineral rights. On an annualized basis, PHA has agreed to reimburse the owners for any damage to improvements on the property, and if exploration activities prevent profitable agricultural use of the surface. All payments under the agreement were current at the time this report was prepared.

Gontarek and Buck Agreement

On 30 January 2012, PHA entered into an agreement with Brian D. Gontarek and Gwendolyn S. Buck for approximately 16.2 ha of surface and mineral rights in Section 9 (NW¼ SE¼), T14S, R43, Boise Meridian, Bear Lake County, Idaho, for a series of annual payments in the amount of US$10,000 as advances upon a 5.0% gross production royalty. The agreement has been executed by Brian D. Gontarek and Gwendolyn S. Buck representing 100% of the surface rights and 100% of mineral rights held by lessor, representing an unspecified proportion of the total mineral rights. On an annualized basis, PHA has agreed to reimburse the owners for any damage to improvements on the property, and if exploration activities prevent agricultural use of the surface. All payments under the agreement were current at the time this report was prepared.

Gambling Agreement

On 19 March 2012, PHA entered into an agreement with Steven J. Gambling for approximately 16.2 ha of mineral rights in Section 15 (SE¼ NW¼), T14S, R43, Boise Meridian, Bear Lake County, Idaho, for a series of annual payments in the amount of US$10,000. In addition, there is a 4.0% gross production royalty, with royalty payments limited to no less than US$10,000 per annum. The agreement has been executed by Steven J. Gambling representing 100% of the mineral rights held by the lessor, representing an unspecified proportion of the total mineral rights. All payments under the agreement were current at the time this report was prepared.

4.2 Existing Environmental Liability

The property position includes the former Bloomington Canyon Mine, Consolidated (Little Canyon) Mine and Paris Canyon (McIlwee) sites. In 2002, the BLM, United States Forest Service, IDL, and Idaho Department of Environmental Protection (IDEP) jointly conducted a preliminary assessment and risk screening assessments for selected orphan mine sites, including the Bloomington Canyon Mine and Consolidated Mine locations. The risk evaluation process consisted of reviewing the resulting site data in terms of site conditions, areas of impact, potential for continued releases, and regional risk-based action. The resulting recommendations were directed at addressing localized release pathways and associated ecologically sensitive risks, and addressing public safety concerns such as the presence of open adits, portals, or mine shafts. A number of recommendations for the two sites were made for further sampling, site investigation, waste consolidation, erosion control, and reclamation improvements.

In 2004, the same working group conducted a follow-up assessment with respect to reclamation of the recommended sites from the 2002 assessment. Additional recommendations for the Bloomington Canyon Mine and Consolidated Mine sites were made for grading, top soiling, seeding, adit closure, and clean-out of sediment at an estimated total cost of US$65,000. These activities have not yet commenced.

PHA has assumed all, or portions of, the remaining reclamation liability associated with ongoing exploration activities. RMP was bonded at US$30,000, which allows for drilling disturbance on the lands under the three exploration permits from IDL. This bond was replaced by PHA upon reissuance of these permits to PHA by IDL.

PHA is presently fully bonded under the approved exploration plan for disturbance on the federal phosphate-reserved lands.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Access

Access to the Paris Hills Phosphate Project (the Property) is provided by county-maintained roads in the canyons of Bloomington Creek and Paris Creek. These are all-weather roads that are cleared of snow throughout the winter. From these roads, access onto the Property is gained via two-track unimproved trails, used primarily by ranchers to manage grazing of cattle.

Bloomington Canyon Road and Paris Canyon Road both intersect with United States Highway 89 (US 89) in the towns of Bloomington and Paris, respectively. Paris is the oldest settlement in Bear Lake County and remains the county seat.

5.2 Climate

The climate in southeastern Idaho is influenced by topographic features and prevailing westerly winds from the Pacific Ocean. Temperature and precipitation amounts are strongly dependent on elevation, with higher elevations experiencing lower temperatures and higher amounts of rain and snow. In winter, although temperatures are moderated by Pacific Ocean air currents, temperatures can sink to less than –17.8 degrees Celsius (°C) for periods lasting several days. Mean temperatures at the Property are expected to be similar to those at Conda, Idaho, which are reported to be around 10°C in summer and –5°C in winter.

Snow cover usually begins in November or December and may stay until April or May. Freezing temperatures persist into May, and frost can occur any month of the year at elevations above 1,981 meters (m). Precipitation amounts range from 25 centimeters (cm) in Bear Lake Valley to 51 to 76 cm over the Property, and up to 114 cm near the peaks of the Wasatch/Bear Lake Range. More than half of the precipitation falls between October and March, commonly in the form of snow, particularly at the higher elevations. Thunderstorms are common and occur several days each month between June and August. The growing season averages 80 days at Montpelier.

These weather patterns are expected to limit field activities for exploration and development to the months of April through October. Winter weather would also impact activities during any construction period for the project, but facilities would be designed for all-weather operation and weather would be expected to have only minor impact on the ultimate mine operation.

5.3 Local Resources and Infrastructure

Montpelier is 19 kilometers (km) north of Bloomington on US 89. Montpelier is the largest population and commercial center in Bear Lake County. In Montpelier, US 89 intersects with United States Highway 30. From this intersection, the driving distance to interstate highways is as follows: I-15 at McCammon, Idaho, 100 km; I-15 at Brigham City, Utah, 150 km; and I-80 at Green River, Wyoming, 160 km.

The Bear Lake County Regional Airport serves the general aviation needs of the local communities. The airport is located between Paris and Montpelier. Commercial air service is available in Pocatello, Idaho and Idaho Falls, Idaho to the northwest; Jackson, Wyoming to the northeast; and Salt Lake City, Utah to the south.

The Union Pacific Railroad (UP) provides freight services to Bear Lake County from an office located at 149 S. 12th Street in Montpelier. The track through Montpelier connects into the UP system at Pocatello, Idaho and Green River, Wyoming.

Adequate surface rights have been obtained to support mining operations on the Property, in the form of the private-owner leases and exploration permits from the State of Idaho, as more fully described in Item 4 of this report. Additional rights may be required for development of various infrastructure.

Electric power for the Property is available through a 69-kilovolt (kV) Rocky Mountain Power power line located approximately 2.4 km east of the town of Bloomington. The power line runs north-south along the Powerline Road which borders the west side of the Bear Lake National Wildlife Refuge. Rocky Mountain Power has indicated that there is sufficient power available to meet the estimated 12.47-kV, 20-megavoltampere (MVA) base-rated substation needed for an underground mine operation.

Water rights in the Bear Lake Basin are fully subscribed. Property water needs, encompassing mine, process and potable water will need to be secured through a purchase or exchange transaction with a local water rights holder.

Experienced surface mining personnel are available in the immediate area. Many local residents have worked in the phosphate mining and processing operations presently active 50 to 65 km to the north in Soda Springs, Idaho.

5.4 Physiography

The Property is perched in the foothills of the Bear River Range on the west side of Bear Lake Valley. Elevation at the west side of the valley, below the Property, is between 1,815 m and 1,822 m. The elevation rises abruptly from 1,966 m to 1,981 m, and the topography changes to gently rolling slopes across the Property. The highest point on the Property lies to the northwest at just over 2,073 m elevation. West of the Property, the elevation increases to high peaks exceeding 2,895 m elevation. Paris Peak, at 2,918 m, lies 8 km west of the town of Paris.

Canyons that bound the Property on the south (Bloomington) and north (Paris) are deeply incised, with walls rising steeply from the eponymous creeks to the project site above.

Predominant vegetation is of the mountain shrub type, with some grasslands at the lower elevations.

6.0 HISTORY

6.1 Property and Ownership Changes

Portions of the following descriptions of land ownership and exploration history were excerpted by AMEC (2010) and reproduced in this report from the United States Geological Survey (USGS) publication titled "A History of Phosphate Mining in Southeastern Idaho" by William H. Lee, located under USGS Open-File Report 00-425 (2000).

6.2 Exploration and Development

6.2.1 Paris Canyon/McIlwee Mine

On 06 November 1901, Margarette Grandi, widow of Pietro Grandi, received a homestead patent from the United States Bureau of Land Management (BLM) General Land Office (GLO) for the E½SE¼ of Section 8, T14S, R43E. On 08 November 1913, Mrs. Grandi received another homestead patent from the GLO for adjacent acreage in Sections 8 and 17. These two contiguous patents formed what would become the Paris Canyon Mine.

In 1913, phosphate exploration work began in Paris Canyon on the northwestern portion of the current Property. The first test shipments of phosphate occurred in the summer of 1915 to Los Angeles, California and to Anaconda, Montana.

In 1917, the Property was purchased by the Western Phosphate Mining and Manufacturing Company of Salt Lake City, Utah. The mine became the second producing phosphate mine in Idaho with the first shipment of ore in October 1917. This company reorganized in 1920 as the Western Phosphate Company under the leadership of James A. McIlwee, who was a significant shareholder. It was about this time that the mine started to be called the McIlwee Mine. Up to 1919, the mine produced an estimated 54,430 tonnes (t) of ore, and in 1920, reports were made of a full trainload shipment of ore bound for Hawaii and Japan.

In 1921, the Western Phosphate Company filed for bankruptcy and as a result James A. McIlwee purchased the mine and formed a new company known as the Idaho Phosphate Company. The name was later changed to the McIlwee Phosphate Company and, subsequently, the McIlwee Idaho Phosphate Company. By 1925, total underground workings consisted of 915 meters (m) of tunnels, drifts, winzes, and crosscuts. In the intervening years, the company had installed a 270 tonne per day (tpd) mill, offices, a drying plant, living quarters for workers, and a railroad spur from the village of Paris. The mine closed in 1926 as a result of a downturn in the phosphate market. No estimates of total production are available.

The Property was leased to the Metals Reserve Company from 1942 to 1950 and then sold to L.W. McGann, the former president of the McIlwee Idaho Phosphate Company. In 1973, the McGann holdings were sold to Earth Sciences, Inc. (ESI).

6.2.2 Consolidated/Little Canyon Mine

Historic work on the Property began with location of a claim in Little Canyon in 1903. In 1908, this original claim was replaced by three lode claims. On 25 April 1908, three prospectors

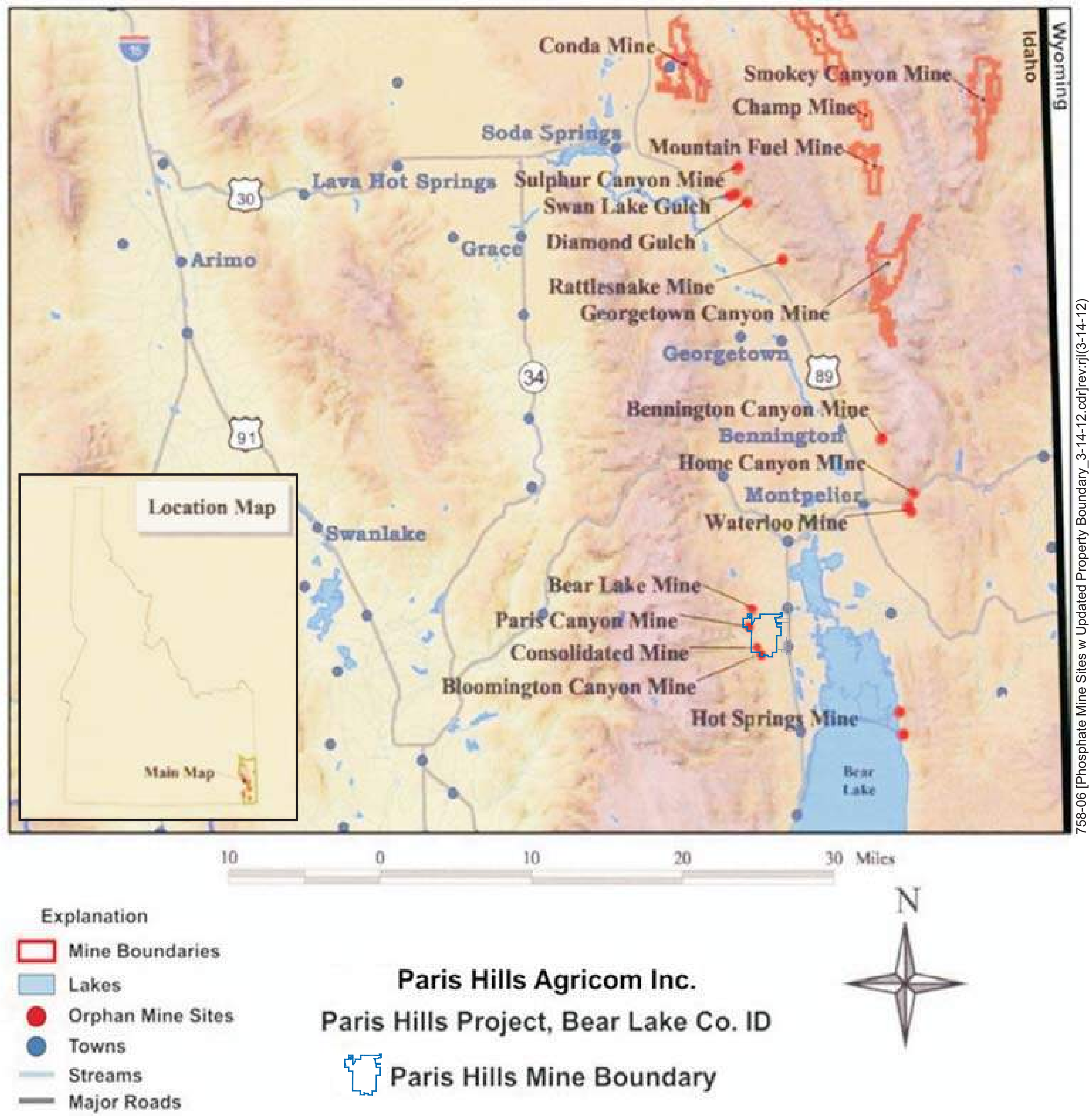


Figure 6-1. Phosphate Mine Sites in Southeastern Idaho

named Joseph Oakey, G. W. Nebeker, and G. Spongberg located three lode mining claims. These three claims, Star Nos. 1, 2, and 3 were located for phosphate rock. The locators sold the three lode mining claims to the United States Phosphate Company of Michigan in 1914 or early 1915. The company applied for a patent to the three claims on 01 May 1916, and received that patent on 20 July 1917. The company was unsuccessful in mining phosphate from the claims, but did note the presence of vanadium in the phosphate rock.

The company transferred on 31 July 1922 by quit claim deed the three patented claims to Francis A. Jeffs. In the latter part of 1930, Solar Development Company, Ltd. (Solar) acquired the property by lease and option from Jeffs. Solar, (a subsidiary of Consolidated Mining and Smelting, Co. Ltd., of Trail, British Columbia, Canada) installed an inclined shaft 60 m deep and two lateral drifts with a total of 1,066 m of underground work. During the first 2 months of 1932, Solar shipped 3,175 t of phosphate ore to the Consolidated facility in Trail, British Columbia where it was converted to triple superphosphate (TSP) that was marketed as "Elephant Brand" fertilizer. This was the last shipment of ore, and no record of total shipments is available. The lease and option held by Solar was returned to Jeffs sometime around 1938.

The property was optioned to Wyodak Coal Manufacturing Company (Wyodak) in 1942 and was later acquired from remaining landowners by ESI in 1973.

6.2.3 Bloomington Canyon Mine

Until the time of Wyodak's interest in the region, the property encompassing the Bloomington Canyon Mine was little explored or developed. The property remained idle from 1943 to 1961.

Ruby Company (J. R. Simplot Co.) applied for a competitive phosphate lease from the BLM in 1961. A phosphate lease sale was held on 07 June 1962 with Ruby Company as the high bidder. A phosphate lease, I-012982, was issued to Ruby Company on 01 July 1962 for Lot 4 and the SW¼SE¼ of Section 21, T14S, R43E. Ruby Company did not develop the lease, and in 1973 assigned the lease to ESI.

On 01 November 1984, ESI's federal phosphate lease was assigned to the Conda Partnership, an established phosphate mining company. The Conda Partnership did no development on the federal lease in Bloomington Canyon and on 01 April 1993, assigned the lease back to ESI.

6.2.4 Bear Lake Mine

On 17 December 1914, Walter H. Lewis applied to the GLO for an enlarged homestead entry for the NE¼SE¼ and S½SE¼ of Section 5 and the N½NE¼ and SE¼NE¼ of Section 8, T14S, R43E (97 hectares [ha]). Mr. Lewis gained a patent to the property on 01 September 1919. The phosphate on this property was reserved to the United States of America (USA or US).

Mr. Lewis contracted to sell his homesteaded lands to a new phosphate mining company called the Bear Lake Phosphate Company in 1920. The same year, Congress passed and the President signed the Mineral Leasing Act (41 Statute 437) (BLM 2007), thereby creating a means to issue leases for the development and mining of federal phosphate and other minerals. The company made application to lease the federal phosphate lands upon passing of implementing regulations and the lease was granted on 21 February 1921, being the first federal phosphate lease issued in Idaho.

The property was sold in 1926 to Keystone Phosphate Company, which resulted in litigation regarding transfer of ownership and lack of payroll. Subsequently, the fee property was transferred to Agricultural Potassium Phosphate Company of California and the federal lease was assigned to Mary Stucki. The lease was terminated in 1938.

Several prospecting permit applications were made in the intervening years between 1938 and present. None were issued, with the exception of a successful 1970 prospecting permit which was rejected upon application to convert to a preferential right lease in 1995 by ESI. While ESI apparently controlled property in the immediate vicinity of the historic Bear Lake Mine, this property is not part of the area presently controlled by Paris Hills Agricom Inc. (PHA).

6.2.5 Other Mines

Phosphate mining activity in the Montpelier Mining District of southeastern Idaho commenced in 1903 with location of claims at the site of the Waterloo Mine. The Waterloo Mine site is located in Bear Lake County, approximately 6.4 kilometers (km) east of the town of Montpelier. The mine was operated sporadically by the San Francisco Chemical Company from 1904 until permanent closure in 1960. Utilizing both underground and open pit methods, production is estimated at 1.1 million tonnes (Mt) of phosphate ore during its 56-year life. The Waterloo Mine was the first producer of phosphate from the Western Phosphate Fields of Idaho-Wyoming-Utah.

Other mines in the Montpelier Mining District, which produced small quantities of phosphate during the period 1910s through 1940s, include the Bennington Canyon Mine 4.8 km north of Montpelier, the Bear Lake Mine located in Sleight Canyon 3.2 km west of the town of Paris, and the Home Canyon Mine located in Montpelier Canyon just north of the Waterloo Mine. The largest producer was the Home Canyon Mine with a total of 18,150 t of phosphate ore shipped.

6.2.6 WWII and Renewed Interest in Vanadium

During World War II, interest in the Paris-Bloomington phosphate deposits was renewed as a potential source of vanadium. Early work in the Consolidated and Paris Canyon Mines had noted the presence of vanadium in the phosphate beds. Vanadium became an important strategic material supporting the war effort and Secretary of the Interior Harold Ickes withdrew extensive areas of public land in the western phosphate deposits that contained vanadium. The USGS began exploration in the Paris-Bloomington area in 1942.

In 1943, the Reconstruction Finance Corporation (RFC) assigned the task of developing the vanadium deposit to its sub-agency, the Metals Reserve Company (MRC). The MRC purchased 204 ha and leased another 576 ha in the area, and then contracted with Wyodak (a subsidiary of Homestake Mining Company) as the agent to conduct exploration, development, and operation. Work was focused in Paris Canyon, Bloomington Canyon, and Little Canyon. During 1942 and 1943, Wyodak advanced nearly 760 m of underground workings: Paris Canyon, 221 m; Consolidated Mine (Little Canyon), 152 m; and Bloomington Canyon, 366 m.

Extensive sampling work was conducted on the properties, and metallurgical work developed a process for extraction and recovery of vanadium from the deposit. Work was stopped by MRC as the shortage of vanadium was satisfied from other sources.

6.2.7 *Earth Sciences, Inc. Work*

During the 1970s, ESI assembled a project area of approximately 1,659 ha in Bear Lake County, Idaho, which apparently included the old Consolidated Mine, the Paris Canyon Mine, the Bloomington Mine, and the Bear Lake Mine. The property consisted of privately held phosphate leases, state mineral leases, federal leases, prospecting permits, or applications and fee holdings. Note for clarity, the property that PHA presently controls is approximately 992 ha and is coincident with the southern portion of the former ESI property, where the phosphate and vanadium beds are closest to the surface and actually crop out in Bloomington Canyon, Little Canyon, and Paris Canyon.

In 1973 through 1977, ESI conducted exploration and development work on the property. Major work consisted of 47 rotary and core drill holes (Tables 6-1 and 6-2) and two underground workings. Insufficient information is known to determine true thickness of the intercepted beds from drill holes. No assay information has been found for 14 missing drill holes as indicated by gaps in the sequential drill hole numbering. The missing drill holes are ESI-04, -06, -07, -09, -11, -12, -13, -14, -16, -17, -19, -20, -40, and -46.

Table 6-1. ESI Drill Hole List Showing Upper and Lower Phosphate Zone Intercepts and Percentage P_2O_5

ESI Drill	Upper Phosphate Zone		Lower Phosphate Zone	
Hole No.	Intercept (m)	P_2O_5 %	Intercept (m)	P_2O_5 %
41	Eroded	Eroded	2.4	30.3
42	Eroded	Eroded	2.4	30.3
43	4.3	28.2	1.8	27.7
44	4.9	24.6	1.5	30.2
45	4.3	29.0	3.0	26.0
46	No data	No data	No data	No data
47	4.6	20.5	1.5	27.0

Table 6-2. Historical Phosphate Reserves (Mt, ESI 1976)

				MII		
	Measured	Indicated	M&I	Total	Horizontal	Upturned
Upper Phosphate Zone	27	20	47	176	149	27
Lower Phosphate Zone	14	9	23	100	85	15
TOTALS	41	29	70	276	234	42

Note: These reserves are not in compliance with NI 43-101 standards.
MII = Measured, Indicated, and Inferred Reserves

Figure 6-2 shows ESI's drill holes circled in blue (DH-3, -29, -30, -32, -33, -34, -35, -36, and -39) that apparently were not drilled deep enough to penetrate the phosphate or vanadium beds. Drill holes within the green circle are located on privately held land and are not subject to federal royalties for phosphate production.

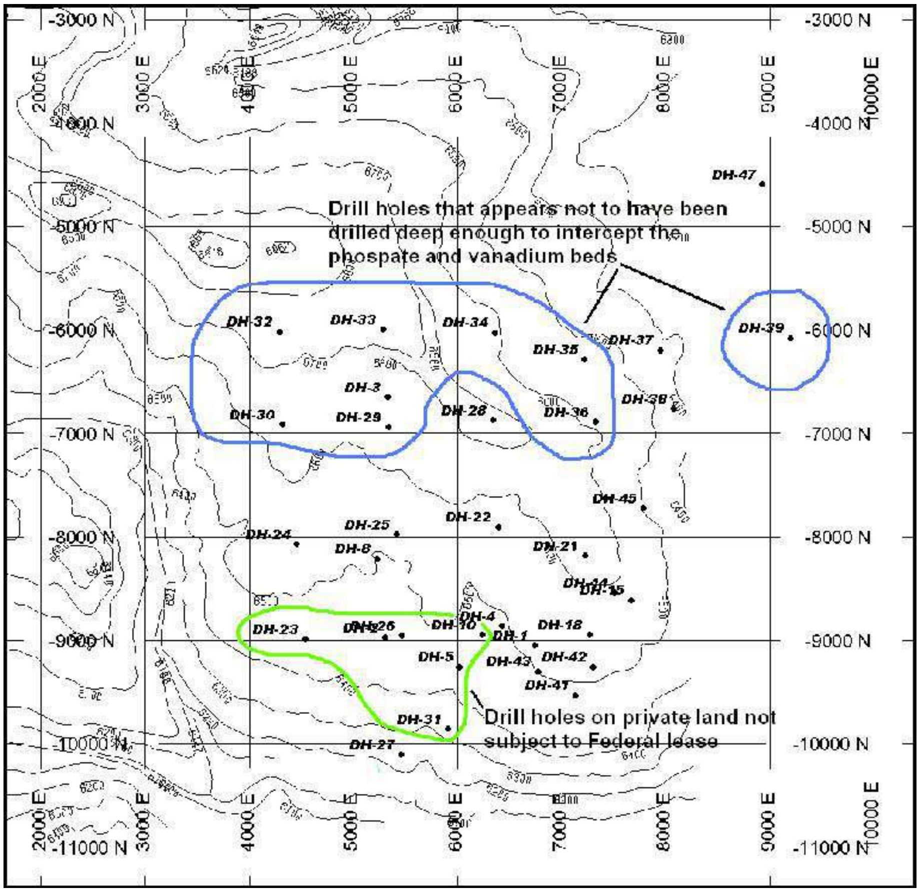


Figure 6-2. ESI Drill Hole Location Map (after AMEC 2010) (*Note: North is at top of map and grid spacing is 305 m.*)

Of the 34 drill holes completed, 14 have assays for both the Upper Phosphate Zone (UPZ) and Lower Phosphate Zone (LPZ) (beds), 19 have assays for the UPZ, and 15 have assays for the LPZ. Vanadium assays have been located for 20 of the 34 drill holes.

In 1972, ESI drove a tunnel 46 m deep on an outcrop in Bloomington Canyon. In 1973, the tunnel was extended to the west and north until a major fault was encountered at approximately 215 m from the portal. An offset drift was driven 58 m east to intercept the VZ. Vertical samples from the ribs of the oolite and shale horizons were assayed for vanadium approximately every 3 m, and, at every 15 to 30 m, openings were extended into the upper lower-grade vanadium siltstone for sampling. This 275 m working is known as the 1974 tunnel.

In 1975, 825 m of workings were driven in the Upper Phosphate Bed for bulk metallurgical testing. Approximately 38,100 t of phosphate rock and waste were mined in a 6-month period. The purpose of the 1975 tunnel was to test various continuous mining machines, determine mining conditions, and provide bulk samples for testing.

Metallurgical testing was conducted by ESI from 1974 through 1977 to determine optimal processing methods. This work led to various initial feasibility studies on processing schemes developed for producing a phosphate rock product as well as a vanadium product for sale. Two different processing flow sheets were developed for the property: one for treating phosphate rock with minimal vanadium present and a second method for treating the feed with higher grade vanadium present. A preliminary engineering design report was completed for the treatment of the phosphate rock. An initial feasibility study was completed on the processing of the feed with higher grade vanadium present.

A lot of 18,150 t of Bloomington phosphate rock from the underground bulk sampling was shipped to the Stauffer plant in Leefe, Wyoming for a bulk processing test. The target was to produce 10,890 to 12,700 t of beneficiated calcined product for a production test at the Western Co-op Fertilizers Ltd. (WCFL) fertilizer plant in Medicine Hat, Alberta, Canada. Early results from the Stauffer plant showed that the Bloomington rock caused the fluid bed roasters to overheat and the trial was suspended.

Figure 6-3 shows in plan view the extent of the 1974 and 1975 test mining.

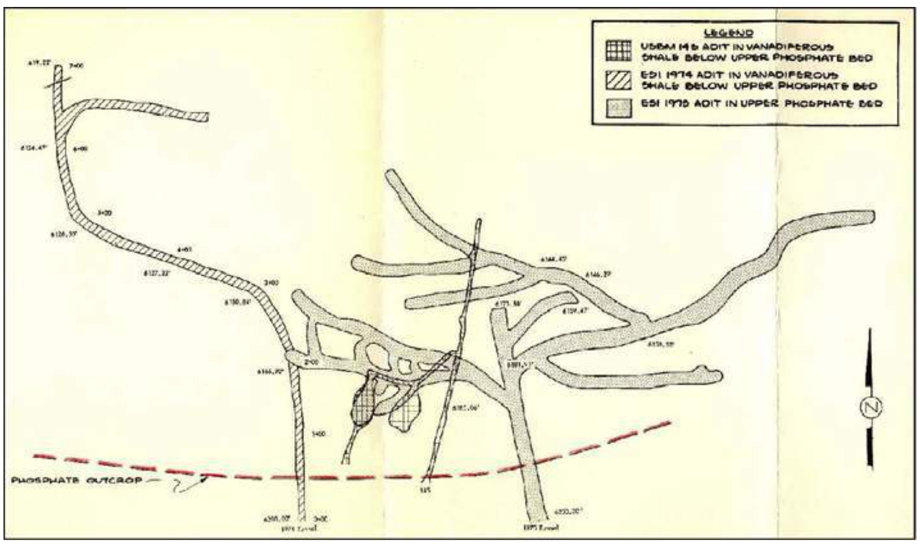


Figure 6-3. Plan View of 1974 Tunnel Drifted on the Vanadium Bed and 1975 Tunnel Drifted on the Phosphate Beds (after AMEC 2010) (*Note: Map is historic and scale bar was not provided.*)

ESI actively continued through the late-1970s, and much of the property package was held until the early 1990s before it was relinquished.

RMP became interested in the property in 2007. With permission of the present land owners, the phosphate and vanadium beds in outcrop were sampled around the perimeter of the property. By August 2008, RMP had assembled a property position comprising 856 ha which included the sites of the former Consolidated, Bloomington Canyon, and Paris Canyon Mines.

In September and October 2008, RMP completed six drill holes on the southern end of the property. The purpose of the drilling was to confirm the results reported by ESI to form the basis for a National Instrument (NI) 43-101 Technical Report (TR) for the property. The drill holes were completed using a reverse circulation (RC) rig. The drilling, sampling, and assaying procedures and results of the program are more fully described in subsequent items of this report.

6.3 Historical Reserve

6.3.1 Historical Phosphate Reserves

In 1976, ESI reported phosphate reserves for the property. ESI estimated that Measured, Indicated, and Inferred Reserves (MII) of the UPZ had an average grade of 25.2 percent (%) phosphorus pentoxide (P_2O_5) and an average thickness of 4.4 m. The LPZ had an average MII grade of 30.4% P_2O_5 and an average thickness of 2.1 m. The average P_2O_5 grade for the 276 Mt of MII is 26.8%. The Reserve was classified as Measured if it was within 400 m from the nearest drill hole. The Reserve was classified as Indicated if it was within 800 m, but more than 400 m from the nearest drill hole. Inferred Reserves included all phosphates beneath the entire Paris-Bloomington property (1,659 ha), minus Proven and Probable Reserves.

The Paris-Bloomington property included 804 ha outside the RMP land holding. A bulk density of 2.84 grams per cubic centimeter (g/cm^3) was used to calculate reserve tonnes. The key assumptions of commodity price, metallurgical recovery, and operating costs used to derive these estimates were not documented to the extent that they could be verified by a Qualified Person (QP) as required under Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards of Mineral Resources and Mineral Reserves (2010), incorporated by reference in NI 43-101. In addition, the equivalence of Reserve categories to the categories set forth by the CIM Definition Standards could not be adequately determined.

In 2010, AMEC reclassified all of the historical MII Reserves on the RMP Resources Corp. (RMP) land holding as Inferred Mineral Resources until sufficient confirmation drilling could be completed to verify historical drill hole intercepts and assays, and until appropriate feasibility studies could be undertaken to define reserves. The historical phosphate reserve tonnages are listed in Table 6-2. **The historical estimates are relevant only for the purpose of demonstrating a potential for phosphate mineralization on the Property. A QP has not done sufficient work to classify the historical estimate as current Mineral Reserves and the historical estimates cannot be relied upon as if they were current Mineral Reserves.**

6.3.2 Historical Vanadium Reserves

In January of 1944, a historical vanadium reserve estimate was developed for the Paris property (equivalent to the current RMP land holdings) by Wyodak in conjunction with the USGS, USBM, and MRC (Walker 1944). Proven Reserves were 0.5 Mt at 0.93% vanadium pentoxide (V_2O_5), Probable Reserves were 3.6 Mt at 0.90% V_2O_5, and Possible Reserves were 45.4–63.5 Mt at 0.6–1.0% V_2O_5. Table 6-3 lists the average V_2O_5 and P_2O_5 grade and thickness of the three vanadium-rich layers. The key assumptions of commodity price, metallurgical recovery, and operating costs used to derive these estimates were not documented to the extent that they could be verified by a QP and they included the category of Possible Reserve that is not recognized under CIM Definition Standards of Mineral Resources and Mineral Reserves (2010), incorporated by reference in NI 43-101. In addition, the equivalence of reserve categories to the categories set forth by the CIM Definition Standards could not be adequately determined. AMEC reclassified all of the historical Proven, Probable, and Possible (PPP) Reserves as

Table 6-3. Average Vanadium Bed Thickness and Percentage V_2O_5 Grade from USGS Work in 1944

Geological Layers	Horizontal Limb		Upturned Limb		All	All
	V_2O_5 (%)	Intercept (m)	V_2O_5 (%)	Intercept (m)	P_2O_5 (%)	Density (g/cm^3)
Upper Vanadium (siltstone)	0.82	1.49	0.89	1.23	5.5	2.1
Middle Vanadium (oolite)	0.44	0.77	0.61	0.65	13	2.6
Lower Vanadium (coaly-Shale)	1.36	1.16	1.35	0.94	15	2.3
Average	0.92	3.41	0.98	2.83	10.4	2.3

Note: These reserves are not in compliance with NI 43-101 standards.

Inferred Mineral Resources until sufficient confirmation drilling could be completed to verify historical drill hole intercepts and assays, and until appropriate feasibility studies could be undertaken to define reserves. **The historical estimates are relevant only for the purpose of demonstrating a potential for vanadium mineralization on the Property. A QP has not done sufficient work to classify the historical estimate as current Mineral Reserves and the historical estimates cannot be relied upon as if they were current Mineral Reserves.**

In 1977, ESI developed an historical reserve for the lower (shale or coaly-shale) vanadium bed (see Table 6-4). ESI stated a Proven Reserve for the lower vanadium bed (1) in the horizontal limb of 4.9 Mt averaging 0.88% V_2O_5 (De Voto 1977) and (2) the upturned limb of 0.7 Mt averaging 1.27% V_2O_5, totaling 5.6 Mt averaging 0.93% V_2O_5. The total historical PPP Reserve of the lower vanadium bed was stated to be 40.1 Mt throughout the 1,659 ha Paris-Bloomington property.

Table 6-4. Historical Lower Vanadium Bed Reserves (Mt, De Voto 1977)

	Proven	Probable	Proven & Probable	PPP	PPP Horizontal Limb	PPP Upturned Limb
Lower Vanadium (coaly-shale)	5.6	0.5	6.1	40.1	34.5	5.6

Note: These reserves are not in compliance with NI 43-101 standards.

ESI did not estimate vanadium grade for Probable or Possible Reserves. A bulk density of 2.29 g/cm^3 was used for tonnage calculations. In the horizontal limb, the stated Proven Reserve was classified as within 305 m horizontally of a sample point (a drill hole, a trench, or underground workings) and to a depth of 152 m.

The key assumptions of commodity price, metallurgical recovery, and operating costs used to derive the estimates were not documented to the extent that they could be verified by a QP and they included the category of Possible Reserve that is not allowed under CIM Standards on Mineral Resources and Reserves—Definitions and Guidelines (2010), incorporated by reference in NI 43-101. In addition, the equivalence of reserve categories to the categories set forth by the CIM Definition Standards could not be adequately determined. AMEC reclassified all of the historical reserves on the RMP land holding as Inferred Mineral Resources until sufficient confirmation drilling could be completed to verify historical drill hole intercepts and assays, and until appropriate feasibility studies could be undertaken to define reserves.

The historical estimates are relevant only for the purpose of demonstrating a potential for vanadium mineralization on the Property. A QP has not done sufficient work to classify the historical estimate as current Mineral Reserves and the historical estimates cannot be relied upon as if they were current Mineral Reserves.

7.0 GEOLOGIC SETTING AND MINERALIZATION

Phosphate and vanadium-rich mineralized beds within the Paris Hills Phosphate Project (the Property) are hosted in the Meade Peak Member of the Permian Phosphoria Formation. The Phosphoria Formation is folded into the Paris Syncline, a north-plunging asymmetrical syncline with a gently dipping to horizontal eastern limb and a steeply dipping to overturned western limb. The mineralized beds dip north-northwest between 7 degrees (°) and 22° along the north-plunging horizontal limb of the syncline. The horizontal limb contains the principal resource target with additional mineralization contained in the steeply dipping, upturned limb of the syncline. Approximately 50 kilometers (km) to the north near Soda Springs, there are three major Idaho phosphate producers using open-pit methods. The Paris Hills Agricom Inc. (PHA) phosphate is of similar character to that being mined at Soda Springs.

The Property is located near the center of the Western United States Phosphate Field (Western Phosphate Field), which constitutes the most extensive phosphorite beds in the United States of America (USA) (McKelvey et al. 1959) and extends across the states of Montana, Idaho, Utah, and Wyoming (Service 1966). The geological setting and mineralization of the Property is summarized by AMEC (2010), in Agapito Associates, Inc. (AAI) (2012b), and again in this document.

The target phosphate mineralization is contained in two zones (beds) within the Meade Peak Member, the Upper Phosphate Zone (UPZ) and Lower Phosphate Zone (LPZ), which range in depth from outcrop to more than 1,000 meters (m) deep. Vanadium is contained in a zone located immediately below the UPZ. Mineralization in the upturned limb has a strike length of over 3 km on the Property.

7.1 Regional Stratigraphy

The Western Phosphate Field is comprised of phosphate-rich beds within the Meade Peak Member of the Permian Phosphoria Formation (Richards and Mansfield 1912). The Phosphoria Formation consists of a chert-mudstone-phosphorite facies in eastern Idaho and southwestern Montana (Service 1966). These beds intertongue with a sandstone facies to the northeast and a carbonate facies toward the east and south, the Permian-Pennsylvanian Grandeur Tongue and Wells Formation, respectively. Further to the east and south, the interval is represented by red bed facies dominant in eastern Wyoming and northwestern Colorado (McKelvey et al. 1967).

The Phosphoria sediments of southeastern Idaho were deposited in the Cordilleran geosyncline under marine conditions. The distribution of the Meade Peak Member and its shoalward facies suggests that it was deposited in a large ocean embayment similar to the present Arabian Sea (McKelvey et al. 1959, p. 25). The various facies of the formation were largely determined by water depth, and exhibit systematic facies changes. From west to east or from deepest to shallowest water, the principal sequence is black mudstone, dark dolomite and phosphorite, chert, limestone, and sandstone. Phosphatic beds and associated black shales of the Meade Peak Member in southeastern Idaho are representative of the intermediate facies. Shallower water chert beds comprise the upper Rex Chert Member of the Phosphoria Formation (Sheldon, Maughan, and Cressman 1967). The rock sequence from the upper part of the Pennsylvanian Wells Formation to the middle of the Rex Chert Member of the Phosphoria

Formation in southeastern Idaho represents a nearly complete cycle of marine transgression and regression (McKelvey, et al. 1967, p. 17) and forms regionally continuous deposits in both areal extent and thickness.

Phosphate abundance in the Phosphoria Formation is more than six times greater than that in the sea today (Sheldon 1989). Increased sedimentation and deposition of phosphorite and organic matter formed as upwelling of nutrient-rich waters in the Phosphoria Sea resulted in high rates of biotal productivity (Sheldon, Maughan, and Cressman 1967; Sheldon 1989).

7.2 Regional Structure

The Phosphoria Formation of the Western Phosphate Field outcrops along a series of imbricate thrusts in an area tens of kilometers wide within the Rocky Mountain Fold- and Thrust-Belt (Armstrong and Oriel 1965 and Figure 7-1). The thrust-belt extends from southern Montana into northern Utah and ranges from late-Jurassic to early Cretaceous in age. The thrusts are progressively younger from west to east and the upper plates of the thrusts moved to the northeast. Continued compressional forces acting in the same direction as the original thrusting folded the thrust surfaces into a series of sub-parallel north-northwest trending anticlines and synclines. During later stages of Laramide deformation, the thrusts were cut by east-trending steeply dipping tear faults. Extensive block faulting associated with Basin and Range deformation during Tertiary time formed the northerly-trending graben valleys in southeastern Idaho and adjacent parts of Utah and Wyoming. The Property is located along the western edge of the Bear Lake Graben and is bounded on the west by a segment of the Paris Thrust.

7.3 Property Geology

A generalized geologic map of the Property is shown in Figure 7-2 (McKelvey and Strobell 1955, Sheet 1), as modified by PHA.

7.3.1 Stratigraphy

Lithologic units present within the Property are described below and are shown in the stratigraphic section illustrated in Figure 7-3.

Qal Quaternary alluvium includes unconsolidated boulders, gravels, sand, landslide debris and shallow soil of Quaternary to Recent age. These deposits unconformably overlie all older units at various localities throughout the Property. Thicknesses range from a meter to over 60 m in places.

Tsl The Salt Lake Formation is Tertiary (Late Miocene to Pliocene) in age and is only exposed in a few discontinuous outcrops at the surface near the far eastern boundary of the property. The unit consists of white to gray to green tuff, calcareous siltstone, tuffaceous sandstone, and conglomerate. The thicknesses are reported as up to several thousand meters near Preston (Oriel and Platt 1980), but are only the order of 0–20 meters (m) thick at the surface on the Property.

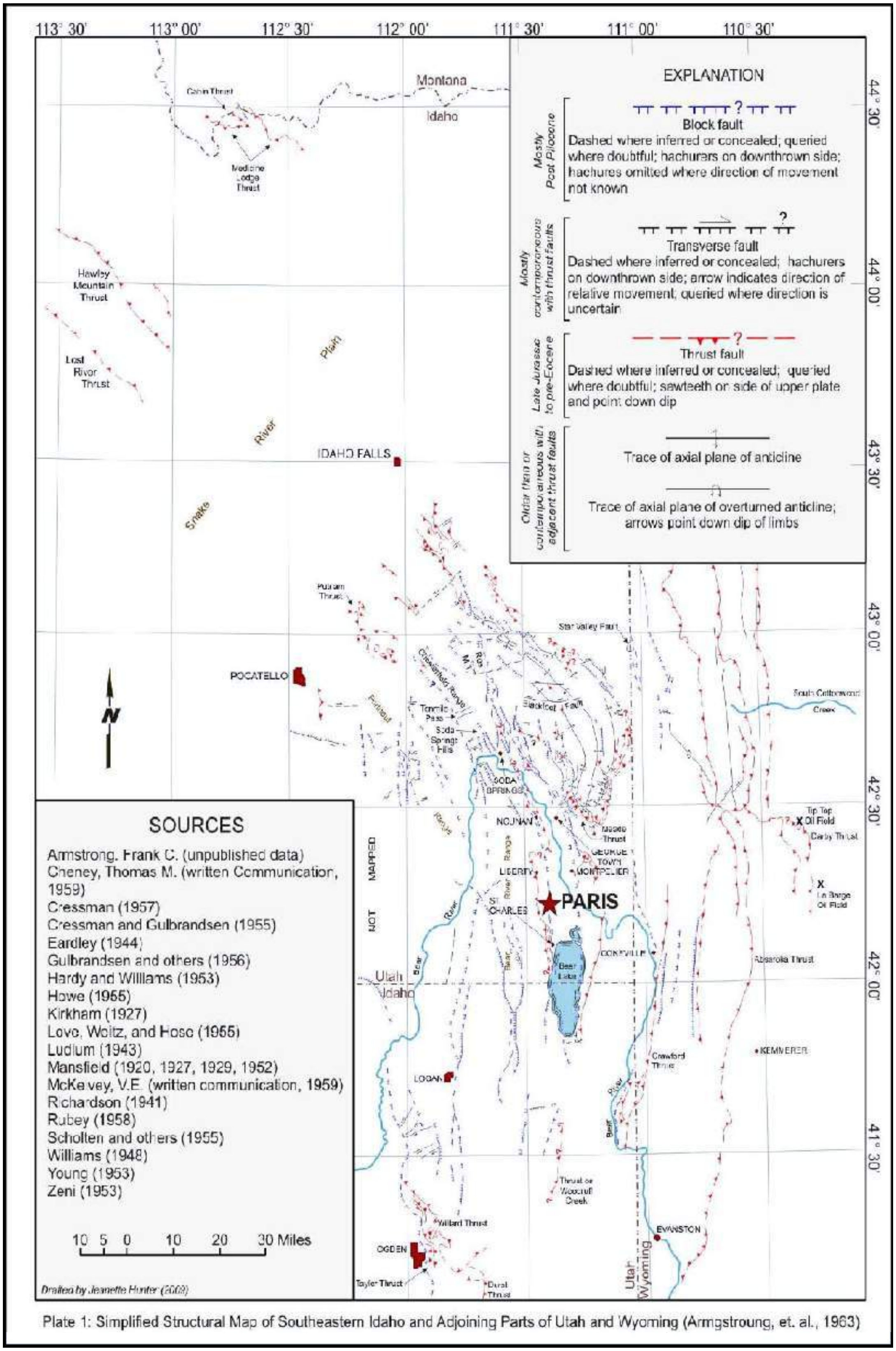


Figure 7-1. Regional Structural Map of Southeastern Idaho (from Armstrong and Cressman 1963)

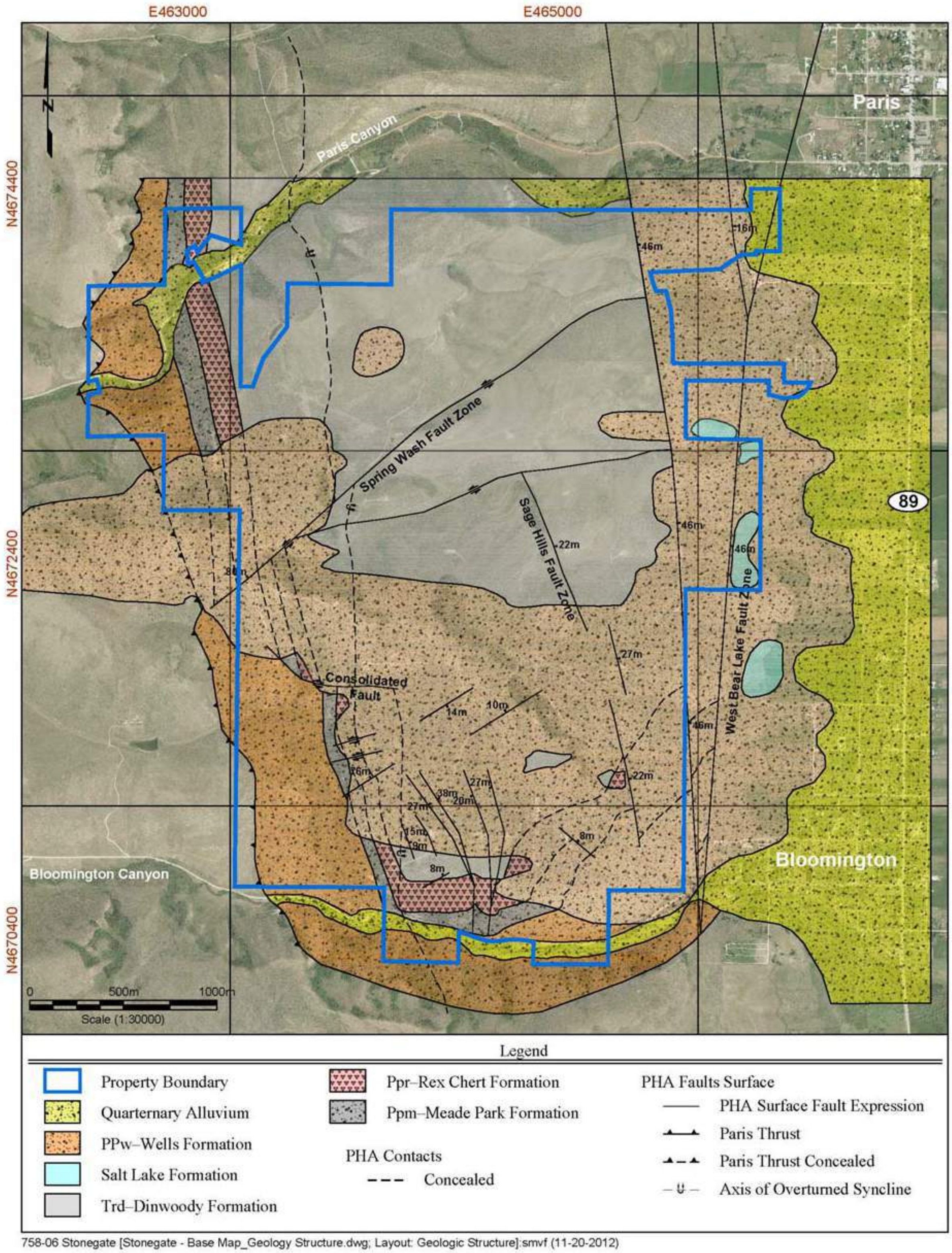
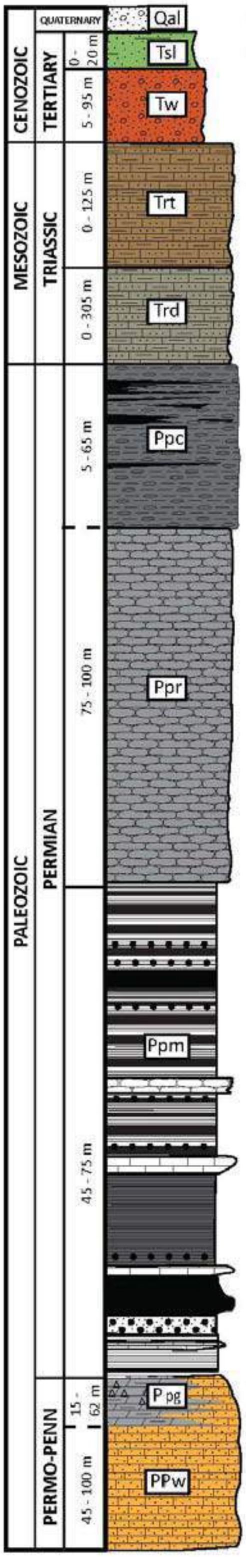


Figure 7-2. **Geologic and Structural Map** (based on a compilation of PHA drill hole data, Earth Sciences, Inc. [ESI] historical drill hole data, three-dimensional Gems Modeling, PHA surface mapping, and historical mapping by McKelvey and Strobell, 1955 and Oriel and Platt, 1980)



SURFICIAL DEPOSITS
Alluvium; well to poorly sorted unconsolidated gravel, sand, and silt

SALT LAKE FORMATION
White, gray, and green tuff; calcareous silstone, sandstone, and conglomerate

WASATCH FORMATION
Variegated red to gray mudstone and/or clay; fine to coarse-grained brown to gray sandstone; conglomeritic lenses of quartzite, chert, and minor limestone pebbles

THAYNES FORMATION
Gray limestone and brown-weathering gray calcareous silstone; dark gray to olive drab finely laminated shale and interbedded limestone abundant in lower part

DINWOODY FORMATION
Upper Member - Shale and Limestone, shaly layers less common and limestone layers are thicker
Calcaerous siltstone and silty limestone
Lower Member - Olive brown calcareous siltstone and shale and grayish brown limestone

PHOSPHORIA FORMATION

Cherty Shale [Ppc]/Retort Tongue [Pprt]
Medium gray to grayish-black chert includes lenses of soft carbonaceous mudstone and pelletal phosphorite; may interfinger or be interbedded with the Rex Chert; tends to be more competent with highly variable thickness; typical sequence includes upper phosphatic rocks, middle calcareous mudstone including carbonaceous, and lower phosphatic layers; nodular phosphorite may mark contact with overlying Dinwoody Formation; Distinct high gamma signatures are associated with the thin phosphatic lenses

Rex Chert Member [Ppr]
Very resistant to weathering and forms prominent marker beds that can be traced for several miles and provide marker for Meade Peak Mbr. at surface.
May include mudstone, phosphorite, and carbonates (see above); Some sandy chert zones up to 25 m thick; Sandy lenses may be associated with shearing and extensive alteration to white/tan/light gray
Chert beds may range in color from nearly white, tan, yellow, gray, and where unweathered typically it is black, dense, and hard due to the presence of organic matter; near the surface there is a loss of organic matter and of cementing carbonate so rock becomes softer and lighter in color, again, this also is common adjacent to fault zones and/or where the formation is sheared. Cherty Shale and Retort Tongue may also be present throughout.

Meade Peak Phosphatic Shale Member [Ppm]
Upper Waste Section - light brown to chocolate brown mudstone, silty, dark-gray, weathers brown
Upper Phosphate Zone - dark, grayish brown oolitic phosphorite
"UPZ" or D" Bed - 2.5 - 4.5 m thick - Interbedded phosphorite (pisolitic) and oolitic mudstone (silty)
"D1" Bed - Vanadium Zone ~ 4 m
"D Lower" Bed - finely pelletal phosphorite, "Buckshot Bed", argillaceous and/or carbonaceous
Middle Waste - Black to brown interbedded shale, mudstone, siltstone, phosphorite
Cherty Marker Bed - ~ 3 m thick - altered limy chert; ~ 30.5 m from Cap Rock, locally distance varies
"E" Bed - phosphatic marker layer based on high gamma signature
Lower Phosphate Zone
"C" Bed - Finely pelletal phosphorite (Low Grade Ore); carbonaceous phosphatic shale
False Cap - Cream to gray limestone or limy chert interlayered with oolitic phosphorite streaks, locally fossiliferous
"B" Bed - finely pelletal phosphorite
Cap Rock - Resistant, fine, dark gray to white, fossiliferous, limestone to dolomitic limestone, locally clay-rich
Brownish black to black oolitic phosphorite
"LPZ" or "A" Bed: ~ 1.5 - 3 m thick; High-grade pelletal - oolitic phosphatic mudstone.
Fish Scale Marker Bed - contains numerous fossil fragments; high-grade phosphorite
Lower Waste - may contain Chert

Grandeur Tongue of the PARK CITY FORMATION - [Ppg]
Dense, hard,gray siliceous limestone, interbedded cherty dolomite, reddish to brownish gray silty dolomite and cherty dolomitic limestone; locally brecciated and altered to clay especially at the uppermost contact. Commonly interbedded with pale-yellowish orange sandstone near basal contact with Wells.

WELLS FORMATION [PPw]
Interbedded near top with Grandeur Tongue; light brownish-gray to pale-yellowish orange or white calcareous sandstone; minor gray dolomite; local bluish-gray cherty lenses; deformation bands are common; sandstone is very porous.

*Based on direct observation during drilling program and general information compiled from Moore and Hovland, 1990; Derkey and Palmer (1985); Oriel and Platt (1980); ESI 1974-77 Reports; Service and Popoff (1964); Hale (1967); McKelvey and Strobell (1955); Powell (1974); Richards and Mansfield (1912; 1914); and McKelvey (1946).

Figure 7-3. Generalized Stratigraphic Column (from PHA)

Tw The Wasatch Formation is Tertiary (Lower Eocene) in age and covers over two-thirds of the Property and is present in drill holes on the southern half and eastern margin of the Property. The deposits are a distinctive red to variegated gray mudstone, fine- to coarse-grained sandstone, and unlithified to lithified conglomerates. Thicknesses range from 0–100 m on the Property.

Trd The Dinwoody Formation is Triassic in age and, as observed from drill cuttings, is predominantly medium-gray siltstone. It is absent due to erosion immediately north of Bloomington Canyon and progressively increases in thickness northward and westward into the axis of the Paris Syncline. The thickness can be over 600 m, but is generally about 200–275 m.

Ppr The Rex Chert Member of the Permian Phosphoria Formation is predominantly dark gray to black chert in unoxidized drill cuttings and brown to gray chert in the outcrop. The Rex Chert Member conformably overlies the Meade Peak Member of the Phosphoria Formation. The chert locally forms resistant outcrops at the head of Little Canyon and both south and north of the Paris Mine at Paris Canyon. It is missing from the extreme southeastern part of the Property because of pre-Tertiary erosion. The typical section averages about 76 m thick where penetrated by both ESI and RMP Resources Corp. (RMP) drill holes.

Ppm The Meade Peak Member of the Phosphoria Formation includes black locally carbonaceous and petroliferous mudstone, phosphorite and black shale with minor chert and limestone. Within the Property, it averages about 60 m in thickness and includes two high-grade phosphate beds along with a persistent vanadiferous shale horizon. The Meade Peak Member is poorly exposed in outcrop because of recessive weathering of the relatively non-resistant shale beds. Frequently, chert fragments derived from erosion of the overlying Rex Chert Member also obscure Meade Peak Member outcrops. The Meade Peak Member locally overlies the Grandeur Tongue Member (PPg) of the Park City Formation and the Wells Formation with apparent conformity observed from drill hole penetrations within the Property.

PPw The Pennsylvanian Wells Formation consists of sandstone, red beds, and carbonate beneath the Grandeur Tongue Member of the Park City Formation. The upper siliceous limestone rocks that make up the Grandeur Tongue Member were formerly assigned to the upper part of the Wells Formation (McKelvey, et al. 1959). The Wells Formation crops out in Little Canyon where it weathers to a yellowish color and forms semi-resistant outcrops. Where observed in drill cuttings, the upper 6 m of the formation is mostly light-gray siliceous limestone to yellowish to white calcareous siltstone.

7.3.2 Structure

The structure of the Property is dominated by the north-trending Paris Syncline (Service 1966). The western upturned to steeply dipping limb is exposed immediately east of the surface trace of the Paris Thrust. The eastern limb is gently west-dipping to horizontal and extends into the subsurface beneath most of the Property. The horizontal limb of the Paris Syncline plunges about 15° north as shown in Figure 7-4 and dips about 12° west as shown in Figure 7-5. The horizontal limb is exposed in an historical adit on the southern edge of the property near Bloomington Canyon.

The steeply dipping upturned limb crops out in Little Canyon and strikes north where it is well exposed both south and north of Paris Creek. Locally, the upturned limb exposes the Meade Peak Member of the Phosphoria Formation; however, the majority of the slopes are vegetated and/or are covered in slope wash. The Consolidated Mine in Little Canyon and the Paris Mine along Paris Creek were developed in phosphate-rich beds of the upturned limb. The brittle Rex Chert is intensely fractured adjacent to the upturned limb where observed in outcrop in Little Canyon and on both sides of Paris Canyon.

The eastern limit of the Property is defined by a series of north-trending normal faults identified as the West Bear Lake Fault Zone (McCalpin 2003, Figure 7-2) that comprise the western margin of the Bear Lake Valley graben. This fault zone is largely covered by landslide debris and down-slope wash, but has been identified in the core by discontinuity of beds, intensity of fracturing and alteration, and brecciation. The structures have been identified in regional seismic lines and are expressed as steeply plunging beds. There is no drilling control to the east of the Property boundary; however, well-preserved fault scarps suggest the central portion of the fault is comprised of multiple fault strands within a 3-km-wide zone that extends north-south for at least 20 km (McCalpin 2003). Structurally, the western margin of the Western Bear Lake Fault Zone defines the eastern limit of potentially economic beds of phosphate and vanadium, which are progressively down-dropped to the east by Basin and Range normal faulting (Witkind 1975, McCalpin 2003, and Coleman 2006).

Other structural elements include the steeply dipping, east- to southeast-trending Consolidated Fault and the northeast-trending Spring Wash Fault Zone (Figure 7-2). These faults are likely tear faults developed during thrust-related deformation and/or reactivation. In the case of the Consolidated Fault, beds of the horizontal limb are offset by these faults and produce significant displacement of a portion of the north-trending upturned limb of the Paris Syncline. The Consolidated Fault displaces the southern end of the deposit downward and to the east (Ralph M. Parsons Co. 1974 report for ESI). The Spring Wash Fault Zone has been identified by surface expression; it does not exhibit a great amount of vertical displacement or dip, but may express horizontal displacement resulting from tear lateral movement.

Several small faults with displacement of a few meters were observed in workings during ESI's mining in the horizontal limb immediately north of Bloomington Canyon. These small faults generally trend easterly and appear to decrease in frequency eastward away from the upturned limb of the Paris Syncline.

The faulting is interpreted from various sources: surface expression from aerial photography, drilling, and refinement on historical interpretations. Additional infill drilling and proposed seismic work will inform the interpretation of structure and possible effects it might have on underground operations. Lineaments are identified almost exclusively from interpretations made from aerial photography. They may represent later jointing or structures that may not extend downwards into the phosphate beds.

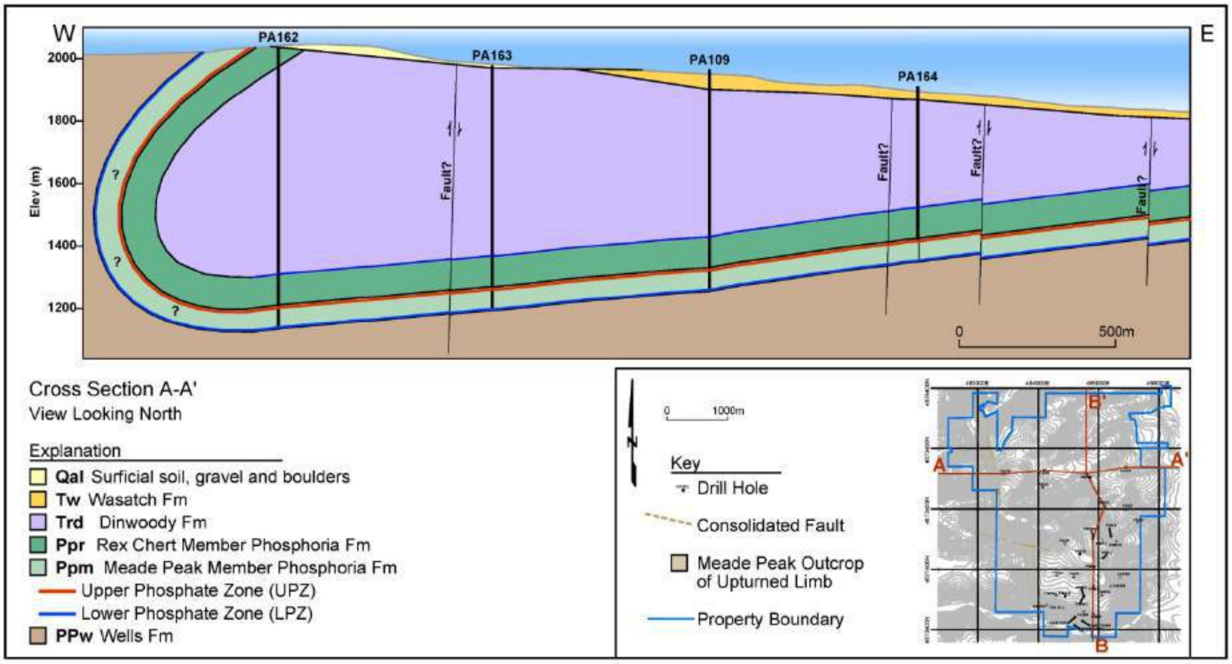


Figure 7-4. East-West Cross Section, Paris Hills Property, Bear Lake Co., Idaho

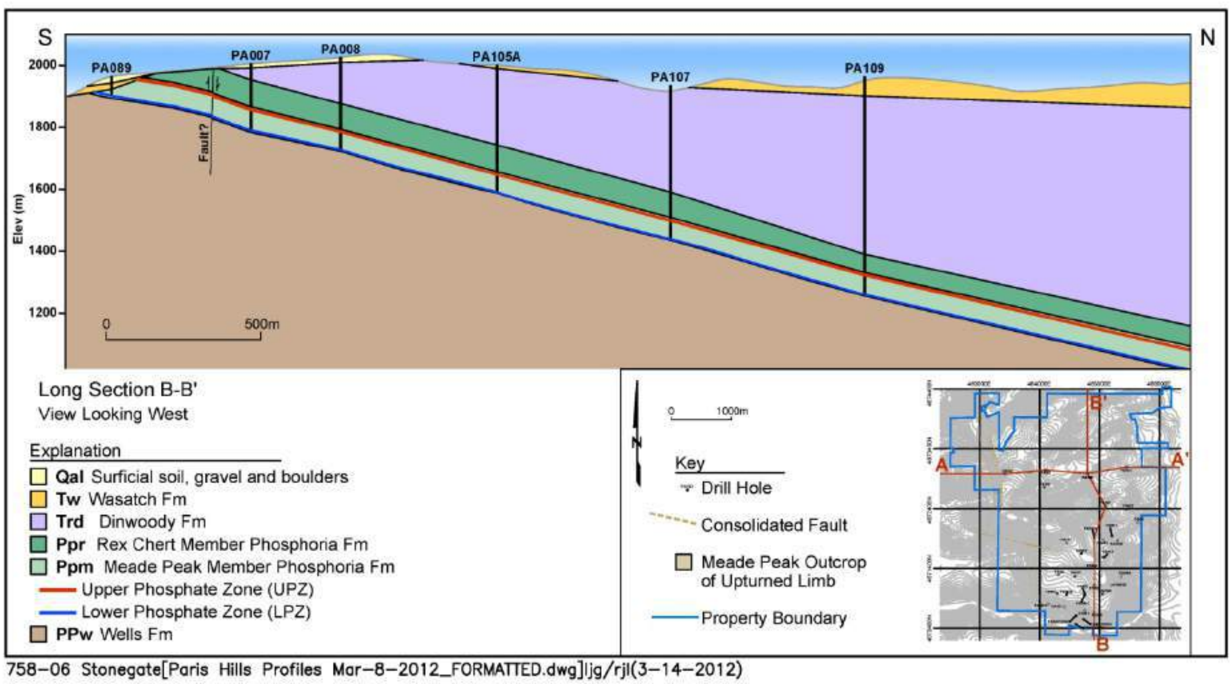


Figure 7-5. North-South Cross Section, Paris Hills Property, Bear Lake Co., Idaho

7.3.3 Mineralization

Phosphorite is a general term for sedimentary rock containing significant amounts of phosphate minerals as well as other constituents such as quartz, feldspar, clay minerals and organic matter. Guldbrandsen (1967) provides a description of the mineral composition of phosphorites from the Phosphoria Formation. Fluorapatite, $Ca_5(PO_4)_3F$, is the primary phosphate mineral. Principal elemental substitutions within the fluorapatite crystal lattice are Sodium (Na), strontium (Sr), uranium (U), thorium (Th), and rare earths for calcium (Ca); carbon trioxide (CO_3) and sulfate (SO_4) can substitute for phosphate (PO_4).

At PHA, three stratiform-bedded zones within the Meade Peak Member of the Phosphoria Formation are of potential economic interest. These are, from top to bottom:

Upper Phosphate Zone (UPZ) occurs approximately 3 m below the contact with the Rex Chert Member. Based on historical evaluation of outcrops, trenches, underground workings and drill penetrations, this bed averages about 4.6 m thick and averages between 21 percent (%) and 25% phosphorus pentoxide (P_2O_5). The UPZ is regionally called the "D" bed and consists of interbedded pelletal and argillitic material with a relatively sharp lower contact grading upward to higher grade coarse pelletal and pisolitic phosphorite and mudstones (Hale 1967).

Vanadium Zone (VZ) occurs as three beds, lies immediately below the UPZ, and is designated the "D1" bed. Based on historical reports, it averages between 3.4 and 3.8 m thick with an average vanadium pentoxide (V_2O_5) grade of 0.74% to 0.92%. The VZ includes three lithologic types with different vanadium grades. Pertinent information for each bed is summarized in Table 7-1. The VZ averages about 13% P_2O_5 based on ESI's drill results.

Table 7-1. Vanadium Bed Summary

Domain	Thickness (m)	V_2O_5 (%)	Lithology
Upper	1.5	0.69	Black mudstone
Middle	1.2	0.35	Black to brown oolitic phosphorite
Lower	1.1	1.13	Black highly organic shale
Average	3.8	0.74	

Lower Phosphate Zone (LPZ) occurs about 1.5 m above the Meade Peak Member's contact with the underlying Wells Formation and approximately 50 m below the VZ. Regionally called the "A" bed, it is a high-grade pelletal phosphorite overlying a basal mudstone and phosphoric fish-scale marker bed (Hale 1967). This bed ranges from 1.1 to 2.9 m thick and averages an overall grade of about 25.0% P_2O_5. Resource grades were subject to a cutoff of greater than or equal to 24%, resulting in much higher average grade.

In addition to the three beds described above, there are significant intervals located between the VZ and the LPZ, ranging from 3 to 15 m thick, and averaging from 10% to 15% P_2O_5.

The mineralized beds described above occur in both the upturned limb and the horizontal limb of the Paris Syncline. Grades and thicknesses in both the upturned limb and the horizontal limb of the anticline are similar, although improvement in grade is noted in areas where the phosphorite has been weathered and/or alteration. This is largely due to driving off contaminants such as calcium carbonate in the weathering process, thereby concentrating the grade. That process may be by chemical or mechanical means and may occur due to areal and sub-areal exposure and faulting.

The majority of the mineralization occurs in the horizontal limb which underlies most of the Property. Continuity of mineralization in both limbs of the Paris Syncline is anticipated to be good, based on the depositional environment and because of the widespread mining of phosphate beds of the Meade Peak Member in southeastern Idaho, western Wyoming, and northeastern Utah. Within the southern one-third of the Property, drill hole penetrations have generally verified continuity of both grade and thickness of the three primary mineralized zones.

Variations between adjacent drill intercepts are likely more influenced by a combination of structural complications than from primary sedimentary concentrations of P_2O_5 and V_2O_5.

Mineralization in the upturned limb has a strike length of over 3.2 km and extends from the surface to a depth exceeding 1,000 m, depending on the location of outcrops along the north-trending strike. Depths of the horizontal limb range from surface along the north side of Bloomington Canyon to estimated depths of 915 to 1,035 m at Paris Canyon.

Elemental substitutions within the fluorapatite crystal lattice may represent deleterious material or, where in sufficient concentration, might be recovered as a byproduct. Deleterious trace elements, including uranium, arsenic, selenium, and cadmium, were preliminarily reviewed for possible effects to marketability and cost of mitigation.

Uranium and its radionuclide of concern, radium (Ra), do not have an impact on the ability to transform phosphate rock into fertilizers, but there is concern about potential health hazards during the manufacture of the fertilizer and, particularly, its byproducts. Radium mainly reports to the phosphogypsum byproduct of fertilizer production and can be a significant gamma radiation source. Acceptable uranium limits vary throughout the market. Morocco, the largest international exporter, produces phosphate rock with uranium levels on the order of 120 parts per million (ppm). US mines produce phosphate rock with uranium levels on the order of 140 ppm. At PHA, composited uranium levels in the LPZ vary between approximately 60 and 100 ppm, and between approximately 60 and 100 ppm in the UPZ, which, even without beneficiation, is low relative to the Moroccan and domestic benchmarks.

Acceptable arsenic limits vary throughout the market. High-purity igneous deposits in Russia and Finland typically range between 3 and 5 ppm, while the most commonly consumed rock concentrates range between 10 and 15 ppm. A 20-ppm arsenic limit is considered readily acceptable. Arsenic levels in the direct ship phosphate ore (DSO) LPZ rock vary between approximately 5 and 90 ppm, and average 18 ppm among samples tested. Composite arsenic levels in the UPZ range between approximately 10 and 70 ppm and may reduce considerably with beneficiation.

Typically, phosphate rock with cadmium levels less than 50 ppm is desirable. Cadmium levels in the LPZ range between approximately 10 and 140 ppm, averaging 97 ppm among samples tested, and between approximately 50 and 215 ppm in the UPZ.

Selenium is a primary issue for companies mining in the Western Phosphate Field where the selenium is hosted in the overburden and can become mobile due to oxidation when exposed to air. Selenium levels less than 10 ppm are considered readily acceptable in phosphate rock and, typically, range between 1 and 5 ppm. Igneous deposits typically fall below 2 ppm, whereas sedimentary deposits can range as high as 9 ppm, such as Tunisia Gafsa rock. Selenium levels in Moroccan phosphate rock are typically in the 5- to 7-ppm range, which is considered the benchmark acceptance level. Selenium levels in the LPZ range between approximately 3 and 46 ppm, averaging 27 ppm among samples tested, and between approximately 4 and 110 ppm in the UPZ.

Where higher levels of arsenic, cadmium, and selenium are encountered in the LPZ, DSO phosphate rock may or may not incur some pricing penalties. Beneficiation of the UPZ phosphate rock is expected to improve quality by reducing trace element levels.

Hydrogeology and geochemistry are discussed in *Item 24—Other Relevant Data and Information*.

8.0 DEPOSIT TYPES

The Permian Phosphoria Formation within the Western Phosphate Field (Richards and Mansfield 1912, McKelvey and Carswell 1956, and Service 1966) contains phosphate, vanadium, and associated trace metals that formed within a shallow and restricted basin (up to 300 m deep) named the Phosphoria Sea off the western coast of the Pangea continent approximately 250 million years ago (Hein 2004).

Phosphate- and vanadium-rich beds were derived from detritus of organic matter produced during coastal upwelling, which accumulated on the basin floor without being diluted by carbonates and/or terrigenous deposition (Hein 2004). It is believed that low relief and an arid climate to the east minimized input of terrigenous sediments, and that water temperature and oceanic conditions prohibited the formation of marine carbonates (Hein 2004). Most known world reserves of phosphate are sedimentary marine.

Depositional conditions of the Meade Peak Member produced bedded deposits characterized by continuity of grade over large distances. Marine phosphate deposits are known for their large size and the Meade Peak Member has been mapped for a distance of greater than 200 km.

Various other metals including selenium, zinc, silver, uranium, and molybdenum occur at anomalous levels within the Meade Peak Member.

9.0 EXPLORATION

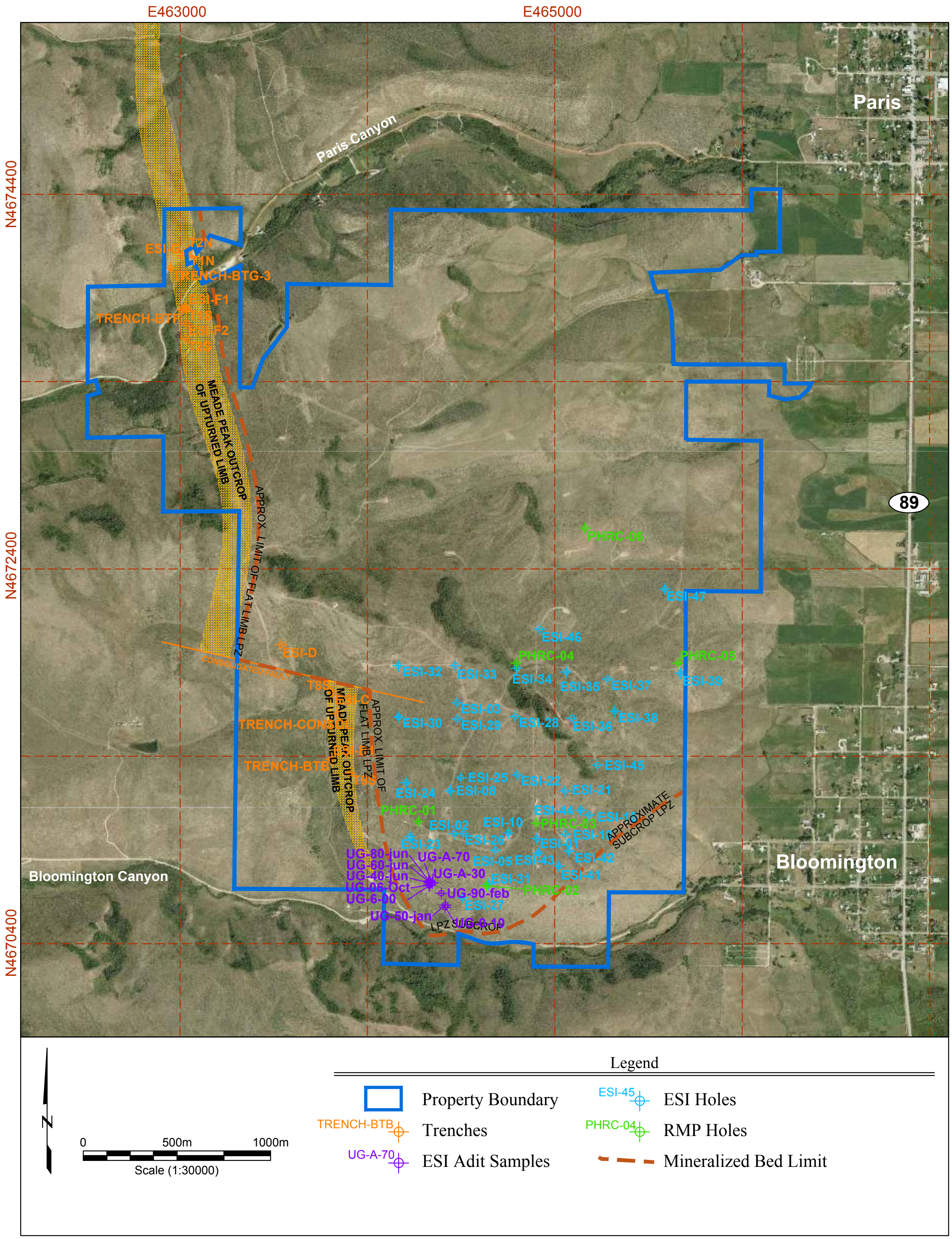
Drilling, gamma logging, geochemical sampling, and outcrop measurements are utilized in exploration and investigation of the mineral deposits. Evaluation of the Paris Hills Phosphate Project (the Property) has been accomplished by:

- Review of published literature
- Review of historical exploration results including work done by the United States Geological Survey (USGS), state agency reports, and private company reports, primarily Earth Sciences, Inc. (ESI) and RMP Resources Corp. (RMP)
- Review of the AMEC (2010) National Instrument (NI) 43-101 Technical Report (TR) on Stonegate Agricom Ltd.'s (Stonegate's) Paris Hills Phosphate Project Idaho, United States of America (USA), 01 February and data used in that report
- Seismic analysis of two-dimensional seismic trade lines purchased by Paris Hills Agricom Inc. (PHA)
- Exploration drilling with downhole gamma surveying conducted by PHA from September 2010 to June 2012
- Chemical analyses on core samples by commercial laboratories
- Analyses and check of assay results

Drilling and resulting assay work are the bulk of contemporary exploration work and are described in detail in Items 10 and 11.

Available historical data, while conforming to industry standards consistent with the time it was generated, are not acceptable for use in this resource evaluation. Drill hole intercepts, trenching samples, and assay results generated from historical data used by AMEC (2010) were reviewed but could not be independently confirmed. A detailed explanation of that data is found in AMEC (2010), AAI (2011), and is highlighted in Item 6.2 of this report. The larger dataset included 47 holes drilled and assayed by ESI in the 1970s. Twenty-two of those holes penetrated the Meade Peak Member and were utilized by RMP. In addition to the drill holes, ESI drove two tunnels and collected trench samples. Assays of drill holes, tunnel, and trench samples were mostly performed in-house and were not confirmed by Certificates of Analysis. RMP rotary-drilled six confirmation holes offset to ESI holes in 2008, only two penetrated the UPZ and LPZ. Historic drilling and trenching by ESI and RMP are shown in Figure 9-1.

In its Inferred Mineral Resource estimate, AMEC (2010) located and used assay and sample results for 17 historic drill holes as well as trench and adit assay results. Those data are not used to evaluate this resource; however, they provide useful constraints for understanding the subsurface geologic structure and for planning new drill holes.



758-06 Stonegate [Stonegate - Base Map_43-101.dwg; Layout: ESI_RMP Hole Coords]:smvf (1-15-2013)

Figure 9-1. ESI and RMP Drill Hole and Trenching Map

PHA acquired the holdings from RMP in September 2009 which included the interests to all Mineral Lease Agreements, rights to the State of Idaho exploration permits, a federal lease, and rights to a federal prospecting permit application. Since acquiring these holdings, PHA has secured the transfer of the Mineral Lease Agreements and the State of Idaho has reissued these exploration permits. An exploration program was filed with the BLM and the State of Idaho on 29 October 2010 (Stone 2010). In that program, 62 drill holes, for a combined total of 22,021 meters (m), were proposed on United States Bureau of Land Management (BLM)-owned property.

PHA applied for approval to drill on the federal phosphate lease and was granted permission in September 2011. PHA applied for and was granted approval for a federal prospecting permit and a federal exploration license in October 2011. Also, PHA entered into five Mineral Lease Agreements expanding the original RMP property boundary in 2011 and 2012. See *Item 4.1—Mineral Surface and Land Tenure* for details.

PHA commenced a drilling program in September 2010 and continued to drill and assay through 10 November 2011 for reporting in AAI (2011) and through 10 February 2012 for AAI (2012a). This report includes drilling and assay data to 04 October 2012.

To estimate a Measured and Indicated (M&I) NI 43-101 compliant resource, PHA has drilled to delineate the phosphate mineralization within the Property boundary. AAI recommended a drilling spacing of 0.4 kilometers (km) for Measured and 0.8 km for Indicated Resources in areas of the eastern horizontal limb. Closer-spaced drilling was recommended in the vicinity of suspected faults, the upturned (upturned) limb, and at the southern boundary of the Property, which is desired for local structural definition. Initial exploration plans and recommendations set out by AMEC (2010) were to set drill hole spacing between 150 m and 300 m.

PHA's exploration plans going forward include infill and step-out drilling to upgrade remaining Inferred portions of the Lower Phosphate Zone (LPZ) and Upper Phosphate Zone (UPZ) in the horizontal limb to M&I, and drilling along the western margin of the deposit to define the LPZ and UPZ Mineral Resources contained in the upturned limb. The upturned limb is presently identified as an Exploration Target.

9.1 Seismic

Five trade seismic lines were acquired for reprocessing to assist in interpretation of regional structure (see Figure 9-2). RPS Boyd PetroSearch (Boyd) reprocessed two-dimensional seismic trade lines, one on a north-south line and four on east-west lines. Structure on top of the Rex Chert Member, LPZ, and the Wells Formation was mapped and tied into historical fault trends. The preliminary analysis confirms the structural dip of the strata previously identified from the drill holes and shows various faults crossing the Property, including major normal faults which bound the deposit near the eastern property line. The age and the quality of the raw data preclude detailed depth or structural mapping.

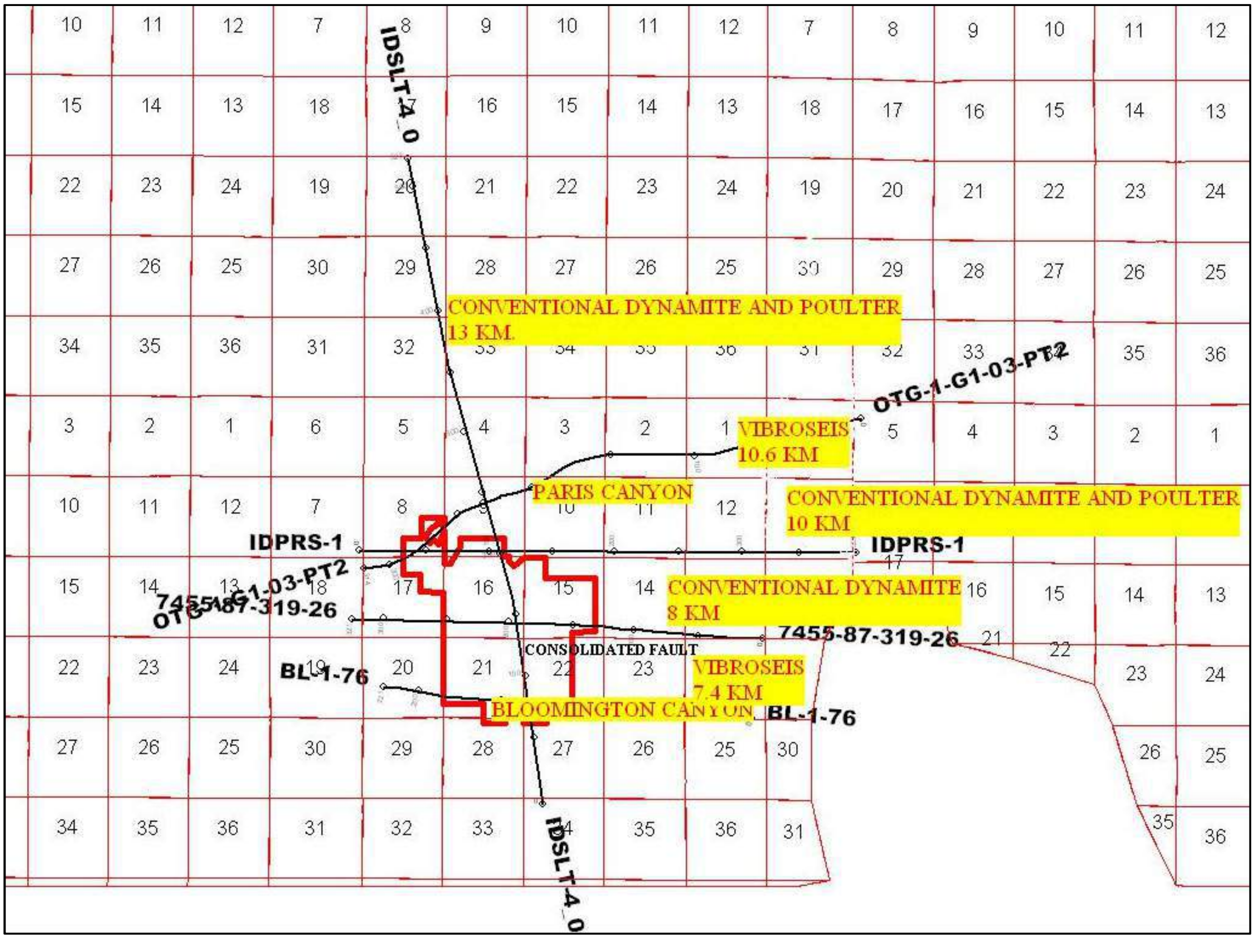


Figure 9-2. Location of Seismic Lines Intersecting the PHA Project Area and Energy Source-Type (from Boyd 2011)

9.2 Gamma Logging

After drilling was completed for each hole, downhole profiles of gamma radiation were obtained with a Mount Sopris 5MXA-1000-120 Matrix Logger with a 2PGA Poly Gamma probe. Depending on hole depth, either a 500-m cable winch or a 1,000-m cable winch was used to lower the probe. Gamma emissions in counts per second (cps) were recorded as the probe was lowered through the drill pipe from the top of the hole to below the base of the Meade Peak Member. Natural gamma radiation occurs as the result of radioactive decay of uranium. Studies have shown a close correspondence of uranium to apatite concentrations in the Phosphoria Formation (Hale 1967). This relationship was reportedly due to uranium within the apatite, substituting for calcium, rather than concentration in the matrix. At PHA, gamma logs provide distinctive signatures for the UPZ and LPZ as well as other lithological changes and marker beds. The gamma log profiles provide a means to consistently correct drillers' depths, identify representative sample ranges, and to identify lithological and structural variations across the Property area. Figure 9-3 shows gamma profiles in cps for holes PA103 and PA105A which highlight the use of gamma to define various intervals within the Meade Peak Member on the Property.

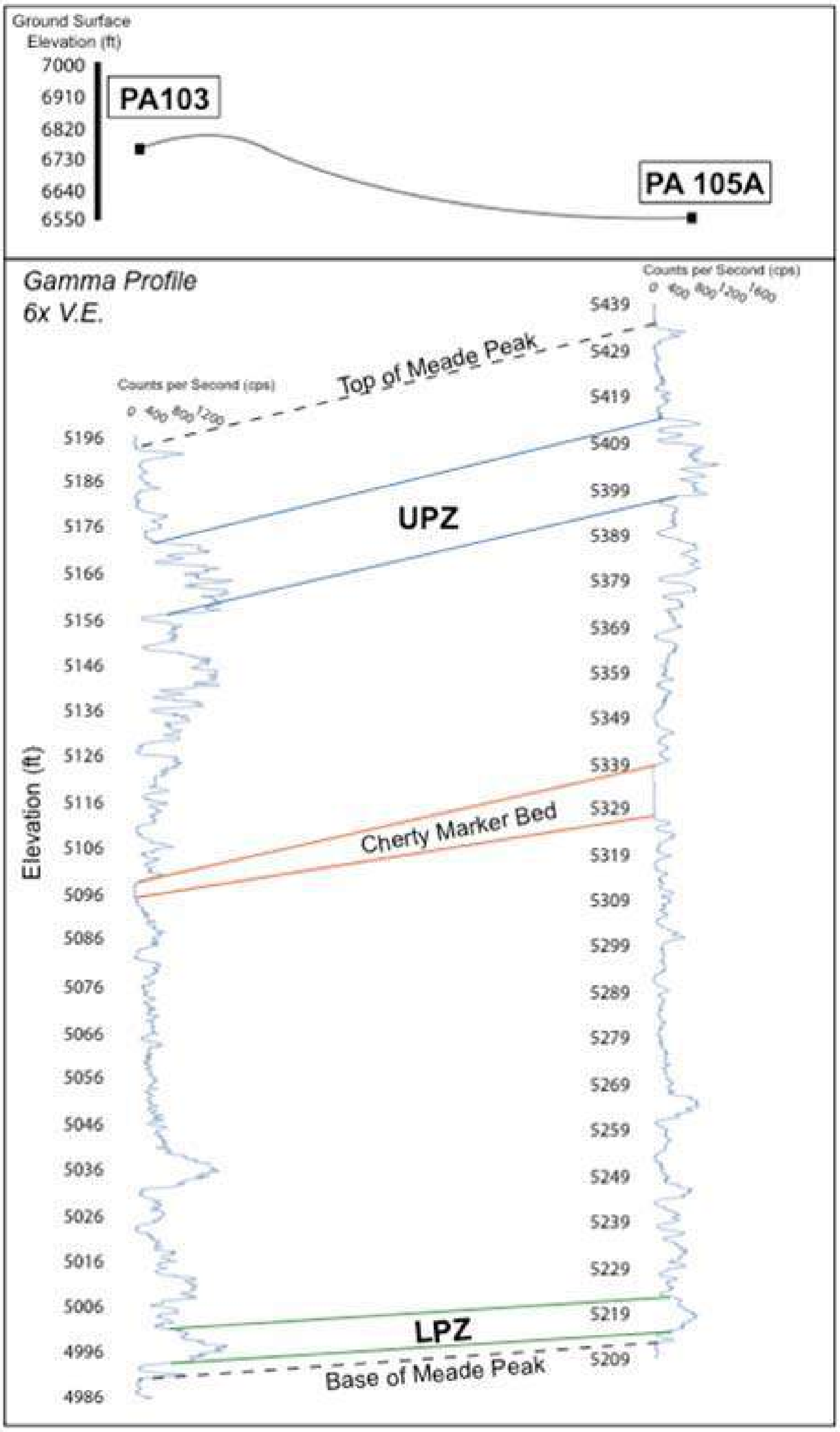


Figure 9-3. Gamma Profiles for Holes PA103 and PA105A (vertical exaggeration = 6x)

9.3 Sampling

Once the core is delivered from the drill rig to the core warehouse, the geologist determined and marked the core sample intervals which were typically ±0.3 m. However, sampling for five of the early drill holes were core sampled at intervals greater than that; the largest sample interval was 0.6 m.

Each sample was double-checked by a senior geologist. Individual marked samples were removed from the core box, shrink-wrapped in plastic (to hold the softer, more fractured segments together), and cut wet with a masonry core saw. Core samples were placed in plastic bags with appropriate sample identification for shipment to the assay laboratory. The samples were typically half-core with the other half left in the core box for reference. If the sample was too soft or fragmented to cut, the whole core was sent. In that case, the laboratory's first split was placed back into the core box for reference. If a core duplicate was required, then the core was quartered. Dry core cutting had been done with a rotary tool on 11 of the early LPZ resource holes, resulting in excessive breakage of the core. Wet core cutting methods replaced the dry methods to assist in holding the core together.

A pre-determined quantity of quality assurance/quality control (QA/QC) samples (standard reference materials [SRMs], blank materials, duplicates and secondary lab checks) was included with each batch of samples.

All samples were documented with proper chain-of-custody and security-sealed before shipment to the assay laboratories. Upon delivery and return, the chain-of-custody documents were signed by both site and laboratory personnel unless the samples were sent by commercial means. In that case, the commercial chain-of-custody procedures were used. The samples were sent to two phosphate industry-recognized laboratories for analysis: EnviroChem in Pocatello, Idaho, Thornton Laboratories Testing & Inspection Services, Inc. (Thornton) in Tampa, Florida, and Jacobs Engineering S.A. (Jacobs) in Lakeland, Florida. Sample preparation was completed only by EnviroChem.

Analytical results from the assay laboratories were reported electronically to senior personnel in both spreadsheet form and a secure Assay Certificate form. The results were combined with the gamma log adjusted drill hole intervals and transferred to a master database that was managed by a qualified technical person. All QA/QC results were checked; if the established criteria were not met, then the entire batch was reanalyzed.

Initially, samples were sent to ALS Chemex (ALS) for sample preparation in their Elko, Nevada facility and then to Vancouver, British Columbia for assay. After review of the PHA inserted standards, it was decided the assay results from ALS would be discarded and samples would be submitted for reanalysis at new laboratories.

9.4 Survey

A designated person arranged for the survey of all drill hole collar locations and downhole deviations.

A.A. Hudson and Associates, an Idaho-licensed Professional Land Surveyor (PLS), surveyed the hole locations and elevations. Hole northing and easting locations are North American Datum of 1983 (NAD83) Universal Transverse Mercator (UTM) Zone 12 coordinates in meters. Elevations are North American Vertical Datum of 1988 (NAVD88), also in meters.

Major Drilling Group International Inc. (Major) ran a single-shot, downhole survey tool to determine hole deviation below the casing, and a geophysical logging contractor, International Directional Services (IDS) used a gyroscopic deviation survey tool within the cased portion of the holes. Downhole survey deviations were not obtained for five drill holes, which were assumed to be vertical.

10.0 DRILLING

Drilling was contracted to Major Drilling Group International Inc. (Major) for both reverse circulation (RC) and core drilling activities. Drilling for the Paris Hills Agricom Inc. (PHA) project commenced on 23 September 2010 with Major with a 24-hour, 7-day-per-week schedule. Due to wet conditions during the spring thaw and resulting difficulty accessing the drill hole locations, drilling was temporarily suspended in 2011 and 2012 for a few weeks in March and April. Exploration drilling on the federally controlled (United States Bureau of Land Management [BLM]) portion of the Property occurred in October and November 2011 following approval by BLM and issue of exploration permits. Groundwater monitor drilling commenced in June 2012 and is ongoing.

The early drilling campaign achieved poor core recovery and produced incomplete datasets. This was later addressed with the introduction of strict quality assurance/quality control (QA/QC) protocols and procedures. If core recovery was less than targeted, holes were re-drilled. All holes were re-logged, re-measured, and depth-corrected to gamma geophysical logs. Where previous sampling made reconstruction difficult or impossible, photographic records were reviewed to determine core recovery.

After drilling resumed in spring 2011, all coring was by split-tube methods and a geologist was present at the drill site during coring at all times. The split-tube coring and the on-site presence of geologist staff resulted in accurate recovery and rock quality designation (RQD) measurements as well as improved core description and handling procedures.

PHA implemented a drilling incentive based on core recovery rather than footage, resulting in improved recovery. The larger PQ-3 core also resulted in improved recovery and provided a larger core for sampling and test work; consequently, it became the primary core size. HQ-3 was used for specialty testing (hydrological) or where depth restrictions dictated. Solid-tube methods were no longer used.

The criteria for exploration holes used in the resource estimate are (1) greater than 90 percent (%) core recovery through the phosphate zone of interest and (2) assays completed by one of the two reliable, independent, and industry-recognized laboratories. The idealized 90% core recovery criterion was later lowered to 85% as a practical response to difficult drilling conditions so that critical information could be included in the resource estimate. Fourteen drill holes were lost due to difficult ground conditions.

Table 10-1 summarizes all 85 PHA exploration holes drilled between 23 September 2010 and 08 June 2012. Drill hole locations are shown in Figure 10-1.

Tables 10-2 and 10-3 describe the total RC and core footages of holes used in the Lower Phosphate Zone (LPZ) and Upper Phosphate Zone (UPZ) resource estimates. The tables also account for the remainder of holes excluded from the resource estimate. The “Drill Hole Status” in the tables indicates the reason for exclusion.

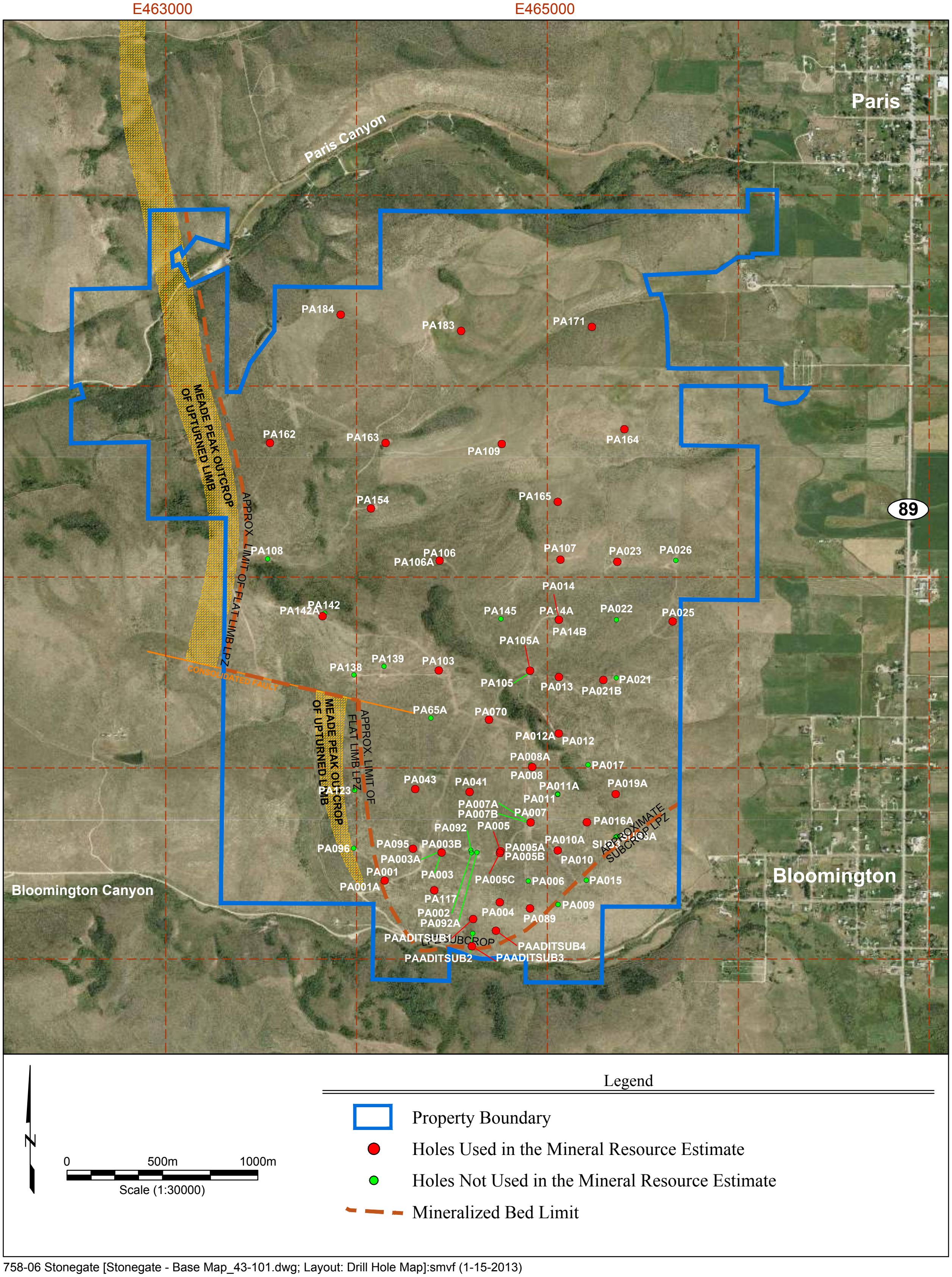


Figure 10-1. PHA Drill Hole Locations

Table 10-1. PHA 2010–2012 Drill Holes as of 8 June 2012

No.	Hole ID	Core Size	Northing (m)	Easting (m)	Elevation (m)	Total Depth (m)	UPZ Status	LPZ Status	Comments
1	PA001	HQ	4,670,813.96	464,140.69	1,937.949	186	PCR, MET	PCR, MET	
2	PA001A	PQ-3	4,670,813.82	464,142.20	1,937.870	183	RC	**LPZ**	CR: 95.4% LPZ
3	PA002	HQ	4,670,956.02	464,602.68	1,976.089	214	PCR	PCR, MET	
4	PA003	HQ	4,670,966.12	464,444.66	1,972.998	201	PCR, MET	PCR, MET	
5	PA003A	PQ-3	4,670,966.64	464,447.01	1,973.273	138	IC	IC	Lost
6	PA003B	PQ-3	4,670,965.92	464,449.06	1,973.392	198	RC	**LPZ**	CR: 100% LPZ
7	PA004	HQ	4,670,696.82	464,750.20	1,949.409	123	PCR, MET	**LPZ, MET**	CR: 91.9% LPZ
8	PA005	HQ	4,670,964.59	464,750.45	1,977.537	169	PCR	**LPZ, MET**	CR: 94.3% LPZ
9	PA005A	PQ-3	4,670,959.10	464,751.64	1,977.254	171	RC	MET	Test hole only
10	PA005B	PQ-3	4,670,957.48	464,751.34	1,977.324	171	RC	MET	Test hole only
11	PA005C	PQ-3	4,670,955.60	464,751.26	1,977.162	172	**UPZ, GT**	**LPZ, GT, MET**	CR: 98.4% UPZ, 100% LPZ
12	PA006	HQ	4,670,808.80	464,899.70	1,976.836	162	PCR, MET	PCR	
13	PA007	HQ	4,671,112.62	464,910.89	2,003.788	274	**UPZ**	**LPZ, MET**	CR: 100% UPZ, 100% LPZ
14	PA007A	PQ-3	4,671,114.99	464,907.98	2,003.944	221	GT	GT, MET	Test hole only
15	PA007B	PQ-3	4,671,110.44	464,911.19	2,003.855	221		MET	Test hole only
16	PA008	HQ	4,671,415.50	464,905.56	2,024.377	355	**UPZ**	**LPZ, MET**	CR: 99% UPZ, 100% LPZ
17	PA008A	PQ-3	4,671,416.59	464,913.81	2,024.571	152	IC	IC	Stopped, to finished at later date
18	PA009	HQ	4,670,685.55	465,055.79	1,974.220	83	NU	NL	
19	PA010	HQ	4,670,961.55	465,055.43	1,991.569	133	PCR, MET	PCR	
20	PA010A	PQ-3	4,670,966.54	465,054.06	1,991.557	128	RC	**LPZ**	CR: 100% LPZ
21	PA011	HQ	4,671,261.17	465,054.15	2,019.617	158	IC	IC	Lost
22	PA011A	HQ	4,671,264.54	465,054.12	2,019.559	258	PCR	PCR	
23	PA012	HQ	4,671,581.00	465,059.28	2,010.424	325	**UPZ, MET**	**LPZ, MET**	CR: 100% UPZ, 98.1% LPZ
24	PA012A	PQ-3	4,671,583.00	465,056.38	2,010.412	18	IC	IC	Stopped
25	PA013	HQ	4,671,876.50	465,059.83	1,991.447	391	**UPZ**	**LPZ, MET**	CR: 100% UPZ, 100% LPZ
26	PA014	HQ	4,672,176.01	465,059.87	1,968.941	447	**UPZ, MET**	**LPZ, MET**	CR: 95.0% UPZ, 93.3% LPZ
27	PA014A	PQ-3	4,672,181.40	465,052.26	1,969.083	366	IC	IC	Stopped, to be finished at later date
28	PA014B	PQ-3	4,672,178.19	465,055.17	1,969.016	195	IC	IC	Stopped, to be finished at later date
29	PA015	HQ	4,670,812.53	465,203.88	1,969.461	61	NU	NL	
30	PA016	HQ	NS	NS	NS	73	IC	IC	Lost
31	PA016A	HQ	4,671,118.06	465,205.79	1,994.963	205	RC	**LPZ, MET**	CR: 99.4% LPZ
32	PA016B	HQ	4,671,117.28	465,204.86	1,995.117	97	**UPZ**	PCR	CR: 88.2% UPZ
33	PA017	HQ	4,671,416.77	465,212.68	1,980.725	122	IC	IC	Lost
34	PA019	HQ	NS	NS	NS	131	RC	RC	RC Only
35	PA019A	PQ-3	4,671,268.51	465,356.35	1,955.623	130	**UPZ**	**LPZ**	CR: 95.6% UPZ, 100% LPZ
36	PA020	HQ-3	4,671,567.89	465,361.49	1,951.253	265	**UPZ HY**	HY, NL	CR: 98.9% UPZ
37	PA021	HQ	4,671,872.08	465,360.85	1,951.480	305	NU	IC	Called early
38	PA021A	PQ-3	4,671,870.13	465,362.13	1,951.397	298	NU	NL	Did not encounter LPZ
39	PA021B	PQ-3	4,671,868.81	465,295.12	1,959.452	319	**UPZ**	**LPZ**	CR: 96.8% UPZ, 94.1% LPZ
40	PA022	HQ	4,672,176.14	465,361.72	1,918.432	240	RC	RC	RC only
41	PA023	HQ	4,672,480.17	465,366.44	1,907.172	461	**UPZ, MET**	**LPZ, MET**	CR: 86.5% UPZ, 95.4% LPZ
42	PA024	HQ-3	4,671,873.06	465,672.70	1,921.748	282	**UPZ**	NL	CR: 98.3%
43	PA025	HQ	4,672,167.62	465,656.49	1,891.410	314	PCR	**LPZ, MET**	CR: 100% LPZ
44	PA026	HQ	4,672,487.17	465,672.84	1,880.087	286	IC	IC	Lost
45	PA041	PQ-3	4,671,275.45	464,597.88	1,996.990	291	**UPZ**	**LPZ**	CR: 100% UPZ, 96.3% LPZ
46	PA043	PQ-3	4,671,277.27	464,285.35	1,994.202	318	RC	**LPZ**	CR: 100% LPZ
47	PA065	PQ-3	4,671,657.32	464,394.45	2,020.725	437	**UPZ**	IC	CR: 97.6% UPZ, Lost before LPZ
48	PA065A	PQ-3	4,671,661.57	464,389.96	2,020.922	201	IC	IC	Stopped
49	PA070	PQ-3	4,671,652.42	464,691.93	2,035.413	424	**UPZ, HY**	**LPZ, HY**	CR: 100% UPZ, 88.9% LPZ
50	PA089	PQ-3	4,670,664.92	464,908.73	1,963.536	72	NU	**LPZ, MET**	CR: 92.9% LPZ
51	PA092	PQ-3	4,670,970.23	464,598.82	1,976.905	195	GT	IC	Test hole for UPZ, Lost for LPZ
52	PA092A	PQ-3	4,670,958.68	464,630.68	1,976.486	206	GT	PCR, GT, MET	
53	PA095	PQ-3	4,670,977.02	464,294.72	1,970.731	235	**UPZ**	**LPZ**	CR: 100% UPZ, 100% LPZ
54	PA096	HQ	4,670,980.05	463,984.68	1,955.341	61	RC	RC	RC only
55	PA103	PQ-3	4,671,910.71	464,431.24	2,056.738	540	**UPZ, GT**	**LPZ, GT**	CR: 97.8% UPZ, 100% LPZ
56	PA105	PQ-3	4,671,902.84	464,912.67	1,999.625	162	IC	IC	Lost
57	PA105A	PQ-3	4,671,909.87	464,908.86	1,999.699	417	**UPZ, GT**	**LPZ, GT**	CR: 97.2% UPZ, 100% LPZ
58	PA106	PQ-3	4,672,483.84	464,438.73	2,013.587	625	IC	IC	Lost, excessive deviation
59	PA106A	HQ-3	4,672,486.35	464,435.33	2,013.587	642	**UPZ, HY**	**LPZ, HY**	CR: 97.7% UPZ, 89.3% LPZ
60	PA107	HQ-3	4,672,490.74	465,068.16	1,934.358	511	RC	**LPZ**	CR: 100% LPZ
61	PA108	HQ	4,672,495.23	463,534.51	2,046.919	597	IC	IC	Lost
62	PA109	HQ	4,673,096.77	464,761.41	1,962.708	725	PCR, MET	**LPZ, MET**	CR: 100% LPZ
63	PA117	HQ-3	4,670,759.91	464,407.02	1,939.372	142	PCR, HY	**LPZ, HY**	CR: 100% LPZ
64	PA123	HQ-3	4,671,283.90	463,989.34	1,980.879	326	NU	NL	Did not encounter UPZ or LPZ
65	PA138	HQ	4,671,887.74	463,986.47	2,043.106	329	IC	IC	Lost
66	PA138A	HQ	4,671,887.74	463,984.99	2,042.980	158	IC	IC	Lost
67	PA139	HQ	4,671,932.55	464,143.97	2,066.343	503	IC	IC	Lost
68	PA142	HQ-3	4,672,210.92	463,833.56	2,074.870	396	IC	IC	Lost
69	PA142A	HQ-3	4,672,195.33	463,822.02	2,075.166	664	**UPZ, GT, HY**	**LPZ, GT, HY**	CR: 100% UPZ, 100% LPZ
70	PA145	PQ-3	4,672,180.67	464,757.29	1,988.470	418	IC	IC	Lost

Table 10-1. PHA 2010–2012 Drill Holes as of 8 June 2012 *(concluded)*

No.	Hole ID	Core Size	Northing (m)	Easting (m)	Elevation (m)	Total Depth (m)	UPZ Status	LPZ Status	Comments
71	PA154	HQ-3	4,672,760.76	464,098.36	1,998.601	739	**UPZ**	**LPZ**	CR: 98.2% UPZ, 100% LPZ
72	PA159	HQ-3	4,672,787.54	465,659.49	1,883.790	423	**UPZ**	NL	CR: 96.6% UPZ
73	PA162	HQ-3	4,673,101.77	463,546.52	2,031.533	938	**UPZ, HY**	**LPZ, HY**	CR: 100% UPZ, 100% LPZ
74	PA163	HQ-3	4,673,102.08	464,151.99	1,976.701	803	**UPZ**	**LPZ**	CR: 100% UPZ, 96.7% LPZ
75	PA164	HQ-3	4,673,174.13	465,402.69	1,909.170	579	**UPZ, GT**	**LPZ, GT**	CR: 99.0% UPZ, 100% LPZ
76	PA165	NQ-3	4,672,794.31	465,053.76	1,927.645	590	**UPZ**	**LPZ**	CR: 100% UPZ, 100% LPZ
77	PA171	HQ-3	4,673,709.63	465,232.91	1,914.983	690	**UPZ**	**LPZ**	CR: 100% UPZ, 100% LPZ
78	PA183	NQ-3	4,673,689.49	464,547.61	1,956.425	819	**UPZ**	**LPZ**	CR: 100% UPZ, 85.9% LPZ
79	PA184	HQ-3	4,673,774.47	463,916.61	2,012.460	941	**UPZ, GT, HY**	**LPZ, GT, HY**	CR: 100% UPZ, 100% LPZ
80	PA Sub 1 Adit	PQ-3	4,670,609.65	464,611.12	1,901.341	78	PCR	**LPZ**	CR: 100% LPZ
81	PA Sub 2 Adit	PQ-3	4,670,533.93	464,608.51	1,887.796	54	NU	NL	
82	PA Sub 3 Adit	PQ-3	4,670,467.03	464,603.95	1,872.927	40	NU	**LPZ**	CR: 86.8%LPZ
83	PA Sub 3	RC	4,671,038.92	465,358.31	1,963.104	111	IC	IC	Lost
84	PA Sub 3A	RC	4,671,042.56	465,365.04	1,962.432	130	NU	NL	Did not encounter LPZ
85	PA Sub 4 Adit	PQ-3	4,670,548.38	464,730.01	1,900.628	51	NU	**LPZ**	100% recovery in LPZ

Notes:

GT = geotechnical; HY =hydrology hole; IC = incomplete (lost, stopped or RC only); **LPZ or UPZ = used in resource**; NL = limited or no LPZ encountered, NU = limited or no UPZ encountered, NS = no survey; CR = core recovery, PCR = poor core recovery; RC = reverse circulation only; MET = metallurgical and fertilizer testing. Coordinate system is NAD 83, projection is UTM Zone 12, units are meters, all surveys are ground shot, surveys provided by AA Hudson and Associates of Preston, Idaho.

Table 10-2. Drill Hole Summary for Lower Phosphate Zone (September 2010—July 2012)

Drill Hole Status	No. Holes	RC (m)	RC (ft)	Core (m)	Core (ft)	Total (m)	Total (ft)
LPZ resource	33	9,468	31,063	4,813	15,791	14,281	46,854
LPZ resource re-drills	6	302	990	861	2,824	1,163	3,814
Did not encounter LPZ	9	1,307	4,288	616	2,020	1,923	6,308
Inadequate LPZ recovery	8	585	1,920	871	2,857	1,456	4,777
Lost, stopped or called early	22	5,163	16,940	783	2,570	5,946	19,510
RC only	3	432	1,416	0	0	432	1,416
Material testing only	4	322	1,057	462	1,516	784	2,573
Total	**85**	**17,579**	**57,674**	**8,405**	**27,577**	**25,985**	**85,251**

Table 10-3. Drill Hole Summary for Upper Phosphate Zone (September 2010—July 2012)

Drill Hole Status	No. Holes	RC (m)	RC (ft)	Core (m)	Core (ft)	Total (m)	Total (ft)
UPZ resource	29	8,999	29,523	4,693	15,396	13,691	44,919
Did not encounter UPZ	10	941	3,088	480	1,574	1,421	4,662
Inadequate UPZ recovery	12	1,521	4,990	1,183	3,883	2,704	8,873
Lost, stopped or called early	19	4,548	14,920	462	1,517	5,010	16,437
RC only	11	1,571	5,153	745	2,444	2,316	7,597
Material testing only	4	0	0	843	2,765	843	2,765
Total	**85**	**17,579**	**57,674**	**8,405**	**27,577**	**25,985**	**85,251**

A total of 85 holes comprising 17,579 meters (m) of RC and 8,405 m of core have been drilled by PHA. The LPZ resource is based on 39 holes which produced 5,674 m of core. The UPZ resource is based on 29 holes which produced 4,693 m of core. Most holes used in the resource encountered both the UPZ and LPZ, although the UPZ was not always sampled. A total of 24 holes contributed to both the UPZ and LPZ resource estimates.

10.1 Reverse-Circulation Drilling

The type of rotary RC rig used on the property was a Schramm T685WS. There were up to two rigs drilling concurrently during the exploration program.

RC is a method of drilling that conveys cuttings to the surface through the inside of the drill rods. At PHA, this method was used for drilling a hole through the upper formations with pre-collars (temporary casing) prior to coring with a wireline coring rig through the lower formations. Casing sizes depended on the size of the subsequent desired core diameter size, either HQ or PQ. HWT casing, with an 11.4-centimeter (cm) outer diameter and 10.2-cm inner diameter, was installed for HQ, and PWT casing, with a 14-cm outer diameter and 12.7-cm inner diameter, was installed for PQ core. The diameter of the hole is nominally 5.1 cm greater than the outer diameter of the casing.

Samples of the RC cuttings (rock chips) were caught in a sieve. After each 3.1-m advance, the drill crew transferred a representative portion of the cuttings from the sieve to a chip tray. Chips that remained in the sieve were discarded and the sieve was placed back into the cuttings discharge stream. The chip tray is a plastic box with 20 compartments, each measuring approximately 2.5 cm wide × 5.0 cm long × 3.0 cm high. A filled chip tray represents 61 m of RC drilling. The RC chip samples were monitored by a geologist to note any compositional and structural variations, clast and grain-size distributions, formation contacts, and to determine the depth at which RC drilling should stop. Typically, this was at or near the top of the Meade Peak Member. Filled chip trays were transferred by the geologist from the drill site to the PHA office where the chips were logged. Each 3-m interval was carefully reviewed and described with notes on any visible structural details (e.g., slicken lines, veining, etc.). A microscope was used to assist with the detailed observations.

RC drilling was occasionally used to determine the extent of the deposit boundaries along erosional features. These features were referred to as subcrop holes.

10.2 Wireline Diamond Bit Core Drilling

Three different wireline core rigs were used on the Paris Hills Phosphate Project (the Property) including a Boart-Longyear LF 90, LF 140, and LF 230.

Two methods of wireline core drilling have been used for the Project: solid-tube and split-tube. The nominal core and hole diameters are listed in Table 10-4.

Table 10-4. Core and Hole Diameters

Core Bit	Core Diameter (mm [inches])	Hole Diameter (mm [inches])	Method
HQ	63.5 (2.5)	96.1 (3.8)	solid-tube
HQ-3	61.1 (2.4)	96.1 (3.8)	split-tube
PQ-3	83.0 (3.3)	122.6 (4.8)	split-tube

Both solid- and split-tube coring are accomplished using an outer core barrel (drill pipe) with a diamond bit on the end. For solid-tube coring, a single solid core tube is lowered to the bottom of the core barrel where it locks into place to receive the core. With split-tube coring, the core tube has an inner split tube (hence, smaller diameter core). As the drill pipe is rotated, the bit cuts the rock so that a cylindrical core of rock feeds into the core tube. The core tube is either 1.5 m or 3 m long. After completion of a core run, an overshot is lowered on a wireline cable though the drill pipe to retrieve the core tube. After the overshot attaches, the core tube is pulled from the hole.

Drill hole locations were selected based on accessibility and then by resource sphere of influence. The size, capability, and availability of rigs determined drilling order, with larger rigs used for deeper drilling in the northern part of the Property.

10.3 Current Exploration Procedures

The drilling targeted two high-grade phosphate horizons (UPZ and LPZ) within the Meade Peak Member of the Permian Phosphoria Formation. Typically, RC methods were used to the base of the Rex Chert Member and then core methods were used through the Meade Peak Member where samples were obtained from the UPZ and LPZ. The UPZ lies near the top of the Meade Peak Member, from approximately 1 to 6 m below the Rex Chert contact. The LPZ lies near the base of the Meade Peak Member separated from the UPZ by approximately 58 m. Coring is completed approximately 6.1 m into the underlying Permo-Pennsylvanian Wells Formation.

RC cuttings were collected on 3-m intervals for logging throughout the upper formations. Core was sampled for assay approximately 3 m above and 3 m below the UPZ and approximately 3 m above and 1.5 m below the LPZ. Coring was done in either 1.5-m or 3-m runs and sampled at 0.3-m intervals or less, respecting geology boundaries. Coring was completed using either solid-tube or split-tube core barrels, with the latter being the preferred and current method because of improved RQD.

Initially, HQ (solid-tube) diameter core was used for all drilling. In January 2011, the larger PQ-3 (split-tube) diameter core was introduced for geotechnical sampling and logging purposes. The PQ-3 resulted in improved core recovery and provided a bigger sample for assaying and test work. Since January 2011, all holes were drilled with PQ-3 core unless drilling depths dictated that split-tube HQ-3 is used. When PQ-3 or HQ-3 core tube was brought to the surface, the inner split core tube was hydraulically extruded from the outer core tube. One-half of the split tube was removed and the driller's helper delivered the other half with the core to the geologist.

The geologist (with help from a geo-technician) verified the cored intervals, determined the core recovery and RQD, photographed the core in the split tube, logged the core's geology and geotechnical characteristics. The core was placed into a plastic sleeve, transferred to core boxes, labeled and transported to the core warehouse. The core warehouse is a secured facility and locked when not in use. The geologist was also tasked with preparing a daily report, calling the drill hole for completion, and was present at the core rig for all drilling operations.

After the core drilling was completed, the geologist logged the hole with a gamma ray logging tool. Gamma log profiles were compared to drilling depths, and assay results and depths were adjusted to the gamma log if necessary.

Solid-tube core handling procedures were different from split tube. The driller's helper placed the core in the core boxes directly from the solid-tube core barrel and labeled the core boxes with drill footages and core run intervals. The boxes were kept at the drill site under supervision of the driller until they were delivered to the core warehouse by either a Major or PHA employee. The solid-tube method resulted in additional mechanical breaking of the core, resulting in a poorer RQD. Photography and determinations of core recovery and RQD were done in the core box. The geologist was not always present at the drill rig during drilling operations.

Drilling was planned in two phases to be completed on approximately 304.8-m centers and infill drilling at approximate 152-m centers. Drilling was completed from surface to the top of the Meade Peak Member by RC and followed by core drilling in HQ (63.5-millimeter [mm] core diameter). HQ coring was initially used for all core that was to be assayed for resource estimation. In January 2011, PQ-3 (split-tube with 83.0-mm core diameter) was added for geotechnical sampling and logging. Because of improved core recovery and quality with PQ-3 core, subsequent resource definition holes were also drilled with PQ or PQ-3. HQ-3 (split tube with 61.1-mm core diameter) coring was used for hydrogeological and PQ-3 for metallurgical testing.

11.0 SAMPLE PREPARATION, ANALYSIS, AND SECURITY

11.1 Sampling

The geologist (or geo-technician) supervised the collection of all core at the drill site and the transfer of the core boxes to the core warehouse following chain-of-custody procedures. The core warehouse is located in the yard of the Paris Hills Agricom Inc. (PHA) office in Bloomington, Idaho.

During the sampling process, the geologist referred to core recovery, gamma log and descriptive core logs to mark sample intervals through the Upper Phosphate Zone (UPZ) and Lower Phosphate Zone (LPZ), then made corrections to core logs as necessary. The core to be sampled was photographed in the core box with sample markers in place. Sample books with preprinted sample numbers were used to record the project, hole number, date, sample interval, a brief soil/rock description, and the appropriate sample suffix. A sample suffix was provided for each sample to track the type of sample and to designate how it should be processed at the laboratory. The following suffix codes were assigned:

- A—Pulp: Sample for analysis only, crushing and grinding not necessary. Also used for quality assurance/quality control (QA/QC) standard material pulps.
- B—Coarse Reject: Already crushed from previous sample preparation, grinding is needed to produce pulp. Also used for QA/QC quartz and blank sample.
- C—Quarter Core: Required crushing and grinding to produce pulp sample. Used for duplicate core samples. Remaining half core was retained in the core box.
- D—Half Core: Required crushing and grinding to produce pulp sample. Remaining half core was retained in the core box.
- E—Whole Core: Required crushing and grinding to produce pulp. Used for sampling of soft or fractured core impossible to cut into half core. No core was retained in the core box, but the first split coarse reject was placed back in the core box when returned from the laboratory.

Sampling proceeded with the following steps:

1. A preprinted sample number tag was chosen for each core sample and the tag placed inside the sample bag. This sample number was then written on the sample bag. Note that the sample number is unique and independent of the drill hole identification or drill hole intervals.
2. QA/QC blanks and standards were put in appropriately tagged and labeled sample bags.
3. Whole core “E” designated samples were placed in appropriately tagged and labeled sample bags.

4. Core samples designated as "C" or "D" were shrink-wrapped in plastic, then wet cut with a masonry saw. Either quarter- or half-core samples were placed in the appropriately tagged and labeled sample bags.

All of the bagged samples were laid out in numerical order and the chain-of-custody form was checked as each sample was placed in a grain sack. A uniquely numbered security zip tie was immediately placed on each grain sack. The security seal number was recorded on the chain-of-custody form. The security seal remained in place until it was checked and removed at the laboratory.

11.2 Sample Preparation and Assaying

Initial assay samples from the drilling program were processed by ALS Chemex (ALS) in Canada with sample preparation carried out at ALS in Elko, Nevada from November 2010 to May 2011. Following a review of ALS' assay results against the PHA inserted standard reference materials (SRMs) and check assays at Jacobs Engineering S.A. (Jacobs) laboratory, it was determined that ALS analysis showed high bias in samples with higher phosphorus pentoxide (P_2O_5) percentages (greater than 30%). The SRM run through the ALS lab reported uniform, but unacceptably higher grades (+1.8% P_2O_5) than the certified grade, particularly in samples of high P_2O_5 percentages (greater than 30%). This review showed consistency, but not precision, suggesting calibration issues. ALS was not prepared to investigate further or re-test without additional compensation, so the alternate laboratories were selected.

While ALS was not audited, there was no reason to believe that sample preparation was flawed or contaminated in any way. ALS has a documented sample preparation procedure. This point is critical as the ALS pulps from holes that met the criteria for inclusion in the resource model were re-assayed by the new laboratories. All related blank material was re-assayed by the new laboratories and showed no contamination.

Two SRM's were inserted for all drill holes used in the resource estimate: (1) a Florida phosphate rock (AFPC Check #22) and (2) a Western United States of America (USA or US) phosphate rock SRM (694). The blank material submitted was construction silica sand with only trace amounts of P_2O_5. Additional blank material was also introduced in the QA/QC program and consisted of foundry silica sand and coarse crystalline quartz.

EnviroChem, Jacobs, and Thornton Laboratories Testing & Inspection Services, Inc. (Thornton) are all independent of the issuer under the criteria set forth by National Instrument (NI) 43-101.

Initially neither laboratory was named as the primary laboratory for the P_2O_5 analysis, but a very high percentage of duplicates between the two were completed. Total assayed samples (not including standards, checks, duplicates and blanks) were 32 percent (%) duplication overall and approximately 60% duplication within the LPZ. Testing and re-testing was almost exclusively in, above, and below the LPZ. The results of the testing showed agreement between the two laboratories with high accuracy and precision. Where testing was in duplicate, results were averaged for use in the resource model.

Current Laboratories

EnviroChem was tasked with all sample preparation and P_2O_5 analysis. A flow diagram of the sample preparation method is shown in Figure 11-1. EnviroChem has a documented Quality Assurance Plan. Determination of P_2O_5 percentages was made using the Association of Official Analytical Chemists (AOAC) Quimociac gravimetric method.

SOP	Description
IAS-02	Sample is logged in tracking system and labeled.
IAS-P-002	Drying of excessively wet samples in drying ovens. This is the default drying procedure for most rock chip and drill samples.
IAS-P-003	Weigh sample.
IAS-P-004	Fine crushing of rock chip and drill samples to better than 70 % of the sample passing 2 mm (¼").
IAS-P-005	Split sample using riffle splitter.
IAS-P-006	A sample split of 200-400 g is pulverized to better than 85 % of the sample passing 75 microns.

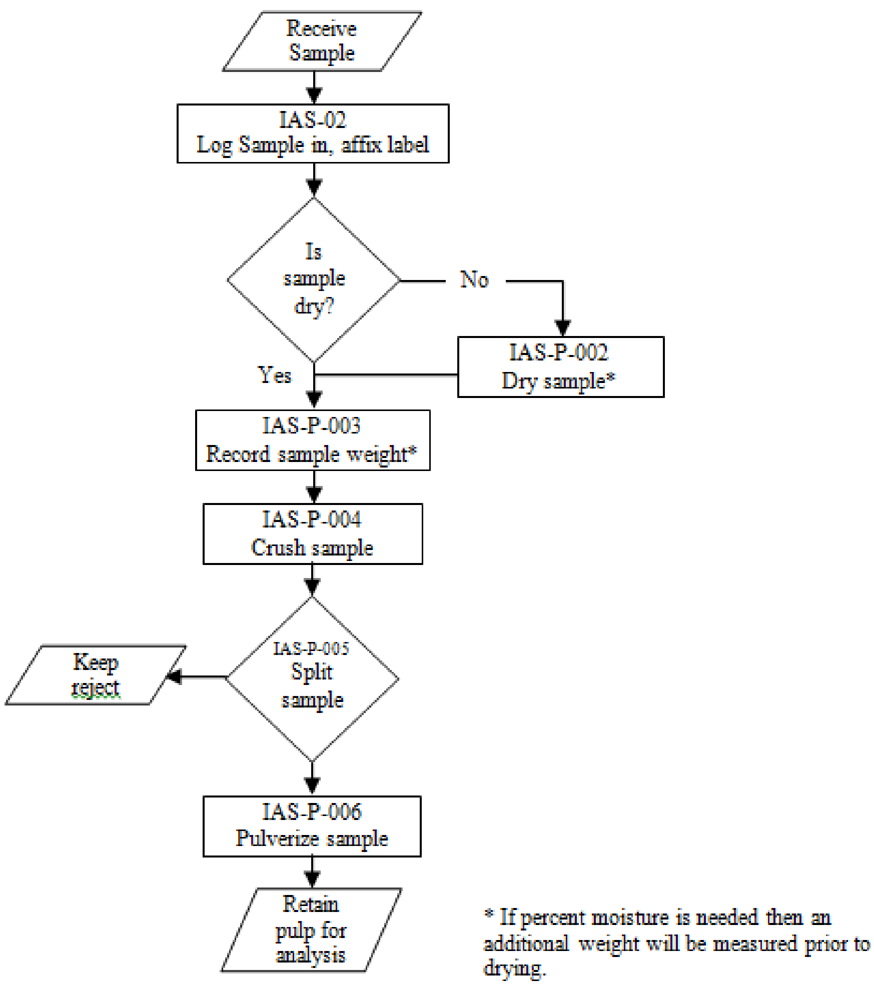


Figure 11-1. EnviroChem Sample Preparation Flow Diagram

Following testing at EnviroChem, samples were sent to Thornton for assay. The methodology for P_2O_5 determination was colorimetric. Thornton also tested and reported for metal oxides (calcium oxide [CaO], magnesium oxide [MgO], iron/ferric oxide [Fe_2O_3], aluminum oxide [Al_2O_3], sodium oxide [Na_2O], potassium oxide [K_2O]), acid insoluble, and organic matter as carbon (C). Thornton is recognized as an independent referee and control testing laboratory for all types of fertilizer analyses and certification. Thornton uses approved Association of Fertilizer and Phosphate Chemists (AFPC) methodologies and is a member of AFPC and AOAC.

Following the March 2012 Preliminary Feasibility Study (PFS) (AAI et al. 2012a), EnviroChem was designated the primary lab and Jacobs as the secondary lab. This was largely due to EnviroChem's proximity to the project site and quicker assay turnaround time, and not due to quality issues with Thornton. Jacobs performed duplicate testing at a rate of 5%.

Table 11-1 shows the assaying methods used by the laboratories.

Table 11-1. Assaying Methods

Analyte	Laboratory	Method Type	Method Source
P_2O_5	EnviroChem	Gravimetric	AOAC – Quimociac
P_2O_5	Thornton	Colormetric	AFPC IX.3C
Calcium oxide (CaO)	Thornton	ICP	AFPC IX.3D.2
Magnesium oxide (MgO)	Thornton	ICP	AFPC IX.3D.2
Iron/ferric oxide (Fe_2O_3)	Thornton	ICP	AFPC IX.3D.2
Aluminum oxide (Al_2O_3)	Thornton	ICP	AFPC IX.3D.2
Sodium oxide (Na_2O)	Thornton	ICP	AFPC IX.3D.2
Potassium oxide (K_2O)	Thornton	ICP	AFPC IX.3D.2
Acid Insoluble	Thornton	Gravimetric	AFPC IX.4.A
Organic Carbon	Thornton	Volumetric	AFPC IX.17.A

11.3 Quality Assurance/Quality Control Program

Shortly after the assay results were received from the laboratory, they were combined with the drill hole intervals (gamma log adjusted) to create an assay database. These results were copied from the laboratory spreadsheets to the assay database matching the unique sample identifiers from the drill hole intervals to the unique sample identifiers from the laboratory. The database was checked for data entry errors against the laboratory's assay certificates.

Once the assay database was created, the data were reviewed for quality assurance for all SRMs, blanks, duplicates, and secondary laboratory checks.

Based on a review of the exploration program, the QPs are confident that early problems of core recovery, sampling, and assay bias have been resolved and that the exploration dataset used in this resource estimate meets the criteria for use under NI 43-101. PHA's QA/QC program is designed with aggressive duplication and insertion. Procedures are well documented and have been followed accordingly. An additional independent audit was conducted by AAI on a witnessed drilled core in January 2012.

The QA/QC insertion rates and monitoring criterion for P_2O_5 are shown in Table 11-2.

Table 11-2. Quality Assurance/Quality Control Parameters for P_2O_5

	Insertion Rates	Monitoring
Duplicates		
1. Core (quarter)	5% of main samples	90% < 20% relative difference of means
2. Coarse reject	5% of main samples	90% < 20% relative difference of means
3. Pulp	5% of main samples	90% < 10% relative difference of means
Checks at Secondary Lab	5% of main samples	90% < 10% relative difference of means
SRM		
1. SRM - AFPC Check #22 (Florida Phosphate Rock)	5% of main, duplicate, and check samples	Mean value ±2 × standard deviation
2. SRM - 694 (Western Phosphate Rock)		Mean value ±2 × standard deviation
Blanks		
1. Construction Silica Sand	5% of main, duplicate,	4 × detection limit
2. Foundry Silica Sand	and check samples	4 × detection limit
3. Coarse Quartz		4 × detection limit

Results of the P_2O_5 analysis met or exceeded the planned insertion rates and monitoring criteria. PHA's QA/QC program was designed with aggressive duplication and insertion. In actuality, the insertion rate for the holes used in the resource model was much higher than the planned program. In general, insertion for each zone (LPZ and UPZ) was two blanks, two SRMs, and two core duplicates.

Results were also verified by the laboratories according to their own internal procedures, including additional insertion of SMRs and duplicates.

All results were monitored as soon as they were received and checked against control charts for laboratory precision and bias. If any of the above quality control analysis failed the criteria established, then the laboratory was notified immediately and the entire laboratory batch was reanalyzed. New results were sent to the PHA senior staff and the entire procedure was repeated.

Three types of blank material with very low amounts of P_2O_5 were inserted into the assay program to monitor contamination during sample preparation. These included (1) a silica construction sand purchased at a local hardware store, (2) a silica sand purchased from a foundry in Salt Lake City, Utah, and (3) a coarse quartz material purchased from a mine in Arkansas. The silica construction sand was used during ALS' sample preparation and the foundry silica sand and coarse quartz material were used during EnviroChem's sample preparation. The blank materials were each sent to three different phosphate industry-recognized labs in Florida for round-robin analysis. This analysis showed trace P_2O_5 amounts and confirmed their use as a blank material. Monitoring of the blanks showed no significant contamination occurred during sample preparation.

Figures 11-2 through 11-5 show control charts for the two laboratories with the Florida phosphate rock (SRM22) and western US phosphate rock (SRM694) SRMs.

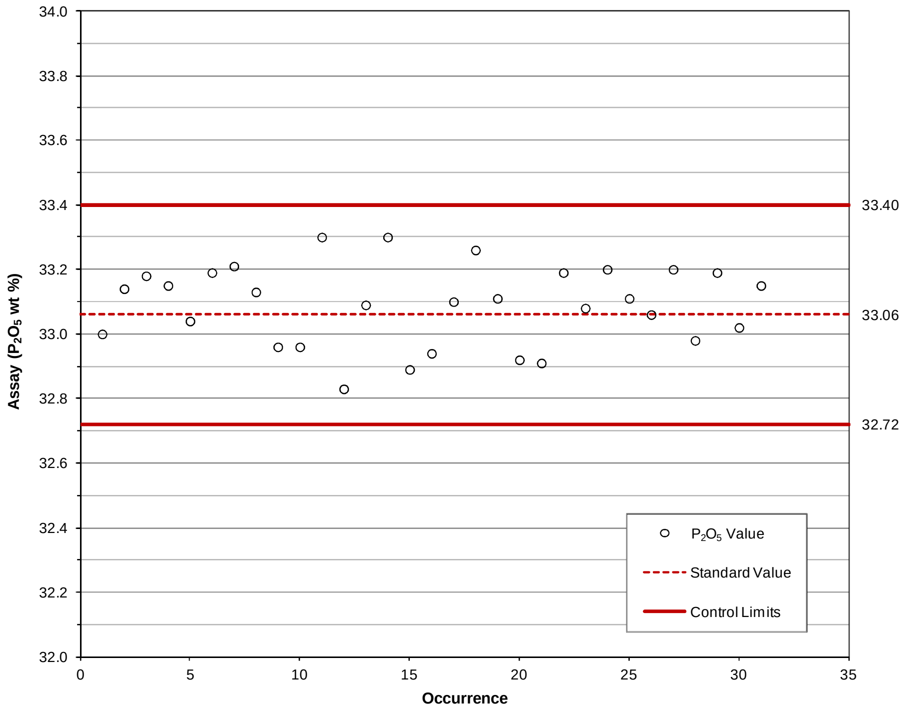


Figure 11-2. Thornton Quality Control Chart for SRM22 for P_2O_5

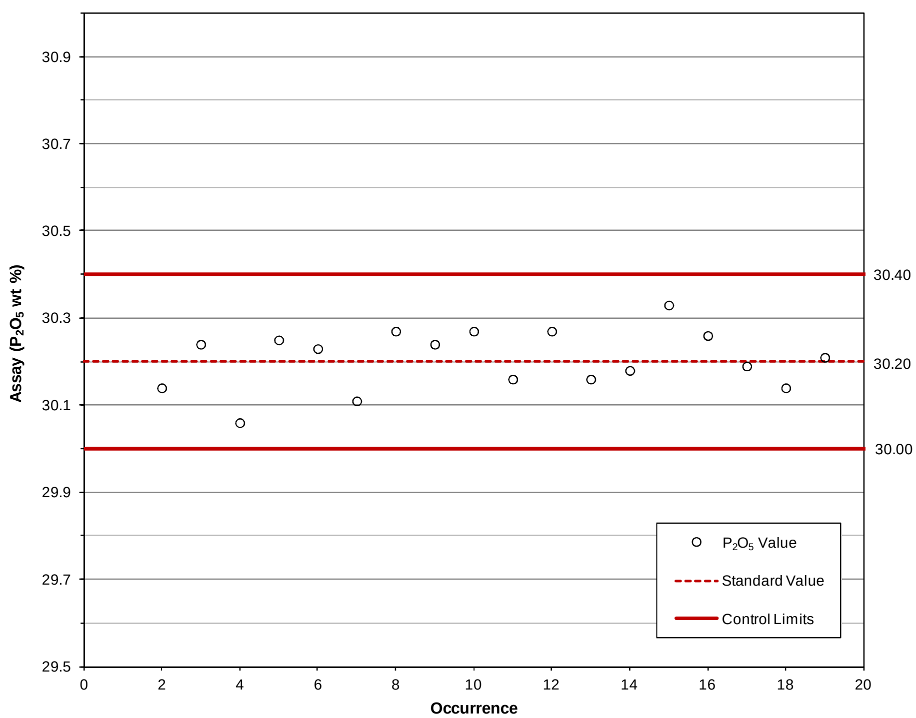


Figure 11-3. Thornton Quality Control Chart for SRM694 for P_2O_5

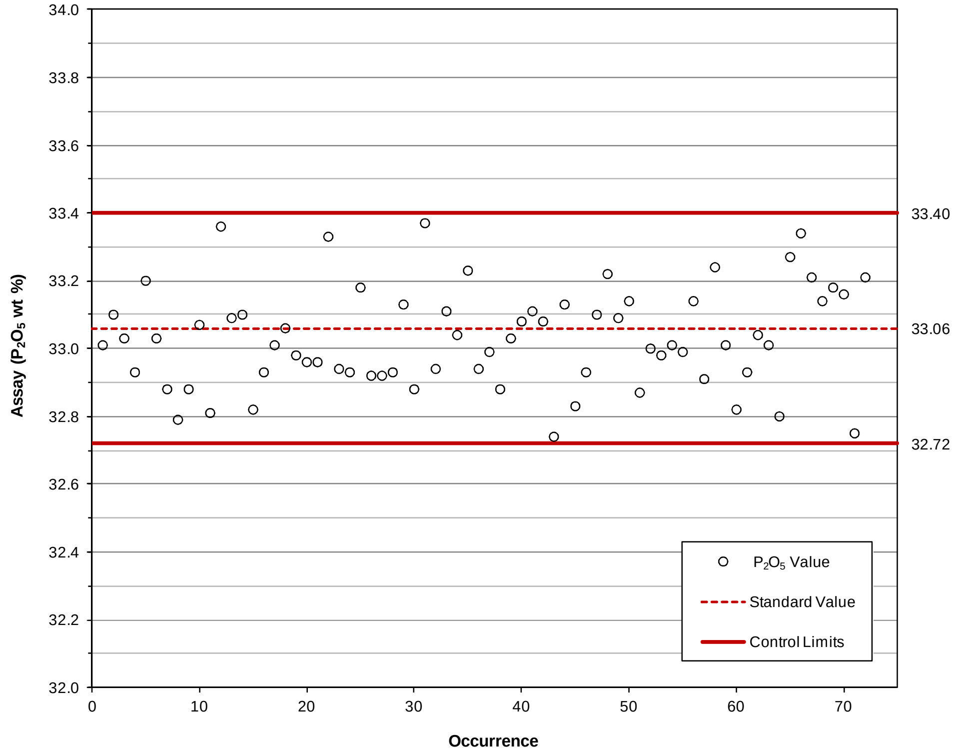


Figure 11-4. EnviroChem Quality Control Chart for SRM22 for P_2O_5

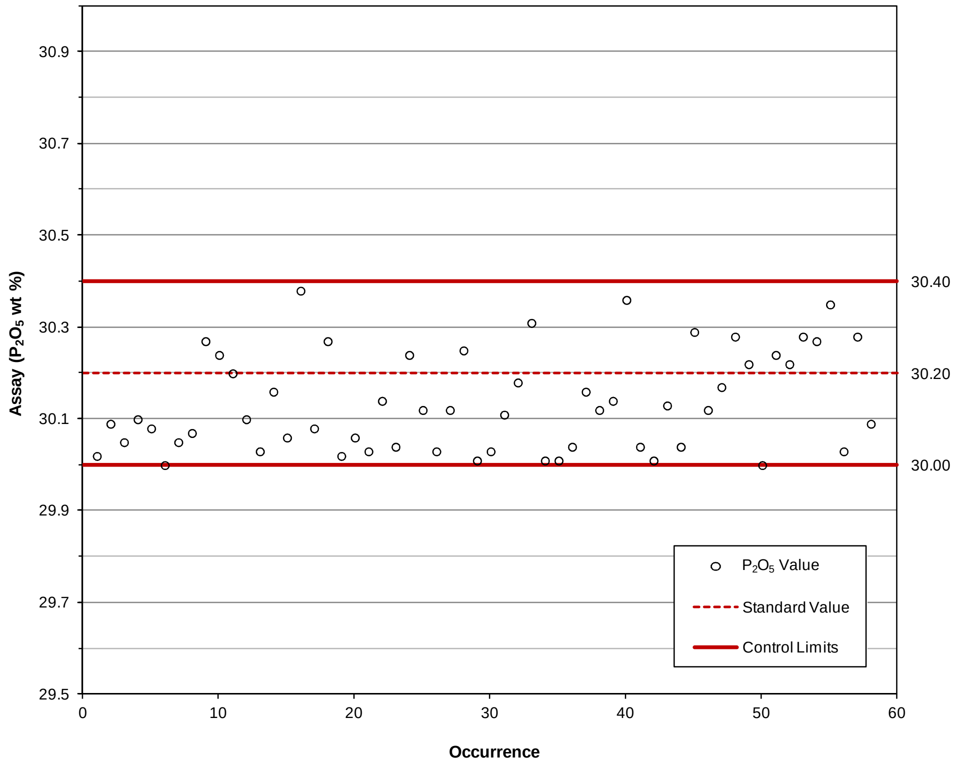


Figure 11-5. EnviroChem Quality Control Chart for SRM694 for P_2O_5

Figure 11-6 compares Thornton to EnviroChem check pulp duplicate pairs for P_2O_5 in the LPZ and the lower-grade bounding roof and floor material. The duplicate tracking demonstrates strong agreement between laboratories.

Figure 11-7 shows generally good agreement between the core duplicates from Thornton and EnviroChem, with the exception of approximately 3% of duplicates falling substantially outside the ±10% tolerance. The outliers were introduced as a result of testing completed between March and June 2012, which may have been related to possible calcite veining in the core. No outliers of significance existed prior to June 2012. The reliability of testing is not considered compromised by the small proportion of outliers.

Figures 11-8 and 11-9 show good agreement between the Thornton-EnviroChem duplicate pairs for the coarse reject and pulp duplicates, respectively.

Analysis was also completed for metal oxides (CaO, MgO, Fe_2O_3, Al_2O_3, Na_2O, K_2O), acid insoluble, and organic matter as carbon (C) for further characterization of the phosphate beds. This analysis was initially only done at Thornton with no secondary lab checks. Following the PFS, this analysis was switched to EnviroChem and Jacobs served as the check lab. Monitoring procedures were the same as P_2O_5, except the criteria for monitoring was relaxed from the "certified mean value ±2 × standard deviations" to the "certified mean value ±3 × standard deviations." If no certified values existed, then the average mean values were compared to each other and reviewed for outliers.

It was noted by Thornton that SRM694 did not follow AFPC methods during its certification. A round-robin analysis was completed for CaO, MgO, Fe_2O_3, and Al_2O_3 for this SRM by three phosphate industry-recognized labs in Florida to determine if adjustment to the mean values and standard deviations was needed for monitoring. After reviewing the round-robin results, adjustments to the certified values were made for Fe_2O_3 and Al_2O_3 only. No round-robin analysis was completed for K_2O or Na_2O. Results for Na_2O met the QC criteria; however, the results for K_2O showed a low bias. It is likely that this bias is due to the difference between the method used for SRM694 during certification and the AFPC method. This assumption is valid based on similar adjustments made to Fe_2O_3 and Al_2O_3. As such, K_2O results were not compared to certified values; only the average mean values were compared to each other and reviewed for outliers.

Results for Na_2O showed a low bias compared to the SRM-22. The bias was explained by Thornton as follows: PHA submitted the SRM694 (western US phosphate rock) as an external QC sample since it best matches the matrix of the PHA samples. As such, all results were "drift" corrected (via instrument software) to match the value ranges of SRM694. This correction was done across all compounds analyzed (CaO, MgO, Fe_2O_3, Al_2O_3, Na_2O, K_2O) at the same time; individual corrections were not done. As a result of this overall correction, a low bias was realized for SRM-22.

Organic carbon testing revealed a systematic low bias in results from Jacobs. A total of 44 samples were sent to Jacobs as secondary lab checks on the primary lab (EnviroChem) between February and June 2012. An additional 21 samples were tested at Jacobs in July 2012. Four of the samples and SRM694 were also tested at Thornton in July 2012 for comparison

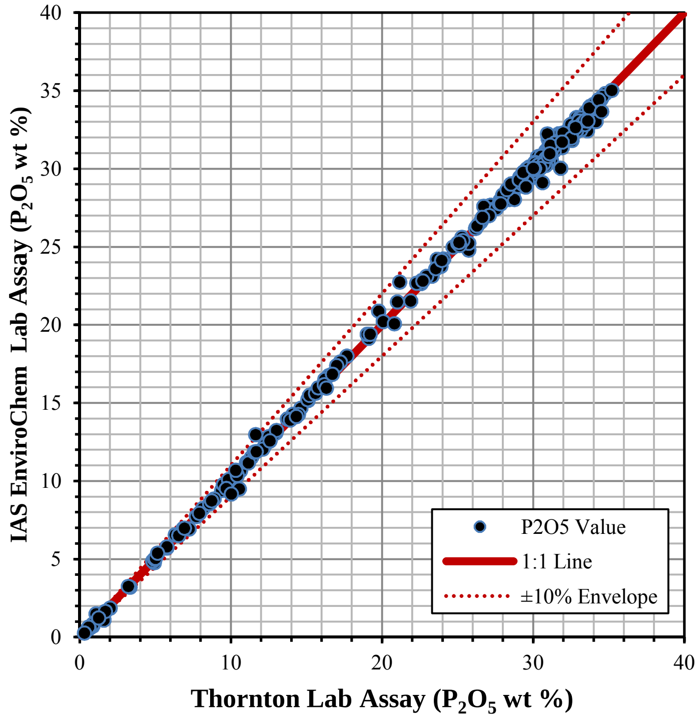


Figure 11-6. EnviroChem versus Thornton Lab Check Pulp Duplicates for P_2O_5

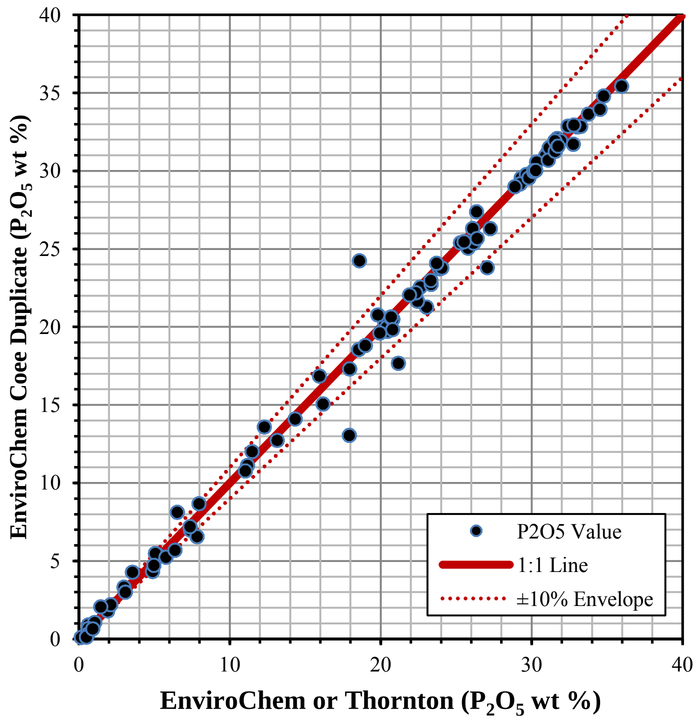


Figure 11-7. Core Duplicates for P_2O_5

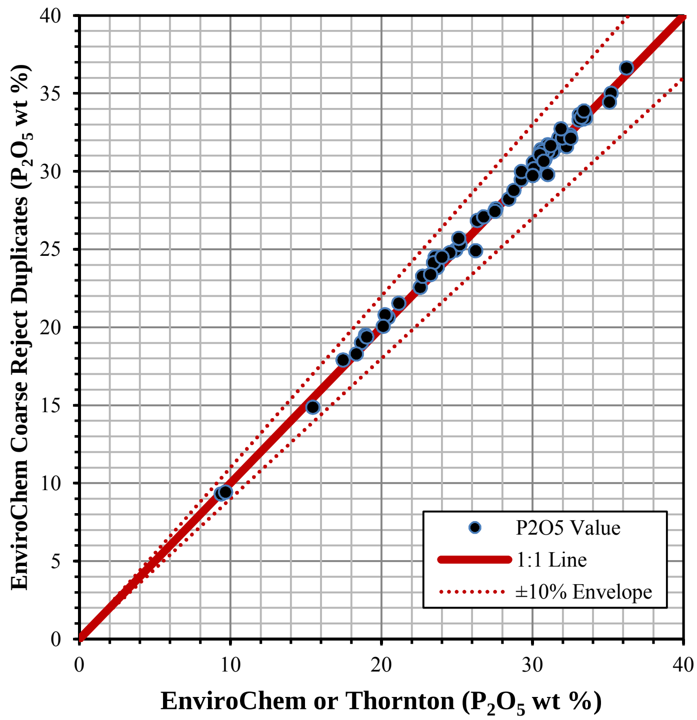


Figure 11-8. Coarse Reject Duplicates for P_2O_5

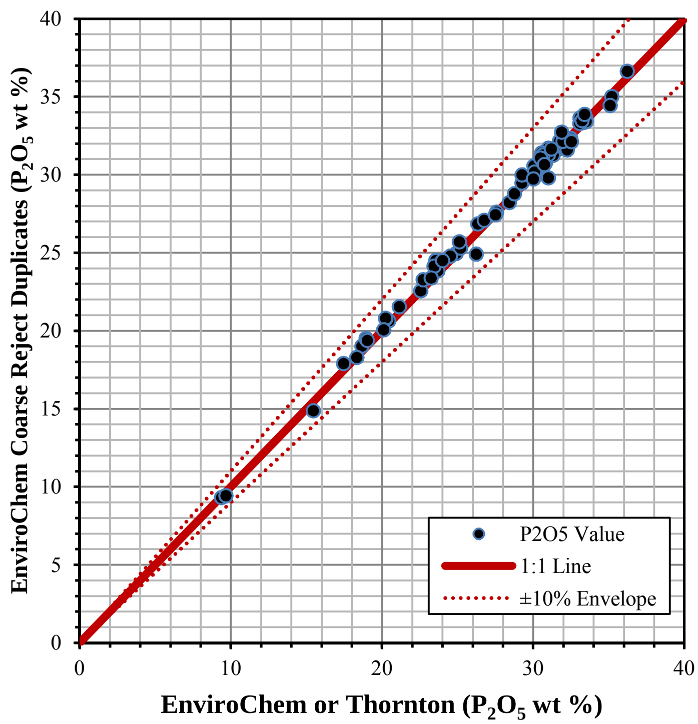


Figure 11-9. Pulp Duplicates for P_2O_5

between all three labs. Comparative testing revealed that Jacobs systematically under-reported organic carbon content when a 0.4-gram (g) aliquot was tested due to incomplete carbon activation during titration. Jacobs achieved results consistent with EnviroChem and Thornton when the aliquot was reduced from 0.4 to 0.1 g, thereby increasing the ratio of potassium dichromate to carbon and improving carbon activation. Consequently, Jacobs' organic content measurements were excluded from the resource model.

Organic content in the resource model is based exclusively on measurements from Thornton and EnviroChem. Limited comparative data indicate small to moderate differences between Thornton and EnviroChem, particularly at higher organic contents (above 4%). Although both labs operate within AFPC tolerances and satisfy SRM checks at lower organic carbon contents (typically less than 1.7%), procedural differences are thought to be responsible for the spread of results between labs at higher organic contents. The labs made adjustments to the procedure for the case of samples with higher organic carbon, EnviroChem and Jacobs by lowering the sample size to reduce the volume of carbon in samples and Thornton by keeping a larger sample size and increasing the amount of reagent. Results from all labs are considered valid and applicable for resource estimation and are used in the resource model.

All other results passed the criteria described above.

11.3.1 Densities

Independent density testing was completed by AAI and Jacobs. A total of 91 dry and 120 wet bulk density tests were completed in the LPZ. The dry bulk density bulk density of the LPZ phosphorite (phosphatic mudstone) averages 2.60 grams per cubic centimeter (g/cm^3) with a standard deviation of 0.18 g/cm^3 and a 95% confidence interval of 2.60±0.14 g/cm^3 based on 91 tests. The moisture content of samples "as received" ranged from dry to 10.1% moisture by weight, with an average of 1.5% moisture in 104 tests. Test results were reviewed and showed good agreement. AAI maintained complete chain-of-custody documentation.

11.3.2 Chain of Custody

In early stages of the drilling campaign, the documented chain of custody was weak, but now it is well documented. Drill core was transferred from the drill site to the core warehouse according to the chain-of-custody procedure. The core warehouse is located within the Property and has limited access and is locked when there is no activity. Samples were always in the control of PHA employees, contractors, or service companies paid to transport or process the samples. Chain-of-custody documentation was prepared before transport to the laboratories for each dispatch of samples or pulps and when archiving core to the warehouse.

11.3.3 Adequacy

The QPs are confident that procedures for sample preparation, security, and analysis for assays used in this resource estimate meet the criteria for use under NI 43-101. Audit and observation showed procedures are being followed by technical and administrative staff.

12.0 DATA VERIFICATION

Site visits were made to the Paris Hills Agricom Inc. (PHA) location by Qualified Persons (QPs) Leo Gilbride and Vanessa Santos. Leo Gilbride visited the location on 06–07 January and 23–25 May 2011. Vanessa Santos visited the location on 23–27 May, 5–8 July, 29–30 August 2011, and 20–22 July 2012. Vanessa Santos also visited the current laboratories to confirm testing procedures and industry-recognized good practice. Assay data from the master database supplied to Agapito Associates, Inc. (AAI) were checked at random against Certificates of Analysis with 100 percent (%) agreement. An independent audit of a drilled core was performed in January 2012 by AAI.

12.1 Historical Data

AAI was supplied digital (scanned) and hard copies of available historical data, including select assays from Earth Sciences, Inc.'s (ESI's) 1970s drilling, trenching, and test mining sampling program and RMP Resources Corp. (RMP's) six confirmation rotary holes from September and October 2008. While copious historical data exist, the quality of those data is substandard for application to National Instrument (NI) 43-101 compliant Mineral Resource estimation.

ESI and RMP typically reported reverse circulation (RC) sample intervals ranging from 0.6 to 1.5 meters (m) long, or greater, resulting in the introduction of oftentimes significant out-of-seam dilution (OSD) into the samples representing the zones of interest. This was reflected in the generally lower grades and thicker beds reported by ESI and RMP. Although the historical RC results confirm mineralization and provide useful structural information, the data cannot be resolved to quantify the higher grade portion of the zones sought for base case mining.

Concern also existed with the reliability of the RMP and ESI data. No blank standards were used and only limited check assays were submitted by ESI. ESI submitted standard reference materials (SRMs); however, no certifications for the standards could be located. In the absence of certifications, it is not possible to identify potential assay bias. Notably, SRMs revealed significant bias with ALS Chemex's (ALS') assays during the initial phase of PHA's 2011 exploration program. Corrective action was required. The ESI historical records showed excessive variability in the phosphorus pentoxide (P_2O_5) standard assay results (high standard deviations), indicating unreliable laboratory precision.

Duplicate P_2O_5 results from ESI's laboratory were available for 66 samples. The QPs considered that good precision has been maintained if 90% of the pulp duplicates agreed within ±10% (pair difference divided by pair mean). Only 48% of the ESI duplicates met the ±10% criterion. By comparison, 97.4% of PHA's 231 EnviroChem-Thornton P_2O_5 duplicates from the 2011–2012 drilling campaign satisfied the ±10% criterion. The disparity detracts from the reliability of the historical ESI data.

It is the opinion of the QPs that the historical data are unreliable for NI 43-101 resource estimation. The QPs consider the historical data reliable for indicating the qualitative presence of mineralization, demonstrating geologic continuity, and for use in structural modeling.

12.2 Current Exploration

AAI reviewed all data from the current exploration program used in this resource estimate. A high standard of integrity was required in view of early problems with core recovery, sampling, and laboratory assay bias. In this case, data was included only if core recovery was greater than 85%, and in many cases, recovery was greater than 95%. An original 90% core recovery threshold was later lowered to 85% as a practical response to difficult drilling conditions so that critical information from several holes could be included in the resource estimate. All holes were re-logged, re-measured, and corrected to gamma geophysical logs. Where previous sampling made reconstruction difficult or impossible, photographic records were reviewed to determine core recovery.

All ALS testing for phosphate was rejected due to over-reporting of P_2O_5 in the samples and standards. Pulps of approved holes were submitted to EnviroChem and Thornton Laboratories Testing & Inspection Services, Inc. (Thornton) with aggressive insertion of standards, laboratory duplicates, pulp duplicates, and coarse reject duplicates as well as blanks. In both cases, the assaying compared well within and between the laboratories.

12.3 Site Visits

Multiple site visits were made by AAI to review the project parameters and procedures. These visits included trips to the drill rig, field and surrounding areas, core warehouse, and administrative offices. The QPs observed fresh core on the drill rig, observed field logging by PHA geologists, and examined boxed core in PHA's storage facility to confirm log records. Random selections of core were examined and confirmed in multiple holes. Extensive interviews were conducted with technical, administrative and senior personnel, including consultants to the project. Procedures and protocol were reviewed and refined until they conformed to industry standards of best practice.

12.3.1 Site Reviews

12.3.1.1 AAI's January 2011 Site Review—AAI's initial visit to the Property was in January 2011. At that time, AAI reviewed exploration activities and existing drill cores. Based on those discussions, AAI recommended revision of drilling density for Measured and Indicated Mineral Resource (M&I) classifications to be 0.4 kilometers (km) for Measured and 0.8 km for Indicated Resources in areas of the eastern horizontal limb. Closer-spaced drilling was recommended in the vicinity of faults, the upturned limb, and at the southern boundary of the Property which is required for local structural definition. In addition, AAI made recommendations on procedures to improve the quality and integrity of the data being collected.

12.3.1.2 AAI's May 2011 Site Review—During AAI's visit to the property in May 2011, a detailed review of the exploration dataset provided by PHA was completed. This review revealed some weaknesses in procedure. AAI determined that core recovery must be 90% or above. At 90%, data shows variability at less than the statistical uncertainty of the actual composite P_2O_5 grade, through either the Upper Phosphate Zone (UPZ) or the Lower Phosphate Zone (LPZ) than was introduced by the less-than-complete core recovery through the phosphate zone. The level of uncertainty is derived from the variability of individual assays within the respective phosphate zone. High core recovery is necessary to minimize uncertainty, particularly in the LPZ where tight P_2O_5 content tolerances will control the feasibility of a direct-ship mining scenario.

An issue of sampling related to core recovery revealed the potential for stretching core over the missing intervals. A notable example was PA002, which was the first hole to be sampled in October 2010, where short samples were stretched to cover the 1.5-m core run interval. Subsequent holes were sampled by more experienced individuals and sample stretching was not a continuing problem. However, with the solid-tube coring methods, there was difficulty assigning footage to the lost core intervals.

The core recovery issue induced a reevaluation of the assays and data, which is detailed in the following discussion. PHA decided to discard the assays from ALS and re-assay at new laboratories. PHA also decided to concentrate the re-assaying on the LPZ, which is typically of higher grade, for initial development of the Property. This would be an unbeneficiated phosphate rock product averaging greater than 29% P_2O_5 and suitable for direct shipment. In the future, work will be done to evaluate the UPZ for potential development.

With new documented procedures, all drill hole data were reviewed and core was re-logged, with a focus on the LPZ, to assess recovery percentages. Depths were corrected to gamma logs. Review was by senior personnel and any changes to the database were documented and approved. In the case of core that could not be reconstructed due to previous sampling, photographic records were used.

12.3.1.3 AAI's June 2012 Site Review—AAI visited the Property in June 2012 to observe sampling procedures for the UPZ. The review confirmed that Stonegate Agricom Ltd. (Stonegate) was adhering to its sampling protocol and that the quality of sampling was acceptable and equivalent to that practiced in the LPZ.

12.4 Audits

Visits were made to both current laboratories to observe procedure and practice. The EnviroChem laboratory was visited on 29 August 2011 and the Thornton laboratory was visited on 17 August 2011. Both labs are well-recognized in the industry and utilize well-recognized and referenced assay methodologies and QA/QC procedures. In both cases, detailed tours of the facilities were made and all levels of personnel were interviewed. EnviroChem lacked documented internal procedures for sample preparation, but management and personnel were consistent in reporting and execution. Thornton did not document its own internal procedures, but again followed well-recognized testing methodologies. Chain of custody, sample receiving, and results reporting were consistent for both labs. PHA's own QA/QC results were reviewed and showed high accuracy and consistency within and between the labs.

12.4.1 Certificates of Analyses

AAI conducted random data integrity checks on the Certificates of Analyses provided by the testing laboratories by checking against the master database for accuracy and concluded the information to be reliable.

12.4.2 Certified Survey

A.A. Hudson and Associates, of Preston, Idaho, Professional Land Surveyor (LPS), provided documents of Certified Survey for the hole locations and elevations. These documents were not checked against actual field locations; rather AAI has relied on the expertise and licensure of the surveyors. However, the survey locations were used in the construction of maps and the locations matched the drill pad locations when compared to actual drill sites.

12.4.3 Independent Audit

To further confirm agreement between the collected data at the drill and assay data within and between the testing laboratories, an independent audit was conducted. While not typically conducted for industrial minerals projects, this type of audit requires an independent party (AAI) to take possession of core at the drill site, sample and assay at the complete discretion of the independent party to confirm the integrity of the assay as well as to independently compare the agreement between labs.

AAI collected the cored LPZ, 2.2 m above and 1.3 m below for PA Sub-Adit 4 at the drill site. AAI maintained strict chain of custody and transferred the samples to AAI labs located in Grand Junction, Colorado where the core was logged, sampled following PHA’s procedures, and sent for assay. Blanks, standards, and duplicates were inserted by AAI. The samples were sent to Jacobs’ laboratories in Lakeside, Florida where the samples were prepped and assayed. Jacobs also inserted duplicates for check samples. A total of 29 samples were analyzed. The split core was retrieved from AAI labs by PHA and sent to EnviroChem in Pocatello, Idaho. Whole core was sample-prepped at Jacobs when the core was too brittle or broken to be cut in half. In that case, Jacobs sent the sample split to PHA for subsequent analysis at EnviroChem.

The audit concluded that the laboratory results matched within normal limits and were reliable for the purposes of resource estimation. Additionally, the assay values reported on the Certificates of Analysis were confirmed to be reliable.

12.5 Adequacy

Based on a review of the exploration program, the QPs are confident that early problems of core recovery, sampling, and assay bias have been resolved and that the exploration dataset used in this resource estimate meets the criteria for use under NI 43-101. PHA’s QA/QC program is designed with aggressive duplication and insertion. Procedures are well documented and have been followed accordingly.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

Metallurgical testing and characterization of Paris Hills Agricom Inc. (PHA) phosphate rock was comprised of two programs:

- Beneficiation testing of Upper Phosphate Zone (UPZ) and Lower Phosphate Zone (LPZ) samples
- A pilot plant operation to produce phosphoric material and ammonium phosphate fertilizer samples using unbeneficiated LPZ phosphate material

All beneficiation testing, material characterization, and phosphoric acid and fertilizer testing were completed by Jacobs Engineering S.A. (Jacobs) at their laboratory facilities in Lakeland, Florida.

The scope of work for Jacobs for the first program included material characterization, density determinations, and bench-scale beneficiation tests to establish the unit operations required to produce an acceptable grade of concentrate at the target recovery.

The phosphoric acid pilot plant program used unbeneficiated LPZ material composited from 15 drill holes. The pilot plant run demonstrated that commercial grade phosphoric acid and granular fertilizers could be produced from LPZ material.

Variability testing is recommended as a follow-up to the acidulation pilot plant work. Material variability testing can be evaluated using the Jacobs phosphoric acid pilot plant to test the impact of lower grade phosphate material and higher organic carbon on the production of phosphoric acid and ammonium phosphate fertilizer production.

13.1 Phosphate Rock Characteristics

13.1.1 Background and Previous Work Done

Evaluation of the phosphate rock characteristics for the Project was done by Jacobs in 2011 and 2012. References to the phosphate rock characterization results and details reported are included in the reports titled "Beneficiation Status Report," dated September 2011, and "Beneficiation Status Report 2," dated February 2012.

Previous metallurgical and process studies have been conducted by Earth Sciences, Inc. (ESI) in the 1970s which characterized phosphate rock from the UPZ as well as the Vanadium Zone (VZ). Much of the ESI work in the 1970s focused on developing a technically viable processing flow sheet for the VZ, which is located directly beneath the UPZ. The VZ is characterized by much lower grade phosphate material (10 percent [%] phosphorus pentoxide [P_2O_5] and +1% vanadium pentoxide [V_2O_5]) as compared to the UPZ (22% to 25% P_2O_5) and the high-grade LPZ (+30% P_2O_5). ESI constructed a test adit in the UPZ and extracted 10,886 tonnes (t) of phosphate material, which they shipped by truck to a phosphate rock calcination plant owned by the Stauffer Chemical Company located in Leefe, Wyoming. The plant was a distance of approximately 102 kilometers (km) by road from Bloomington. The calcination test was unsuccessful as reported by ESI (1976). Some attempts to rationalize the development plan and simplify the complicated phosphate/vanadium flow sheet were attempted by ESI in the late-

1970s with no success in advancing the development of the property. From the late-1970s there had been no additional metallurgical work done on the Paris Hills Phosphate Project (the Property) until PHA began metallurgical evaluation work at Jacobs in 2011.

Previous to the ESI work, a subsidiary of the Homestake Company in the 1940s evaluated for a short time the viability of mining and producing vanadium from the vanadium-rich zone. This was done under a mandate by the United States of America (USA) Government to identify new sources of vanadium for the war effort; a report by Wyodak Coal and Manufacturing Company (Wyodak) was written in 1944. The report includes data for density determinations and chemical analysis of various surface samples and samples obtained from a small United States Bureau of Mines (USBM) adit in the VZ. This report provided a good reference check on the current density determinations completed by Jacobs.

Phosphate rock in the UPZ and LPZ can be characterized to be similar to other phosphate rock deposits located in southeast Idaho. These phosphate zones are contained within a Permian Age geologic sequence known as the Meade Peak Member. Phosphates in the Meade Peak Member have been studied for more than 100 years and are well understood. The mineralogical characteristics of PHA phosphate material appear to be similar, if not identical, to other phosphate rock deposits in the area which have been previously mined or studied. Phosphates in southeast Idaho typically host a very high-grade phosphate bed (+30% P_2O_5) at the bottom of the Meade Peak sequence, a mineral liberation grind size on the order of 300 to 600 microns (µm) (48 to 35 mesh), a fine-grained matrix which contains much of the silica (insolubles), and minor element ratio (MER) contaminants and is much finer size than the fluorapatite oolites, elevated concentrations of organic carbon (1% to 2%), and very little dolomite (magnesium).

The LPZ, or locally what is often referred to as the "A" bed of the Meade Peak Member, is high grade and was usually the focus of pioneer mining efforts in southeast Idaho in the first half of the 20th century. Typically, this phosphate bed has been known to be approximately 30% P_2O_5 with mineralogical characteristics suitable for manufacturing good quality phosphoric acid and ammonium phosphate fertilizer. The closed Waterloo Mine, located near Montpelier, Idaho, and approximately 20 km from Paris Hills, was the first open pit mine in southeast Idaho to successfully mine and direct ship by rail over 800,000 t of 31% P_2O_5 material by 1948. Stauffer Chemical Company operated several underground phosphate mines near Randolph, Utah from the 1950s until the late-1960s. These mines were characterized by steeply dipping phosphate seams which produced high-grade P_2O_5 (+30%) to facilitate direct shipping to Stauffer's fertilizer manufacturing facilities in California. Production rates were reportedly up to 90,000 t per month in the 1960s, with the Cherokee Mine being the largest underground direct ship mine in the region. The concept of mining and direct shipping phosphate rock without the need for beneficiation was widely practiced by the phosphate industry up until the late-1960s.

The phosphate beds higher in the Meade Peak Member are typically lower grade than the "A" bed or LPZ of PHA. When these phosphate beds (e.g. UPZ) are buried deeper (+300 to 500 meters [m]), they are unweathered and will typically contain more calcite in the material matrix. The calcite will be present in coarser grain sizes as compared to the silica (insolubles) contained in the rock matrix. Therefore, these unweathered phosphate ores cannot be upgraded by simply crushing, coarse grinding, and desliming the material. Lower grade phosphates in the Meade Peak Member may require finer grinding and a calcite flotation step to remove sufficient calcite to achieve an acceptable quality phosphate rock concentrate suitable for phosphoric acid and ammonium phosphate fertilizer manufacture. This appears to be the case for the phosphate material of the UPZ at PHA.

13.1.2 Samples Characterized

Jacobs was shipped drill core samples from the Property which were used for both UPZ and LPZ material characterization testing. The core samples were used for chemical analyses and/or testing and also for density determinations. The drill holes from which samples were identified are listed on Table 13-1. Material density determinations were completed on samples from the UPZ, LPZ, and vanadium-rich zone. No chemical analyses or beneficiation tests were performed on samples from the VZ. The LPZ samples were chemically analyzed and, as a result of their high grade, no beneficiation testing was recommended or required for LPZ samples.

The LPZ samples were prepared in a composite which was subsequently evaluated for producing phosphoric acid and ammonium phosphate fertilizers. Four distinct phosphate material types were identified and used to classify the phosphate material density determinations. They are identified as:

- UPZ weathered phosphate material
- UPZ unweathered phosphate material
- LPZ phosphate material
- VZ vanadium material

UPZ samples were divided into two categories of samples: weathered and unweathered sections. These were chemically analyzed and subjected to preliminary beneficiation testing. There was no beneficiation testing of the VZ or the LPZ samples.

13.1.3 Chemical Analyses of Upper Phosphate Zone Material

Initial testing of UPZ phosphate mineralized samples was prepared in two composite samples in advance of beneficiation testing: UZ1 composite sample was a lower grade composite and UZ2 a higher grade composite. Samples were staged and crushed to 3 millimeters (mm) prior to beneficiation testing. The analyses reported in the "Beneficiation Status Reports 1 and 2" (Jacobs 2011a and 2012a) of the individual drill hole core samples and composite sample are shown in Table 13-1.

UZ1 showed higher calcium oxide (CaO)/P_2O_5 and MER ratios than UZ2 composite samples, indicating that UZ1 was less weathered than the composite and individual drill hole samples from UZ2. Samples from test program 2 also showed characteristics of unweathered phosphate mineralization with higher calcite content than both UZ1 and UZ2 composite samples.

In the first test program, a second composite sample from weathered UPZ drill core samples was prepared and the analysis of that composite is also shown in Table 13-1.

Samples from six drill holes of unweathered UPZ material were analyzed and results are shown in Table 13-2. Additionally, a test program completed in February 2012 included four

Table 13-1. Analyses of Upper Phosphate Zone Drill Core Samples

Drill Hole	% P_2O_5	% Insol	% LOI	% Fe_2O_3	% Al_2O_3	% MgO	% CaO	CaO/P_2O_5	MER
Test Program 1									
PA-007	20.55	13.93	12.99	1.02	1.52	1.10	39.87	1.94	0.18
PA-008	23.02	12.39	11.60	0.82	1.41	0.52	41.42	1.80	0.12
UZ 1	**21.47**	**13.35**	**12.47**	**0.95**	**1.48**	**0.88**	**40.45**	**1.88**	**0.16**
PA-001	26.09	16.97	9.99	1.13	1.68	0.19	36.38	1.39	0.11
PA-003	25.61	21.70	5.19	1.25	1.72	0.33	37.33	1.46	0.13
PA-010	26.98	19.40	5.48	1.37	1.67	0.23	37.00	1.37	0.12
UZ 2	**26.33**	**18.74**	**7.44**	**1.24**	**1.68**	**0.23**	**36.78**	**1.40**	**0.12**
Second Unweathered Sample									
	24.56	27.52	n/a	1.31	2.13	0.28	35.63	1.45	0.15

Insol = insolubles; LOI = loss on ignition

Table 13-2. Analyses of Unweathered Upper Phosphate Zone Drill Core Samples

Drill Hole	% P_2O_5	% Insol	% Fe_2O_3	% Al_2O_3	% MgO	% CaO	CaO/P_2O_5	MER
PA-012	23.27	10.79	0.91	1.65	1.12	43.53	1.87	0.16
PA-014	21.48	8.44	0.74	1.38	0.72	47.38	2.21	0.13
PA-016B	30.94	16.52	0.74	2.56	0.24	42.05	1.36	0.11
PA-023	20.46	9.39	0.73	1.49	0.96	45.84	2.24	0.16
PA-089	25.07	20.46	0.83	2.98	0.40	38.51	1.54	0.17
PA-109	20.92	8.35	0.69	1.48	0.49	46.98	2.25	0.13
Average	**23.69**	**12.32**	**0.77**	**1.92**	**0.66**	**44.05**	**1.86**	**0.14**

other drill core samples which were analyzed. These drill holes would be characterized by samples that would have come from depths greater than 400 m. Analysis of those samples is shown in Table 13-3.

Table 13-3. Analyses of Unweathered Upper Phosphate Zone Drill Core Samples, February 2012 (from Jacobs' Beneficiation Status Report 2, February 2012)

Drill Hole	% P_2O_5	% Insol	CaO/P_2O_5
PA-012	23.27	10.79	1.87
PA-014	21.48	8.44	2.21
PA-023	20.46	9.39	2.24
PA-109	20.92	8.35	2.25
Average	**21.53**	**9.24**	**2.14**

The comparison of analyses between Tables 13-1, 13-2, and 13-3 confirms that unweathered material typically has more CaO and magnesium oxide (MgO) than weathered material. The MER ratio is similar in both UPZ material types. The analyses confirm that beneficiation will be required to remove excess CaO for both the weathered and unweathered UPZ phosphate material, by desliming and possibly flotation.

13.1.4 Chemical Analyses of Lower Phosphate Zone Material

Samples of LPZ samples were composited from eight drill holes and analyzed, and the results are presented in Table 13-4.

Table 13-4. Analyses of Lower Phosphate Zone Drill Core Sample Composite

Drill Hole	% P_2O_5	% Insol	% LOI	% Fe_2O_3	% Al_2O_3	% MgO	% CaO	CaO/P_2O_5	MER
Sample 1	32.15	5.48	6.1	0.91	1.65	1.12	43.53	1.87	0.16
Sample 2	32.01	5.52	6.23	0.74	1.38	0.72	47.38	2.21	0.13

The analysis of the LPZ composite sample confirmed that the LPZ material, without the need of beneficiation, would be suitable for producing phosphoric acid and ammonium phosphate fertilizers.

With the confirmation that the LPZ phosphate material would be suitable for phosphoric acid production, a composite sample was prepared using drill core intersections from 15 drill hole intersections of the LPZ. Details of the drill holes used, intervals sampled, sample weight, and P_2O_5 analysis are described in Jacobs' "Beneficiation Status Report" (Jacobs 2011a).

13.1.5 Density Determinations

Jacobs determined bulk densities of 70 samples by a displacement method. The average density for each of the four zones is shown in Table 13-5. The LPZ had the highest density (2.58 dry tonnes per cubic meter [t/m^3]) and the weathered UPZ had the lowest density (2.28 dry t/m^3). Weathering apparently increases the porosity of the material and thereby reduces the density. Details of individual density measurements for the 70 samples are included in Jacobs' "Beneficiation Status Report" (Jacobs 2011a).

Table 13-5. Density Determinations

Ore Zone	No. of Samples Tested	Dry Basis (t/m^3)	Wet Basis (t/m^3)	Drill Holes Tested
LPZ	21	2.58	2.62	PA-012, -014, -016, -023, -025, -089, -092, -109
UPZ Weathered	13	2.41	2.47	PA-001, -003, -006, -010
UPZ Unweathered	10	2.28	2.35	PA-012, -014, -016, -023, -089, -109
VZ	16	2.31	2.35	PA-003, -008, -010, -012, -014

13.2 Beneficiation Concepts

13.2.1 Upper Phosphate Zone Weathered Phosphate Material

Typically weathered phosphate material from Idaho is beneficiated by size reduction, followed by attrition and desliming to remove clays containing insolubles and alumina to improve (reduce) the MER ratio. Additionally, a coarse reject from scalping is performed to improve concentrate grade. The usual desliming cut point is 53 to 44 µm (270 to 325 mesh).

Dry beneficiation was tested on a sample as reported in Table 13-1 and identified as UZ2. The dry beneficiation procedure included crushing and drying a –3 mm sample, tumbling a 1-kilogram (kg) sample for 6 minutes at 55 revolutions per minute (rpm) in a 20.3-centimeter (cm) diameter drum. The tumbled material was then sieved and the size fractions were analyzed.

Wet beneficiation was examined by roll crushing to pass 5 mm, then stage grinding (wet) to pass 1,410 µm (14 mesh). The –1,410 µm mill discharge was wet sieved on 600 µm (28 mesh) to determine if +600 µm material could be rejected and to determine a cut point for desliming that would yield acceptable grade product with acceptable recovery of P_2O_5.

Wet beneficiation yielded better results on disaggregating the material and rejecting the low-grade fines. Table 13-6 shows the project concentrate quality if UPZ weathered phosphate material was ground to 1,410 µm (14 mesh) then deslimed at 74 µm (200 mesh). The wet beneficiation results would yield a merchant grade phosphoric acid (MGA) concentrate with high overall phosphate recovery, excellent %P_2O_5 grade, and low CaO/P_2O_5 and MER ratios.

Table 13-6. Upper Phosphate Zone Weathered Phosphate Material Deslimed at 74 µm (200 mesh)

Process	P_2O_5 Recovery	% P_2O_5	% Insol	% Fe_2O_3	% Al_2O_3	% MgO	% CaO	CaO/P_2O_5	MER
Dry	88.2%	27.57	15.83	1.30	1.64	0.24	39.50	1.43	0.12
Wet	95.5%	31.78	9.58	1.03	1.49	0.18	43.27	1.36	0.08

13.2.2 Upper Phosphate Zone Unweathered Phosphate Material

Unweathered phosphate material does not respond well to grinding and desliming as is typical of western US phosphate operations. Unweathered phosphate material as exhibited in Tables 13-2 and 13-3 shows that the main contaminants are insolubles and calcite as evidenced by the high CaO/P_2O_5 ratio (average 1.86 and 2.14, respectively).

The preliminary testing of PHA unweathered UPZ phosphate material (–3 mm) indicated that dry fines removal was ineffective and no size fraction was suitable as commercial quality phosphate rock. The best size fraction 210 to 149 µm (65 to 100 mesh) measured 26.11% P_2O_5 representing 3% of the weight mass.

Calcination, slaking, attrition, and desliming were ineffective and no merchant-grade quality phosphate rock was produced at the conditions tested. The best phosphate grade obtained was the 600- to 105-µm (30 to 150 mesh) size fraction which measured 25.76% P_2O_5.

Grinding, desliming, and carbonate flotation produced acceptable quality phosphate rock and recovered about 70% of the P_2O_5 from unweathered UPZ samples. Two flotation tests were performed producing concentrates of about 30% P_2O_5, with CaO/P_2O_5 ratios of 1.44 to 1.50 and MER of 0.06 and 0.07. Results of the two tests are shown in Table 13-7.

Table 13-7. Flotation Test Results of Unweathered Upper Phosphate Zone Material

Test	% P_2O_5	% Insol	% Fe_2O_3	% Al_2O_3	% MgO	% CaO	CaO/P_2O_5	MER	P_2O_5 Distribution
Test 1									
Concentrate	29.99	7.16	0.59	1.08	0.28	43.33	1.44	0.07	70.9%
Tails	13.27	10.59	0.65	1.01	1.56	43.90	3.31	0.24	11.4%
Slimes	12.15	28.69							17.7%
Test 2									
Concentrate	30.32	7.29	0.63	1.06	0.28	45.34	1.50	0.06	71.1%
Tails	13.46	11.67	0.68	1.01	1.59	43.65	3.24	0.24	11.3%
Slimes	12.15	28.69							17.6%

Follow-up test work as reported in the "Beneficiation Status Report 2" dated February 2012, tested UPZ material from drill holes PA-012, PA-014, PA-023 and PA-109. Twenty-three bench-scale flotation tests were performed to examine beneficiation of 600/74 µm (28/200 mesh) flotation feed. Heavy liquid separation tests were performed on three size fractions from two of the drill holes (PA-023 and PA-109).

The conclusions of that test program were as follows:

- The CaO/P_2O_5 ratio is a good indicator of the extent of UPZ weathering and determining when calcite flotation is required for upgrading phosphate material to marketable grade (+30% P_2O_5).
- A CaO/P_2O_5 ratio < 1.60: Grind to 600 µm (28 mesh), wash and deslime to produce a 600 x 74 µm (28/200 mesh) concentrate which will be +31% P_2O_5.
- A CaO/P_2O_5 ratio > 1.60: Grind to 210 µm (65 mesh), deslime at 20 µm (600 mesh) to produce a marketable concentrate (+31% P_2O_5)
- Flotation testing on the deepest and highest CaO/P_2O_5 ratio samples (PA-023 and PA-109) achieved a +31% P_2O_5 concentrate at 58% overall P_2O_5 recovery.
- The phosphate rock concentrate produced from flotation testing would be suitable for producing phosphoric acid, monoammonium phosphate (MAP) and possibly diammonium phosphate (DAP).

As a result of this follow-up testing, Jacobs was able to define a conceptual flow sheet for beneficiation of UPZ material. Figure 13-1 illustrates the conceptual flow sheet for processing the three phosphate material types at PHA (LPZ direct ship material, UPZ weathered material, and UPZ unweathered material).

The recommended unit operations for processing of PHA weathered UPZ material includes crushing to –25 mm, closed-circuit rod mill grinding to pass 80% less than 600 µm (28 mesh), scrubbing and desliming at 74 µm (200 mesh) (washing plant), and concentrate dewatering using vacuum filtration and flash drying to an acceptable moisture content. Overall P_2O_5 recovery would be in the order of 85%.

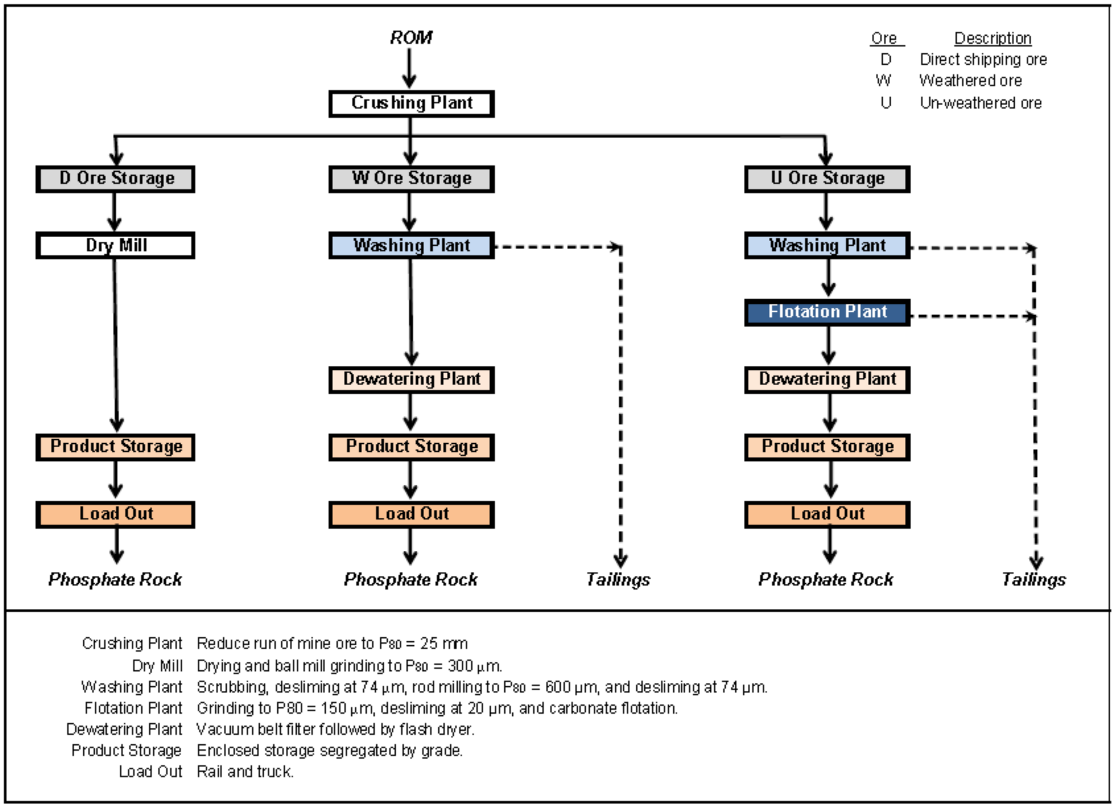


Figure 13-1. Conceptual Flow Sheet for Processing Upper Phosphate Zone and Lower Phosphate Zone Material

For unweathered UPZ material, this beneficiation process would include crushing to –225 mm, closed-circuit rod mill grinding (1st stage), scrubbing and desliming at 74 µm (200 mesh), followed by a second-stage ball mill grinding to 80% less than 150 µm (100 mesh), desliming at 20 µm (600 mesh), followed by reverse flotation of calcite, and finally dewatering of the final concentrate with vacuum filtration and flash drying. This would produce a merchant-grade phosphate rock concentrate of at least 31% P_2O_5 with low CaO/P_2O_5 and MER ratios. Overall, P_2O_5 recovery would be on the order of 60% to 75%, with higher recovery on partially weathered UPZ, and trending to lower recovery rates with the highest calcite content (>2.0 CaO/P_2O_5 ratios) in the deepest UPZ material.

13.2.3 Recommendations for Future Upper Phosphate Zone Beneficiation Testing

Although immediate testing of the unweathered UPZ phosphate material is not critical to the development of the project for the Feasibility Study (FS), additional testing of the recommended flow sheet as defined in Section 8.2.2.2 will be required to conduct fertilizer testing on flotation concentrate produced from UPZ material. A large potential phosphate resource exists in the UPZ, of which most of this material will be unweathered phosphate material. Demonstrating the proposed flotation flow sheet for processing unweathered UPZ phosphate material over a wide cross section of drill hole samples is recommended. The more drill hole samples that can be tested, the greater the confidence in assessing the robustness of the recommended process flow sheet. A larger program of flotation testing would be required to produce sufficient concentrate samples (+100 kg) for future UPZ fertilizer testing. As a guide to quantity of material needed for UPZ fertilizer testing, it is estimated that at least 250 kg of unweathered UPZ material sample would be needed to produce 100 kg of concentrate.

In the future, additional testing on unweathered UPZ material would focus on optimizing grind size and flotation parameters such as reagent dosages in order to maximize concentrate grade and overall P_2O_5 recovery rates. Other testing might also include dewatering testing on the concentrate and tailings product with a focus on developing high density or dry tailings concepts for developing the UPZ.

For weathered UPZ material, it is recommended that scrubbing tests be performed to better define retention time and percent solids for drum scrubbing. These can be completed for a modest cost (under US$10,000).

13.3 Acidulation and Fertilizer Testing of the Lower Phosphate Zone Phosphate Rock

A bulk sample of LPZ material, obtained by compositing cores from a series of drill holes, was dried and ground to pass 500 µm (35 mesh) at the Jacobs laboratory in Lakeland, Florida. The sample was then processed in the Jacobs Phosphoric Acid Pilot Plant. It is important to note that the composite sample included the entire LPZ for each core, and no internal strata were rejected prior to the phosphoric acid pilot plant run.

A high-quality phosphoric acid was produced by operating the reactor at 26% P_2O_5 strength with a low level of excess sulfate. During the stabilized operating period, the overall P_2O_5 recovery was high at 97%, sulfuric acid usage was low at 2.43 t sulfuric acid (H_2SO_4)/t P_2O_5, and the slurry filtration rates were acceptable at 5.2 filtration rate (t $P_2O_5/(m^2 \bullet d)$). The filter acid produced was a bright green, but due to the amount of organic material present in the feed, both defoamer and flocculent additions were required to process the material.

Several portions of 26% P_2O_5 filter acid were concentrated to MGA. The concentrated acid deepened in color, but remained green and showed no signs of organic charring. When clarified after 24 hours of aging, the MGA concentrated to 55% P_2O_5 produced a sludge that contained only 4.2% P_2O_5 at a rate of 1.6% by weight. Two granular ammonium phosphates (MAP and DAP) were produced from the concentrated acid. The DAP produced from clarified MGA was analyzed at 18.7:50.3:0 and the MAP produced from non-clarified MGA analyzed at 11.8:56.1:0. Both products were light green in color, exhibited good crush strengths in the 2.7 to 3.2 kg range, and exceeded commercial specifications for grade.

13.3.1 Background

The purpose of the test program was to evaluate the suitability of LPZ phosphate mineralization for producing MGA with final conversion to commercial ammonium phosphate fertilizer products MAP and DAP. A composite sample, containing LPZ core from 15 drill holes, was dried and ground to pass 500 µm (35 mesh) before being processed in a phosphoric acid pilot. Although the sample had a low MER content of 0.057, it did contain organic material (1.69% organic C). Drill cores included in the program used the entire LPZ and no internal strata were rejected prior to the phosphoric acid pilot plant run.

13.3.2 Description for Processing Lower Phosphate Zone Mineralization

The two most commonly used processes for the manufacture of wet process phosphoric acid are the dihydrate and the hemihydrate processes. The dihydrate process produces a dihydrate gypsum crystal and filter acid at 27% to 29% P_2O_5, and the hemihydrate process produces a hemihydrate gypsum crystal and filter acid at 38% to 42% P_2O_5. The advantage of the hemihydrate process is the reduction of steam required to evaporate filter acid to MGA. The disadvantage of the hemihydrate process is generally lower recovery and lower filtration rates.

The two chemical reactions that have been widely used to describe either process are:

- Dissolution of rock by phosphoric acid

$$Ca_{10}\,F_2(PO_4)_6 + 14H_3PO_4 \rightarrow 10Ca(H_2PO_4)_2 + 2HF$$

- Precipitation of gypsum by sulfuric acid

$$Ca(H_2PO_4)_2 + H_2SO_4 + XH_2O \rightarrow CaSO_4{*}\ XH_2O + 2H_3PO_4$$

If the process is dehydrate, then X=2 and if hemihydrate X=0.5. The degree of hydration, or the value of X, depends on the process conditions. The formation of the hemihydrate crystal takes place at a higher temperature, 95–100 degrees Celsius (°C) versus 75–80°C for dihydrate. The Jacobs pilot plant can be configured to operate in either dihydrate or hemihydrate mode. In Jacobs's dihydrate mode, the reaction takes place in a single stirred tank reactor, and in the hemihydrate mode, the reaction takes place in two stirred tank reactors.

13.3.3 Pilot Plant Testing Objectives for Processing Lower Phosphate Zone Mineralization

The objectives of the test program were to produce filter acid using the dihydrate process and to concentrate the filter acid to MGA. After evaporation to MGA concentration, the acid was converted to solid ammonium phosphates.

Additional objectives were to determine filtration rates, P_2O_5 recoveries, acid quality, and to quantify sludge production. The testing procedures simulate an industrial plant using 14% moisture in the concentrate feed and consuming 93% sulfuric acid. Several test runs of 10-hour duration each were completed prior to the beginning of the continuous acidulation test. The day runs were used to generate the initial reactor slurry for the start of continuous operation and to establish operating parameters for the continuous run.

The continuous test runs began on 17 July 2011 and lasted for 90 hours. Although 22 filtration tests were performed during the run, the performance calculations were generated from a subset of 12 tests taken in the latter half of the run. The filtration tests were conducted to calculate the 90 and 180 second-cycle filtration rates corresponding to a belt filter and a tilting pan filter, respectively. Acid and gypsum samples from the filtration tests were analyzed to determine the P_2O_5 recovery and the material balance for the major impurities. Filter acid from the run was aged and decanted prior to concentration to MGA.

13.3.4 Pilot Plant Equipment and Test Methods Used for Lower Phosphate Zone Mineralization

Phosphate rock, sulfuric acid, and return acid were continuously fed to and reacted in an agitated 9-liter (l) vessel, which overflowed to a filter feed pot. Sulfuric acid was used at 80% H_2SO_4 instead of 93% as would be used in a commercial plant to avoid rock coating problems, since it is added to the reactor directly as opposed to being mixed with return acid. The recycle acid was returned to the reactor by a peristaltic metering pump. A slurry sample was run through a filter leaf test every 4 hours, alternating between the lower and higher rates. The filter leaf tests were conducted to simulate both a 90-second and a 180-second cycle time.

The PHA LPZ material was pre-weighed into amounts corresponding to the hourly usage and fed into the reactor using a variable speed screw, which was adjusted to deliver the sample within 1 hour. Sulfuric acid was metered to the reactor at a rate necessary to control excess sulphate levels between 1.6% and 1.8%. Hourly samples were withdrawn from the reactor to determine the sulfate level, the percent solids and the specific gravity of the reactor slurry. Sulfate control was based on relative sulfate levels determined hourly by chemical analysis and was the primary control parameter for the dihydrate acidulation process. The sulfate control analysis was by precipitation with barium chloride using the centrifuge method.

The pilot plant equipment used for the digestion and filtration tests is shown in Figure 13-2 and the process diagram of the pilot plant is shown in Figure 13-3.

The acidulation reactor was a stainless steel vessel with an active liquid volume of approximately 9 l to process the feed materials. The reactor is typically fed with 80% sulfuric acid, phosphate rock, and return acid. Liquid feeds are transferred to the reactor by peristaltic pumps. The rock is fed by a screw feeder and dispersed into the reactor slurry by a rock wetting agitator. The reaction temperature of the slurry is monitored continuously by a thermocouple probe located under the liquid level in the reactor. Control is maintained using a standalone proportional integral derivative (PID) controller connected to an electrical hot plate and the temperature probe.

As reactor slurry accumulated in the filter feed pot, it was flocculated and filtered to separate the product acid from the gypsum. The Buchner filter, used for the separation, was transferred from flask to flask during the wash process, simulating the counter-current wash system used in a full-scale phosphoric acid plant. A test leaf filter of 76 mm diameter was used for the quantitative determination of filtration rates run every 4 hours. Sample sizes were alternated between tests to produce cycle times and cake thicknesses that simulated both pan and belt filter operation.

Operating conditions, filtration rates, and P_2O_5 losses were recorded on electronic log sheets and plotted chronologically. The day shift tests started with water and the % P_2O_5 in the reactor was increased to about 28% by the end of the week. The purpose of the day shift operation was to produce a reactor gypsum slurry representative of this particular rock for the continuous test. Control of pilot plant operation was by specific gravity measurements of the liquid feeds, product slurry, and product acid and by analysis of the reaction liquor for sulfate. Gravimetric sulfates were also performed on each product acid sample.

Figure 13-2. Acidulation Pilot Plant for Processing Lower Phosphate Zone Mineralization

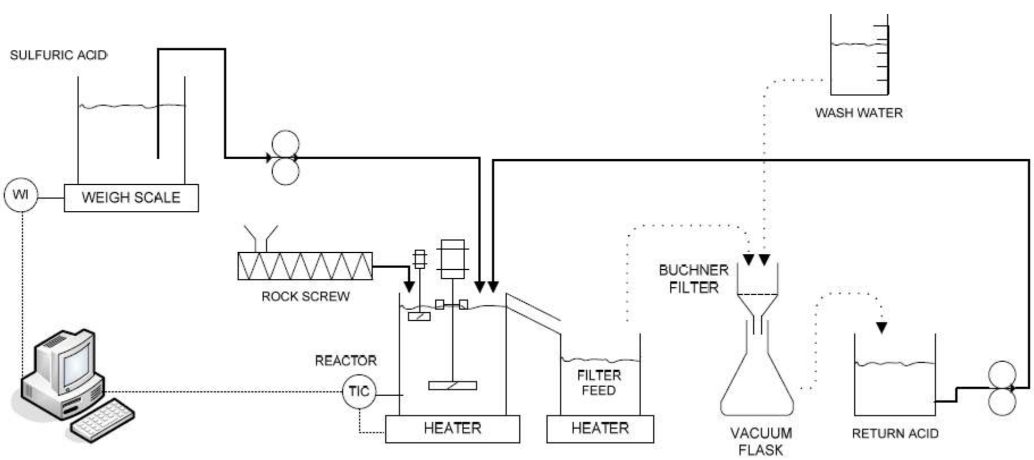


Figure 13-3. Process Flow Diagram of Acidulation Pilot Plant

A 24-hour clarification test was performed on a sample of filter acid, and the bulk of the filter acid was decanted prior to concentration. The concentration equipment used was a batch vacuum distillation with indirect condensation of the vapors.

13.3.5 Lower Phosphate Zone Mineralization Used for Acidulation Pilot Plant

Fifteen drill holes of mainly HQ and some PQ diameter were used to prepare a composite sample weighing 84.95 kg. The chemical analysis of the composite sample is shown in Table 13-8.

Table 13-8. Chemical Analysis of Acidulation Pilot Plant Lower Phosphate Zone Composite Sample (from Jacobs 2011c)

% P_2O_5	% CaO	% MgO	% Fe_2O_3	% Al_2O_3	% Na_2O	% K_2O	% F	% Cl
32.33	48.98	0.26	0.43	1.16	0.94	0.30	3.12	0.02
% SO_3	**% CO_2**	**Insol**	**LOI**	**Total SiO_2**	**Acid Insoluble SiO_2**	**Acid Soluble SiO_2**	**Organic C**	**H_2O**
1.37	1.69	5.28	6.27	5.72	5.30	0.42	1.69†	0.586
CaO/ P_2O_5	**F/Soluble SiO_2**	**F/(SiO_2+Al_2O_3+MgO)**			**(Fe_2O_3 + Al_2O_3)/P_2O_5**		**(Fe_2O_3 + Al_2O_3 + MgO)/P_2O_5 (MER)**	
1.52	7.43	1.69			0.049		0.057	

† The organic carbon value changed from the original reported value based on corrections to the analysis method, explained in a letter from Jacobs dated 02 November 2012 (Jacobs 2012b).

The phosphate rock used in the acidulation pilot plant has components which affect the wet phosphoric acid process. The following bullet points summarize those components:

- Organic carbon can discolor phosphoric acid and cause excessive foaming in the reactor. Defoamer and flocculant was needed to process the PHA LPZ sample.
- The CaO/P_2O_5 was typical of phosphate materials suitable for the wet phosphoric acid process.
- The fluorine (F)/soluble silica dioxide (SiO_2) molar ratio is an indication of corrosivity, and a value greater than 10 indicates a potential for severe corrosion problems. The value for the PHA sample was 7.43.
- The MER value was 0.057 and is a low value indicating good potential for producing good quality phosphoric acid.
- The values for potassium oxide (K_2O) and sodium oxide (Na_2O) are considered high and indicate the potential for the formation of fluorosilicates and therefore increased scale formation.

13.3.6 Acidulation Pilot Plant Test Results

<u>Summary of Lower Phosphate Zone Mineralization Pilot Plant Test Results</u>

Table 13-9 summarizes the results from the acidulation pilot plant test conducted in July 2011.

Table 13-9. Acidulation Plant Summary

Parameter	Unit	Value
Rock analysis	% P_2O_5	32.33
Rock MER		0.057
Acid MER		0.050
Product acid strength	% P_2O_5	26.0
Acid specific gravity (SG)	@ 38°C	1.29
Water soluble loss	% P_2O_5	0.4
Citrate soluble loss	% P_2O_5	1.8
Citrate insoluble loss	% P_2O_5	0.8
Total losses	% P_2O_5	3.0
Pilot plant recovery	% P_2O_5 Fed	97.0
Reactor specific volume	m^3/ (t P_2O_5/d)	1.80
Filtration rate (belt)	t P_2O_5/(m^2•d)	5.1
Filtration rate (pan)	t P_2O_5/(m^2•d)	5.2
H_2SO_4 consumption	t P_2O_5	2.43
Corrosion rate (317L)		5.1
Corrosion rate (904L)		2.0
MGA strength		55.0
MAP grade—unclarified acid	N:P	11.8:56.2
DAP grade—clarified acid	N:P	18.7:50.3

During the 90-hour run, the acid concentration varied between 24.5% and 27.7%, with the average at 26.0% P_2O_5 and the acid MER average at 0.050. When the reactor slurry was flocculated, the color of the filtered product acid was a clear green, otherwise the acid was an oily black liquid that eventually decanted into three phases: 1) a clear green acid layer, 2) a dark, floating oil layer, and 3) a black solid grit. The balance gives the mass of 100% sulfuric acid consumed per tonne of P_2O_5 produced, and the mass of product acid and gypsum produced per 100 grams of rock consumed. The vapor generated and lost during the process is estimated by the balance and the distribution between the liquid, solid, and vapor phases given for the major impurities.

From the material balance, the sulfuric acid consumption was 2.43 t per tonne of P_2O_5 produced and gypsum was produced at 4.79 t per tonne of P_2O_5 produced. The majority of the iron, alumina, and magnesium stayed in solution at 62%, 84% and 92%, respectively.

The P_2O_5 recovery averaged 97.0% for the stabilized run period. Citrate soluble losses were 1.8%, water soluble losses were 0.4%, and citrate insoluble losses were 0.8%.

Filtration rates averaged 5.1 t P_2O_5 / (m^2•d) for a belt filter and 5.2 t P_2O_5 / (m^2•d) for a pan filter. Flocculent addition as a filtration aid was required for all filtering performed.

Corrosion Rates During Acidulation Pilot Plant

Corrosion rates were determined by the loss of weight on the submerged portions of two agitators made from 317L and 904L stainless steel. The weights were recorded before and after the run, and the weight difference was used to calculate the corrosion rate in millimeters per year. The smaller agitator, made from 317L, was operated near the surface of the reactor slurry at a constant speed of 500 rpm and aided in dispersing the rock feed into the reactor slurry. The larger main agitator, constructed from 904L, was operated at 350 rpm. Corrosion rates were considered excessive when more than 20 mm/year. The corrosion rates were low and are not considered a design issue. Table 13-10 gives the values of the corrosion rates for both agitators.

Table 13-10. Corrosion Rates During Acidulation Pilot Plant Testing

Material	Corrosion Rate (mm/year)
317L	5.1
904L	2.0

Gypsum Quality, Clarification, and Evaporation

Gypsum quality (larger crystals with resulting higher filtration rates) improved from the initial pilot plant startup to shut down. At hour 77, an upset occurred which resulted in poor gypsum quality and resulting in lower filtration rates. Microphotographs clearly show the difference in gypsum crystal size and the correlation to filtration rate during the test program. Control of the relative sulphate concentration in the reactor is key to maintaining good gypsum quality and resulting in good filtration rates.

Twenty-four hour duration clarification tests were performed on the filter acid and the MGA. The acid was collected and allowed to clarify in an oven maintained at 50°C for 24 hours. The sludge was decanted, filtered, washed with methanol, dried and analyzed. Table 13-11 shows the sludge analysis for the MGA acid. The filter acid did not produce enough sludge for an analysis.

Table 13-11. Merchant Grade Phosphoric Acid Sludge Analysis

%P_2O_5	%SO_3	%CaO	%Fe_2O_3	%Al_2O_3	%MgO	%F	%SiO_2	%Na_2O	%K_2O	Sludge % Wt
4.18	1.92	9.25	0.203	1.27	0.223	12.32	3.02	1.82	0.52	1.6%

The amount of sludge produced by the filter acid was only 0.2% of the total acid weight and insufficient in quantity to permit analysis of the sludge.

The filter acid was decanted prior to evaporation to MGA concentration. Two batches of acid were evaporated to MGA. MAP was produced from a non-clarified batch of MGA (as-is basis) and DAP was produced from a clarified batch of MGA. Tables 13-12 and 13-13 indicate the analyses of the acids which were used to manufacture the MAP and DAP fertilizer.

Table 13-12. Analysis of Acid Used for Monoammonium Phosphate Production

	%P_2O_5	%SO_3	%CaO	%Fe_2O_3	%Al_2O_3	%MgO	%F	%SiO_2	%Na_2O	%K_2O
Feed acid (decanted)	26.98	1.75	0.20	0.23	0.94	0.25	1.70	0.42	0.76	0.22
MGA (as is)	55.40	2.8	0.38	0.44	1.94	0.54	0.84	0.86	1.42	0.42

Table 13-13. Analysis of Acid Used for Diammonium Phosphate Production

	$\%P_2O_5$	$\%SO_3$	%CaO	$\%Fe_2O_3$	$\%Al_2O_3$	%MgO	%F	$\%SiO_2$	$\%Na_2O$	$\%K_2O$
Feed acid (decanted)	26.98	1.75	0.20	0.23	0.94	0.25	1.70	0.42	0.76	0.22
MGA (as is)	55.00	2.45	0.35	0.45	1.83	0.58	0.82	0.80	1.40	0.38
MGA (clarified)	55.77	2.13	0.38	0.48	2.10	0.60	0.86	0.82	1.46	0.39

Minor Element Analysis and Profile of Various Lower Phosphate Zone Pilot Plant Products

A set of samples were sent to an outside contract lab to profile the distribution of some of the predominant trace metals (arsenic [As], cadmium [Cd], chromium [Cr], nickel [Ni], selenium [Se], strontium [Sr], uranium [U], vanadium [V], and zinc [Zn]) in the material. The analyses are shown in Table 13-14.

Table 13-14. Minor Element Analysis of Various Lower Phosphate Zone Pilot Plant Products

	As	Cd	Cr	Ni	Se	Sr	U	V	Zn
Feed	11	16	200	35	7	400	34	383	375
Gypsum	6	15	15	22	6	148	2	44	222
Feed acid (decanted)	9	21	365	47	< 0.1	32	53	560	414
MGA (as is)	18	39	689	82	< 0.1	2	100	1,073	741
MGA (clarified)	18	40	707	84	< 0.1	2	101	1,062	758
MGA sludge	1	48	41	18	1	434	3	46	46

Figure 13-4 shows phosphoric acid produced during the pilot plant test.

Figure 13-4. Phosphoric Acid Produced During Pilot Plant Run

About 90% to 95% of the Cr, U, and V in the rock feed reported to the product acid. The remaining 5% to 10% was discharged with the gypsum. This trend is consistent with the data reported by other western US producers. About 50% of the As, Cd, Ni, and Zn in the incoming feed reported to the concentrated acid, with roughly 40% remaining with the gypsum, and approximately 10% precipitating in the sludge.

The reported values for these components vary widely through the industry, and while the values reported for this run are high when compared to Florida producers, they appear somewhat below average for western US producers.

Only very small amounts of Se and Sr reported with the clarified MGA. Approximately 90% of these two components were rejected with the gypsum, and almost all the remaining portion reported to the sludge or contributed to the scale during evaporation.

When comparing to The Association of American Plant Food Control Officials (AAPFCO) "Statement of Uniform Interpretation for Heavy Metals," the acid produced from the PHA material was over an order of magnitude below acceptable limits.

13.3.7 Ammonium Phosphate Fertilizer

MAP and DAP phosphate fertilizers were produced from non-clarified and clarified MGA, respectively. The DAP product analysis was 18.7:50.32:0 and the MAP product analysis was 11.8:56.14:0. Both of these products were light green in color and exceeded the commercial specifications of 18:46:0 for DAP and 11:52:0 for MAP. The citrate insoluble P_2O_5 analysis was less than 0.01% on both products. The products granulated well with no sign of wet or dusty characteristics, and no processing problems were noted. The test batches were produced using recycle ratios of six and the final products exhibited good crush strengths at 2.7 to 3.2 kg. Crush strengths that are less than 1.4 kg are considered too weak (i.e. the granules fracture easily and form dust during handling). Values above 2.3 kg are desirable. Typical crush strengths for MAP range from 1.8 to 3.2 kg, while the range for DAP is somewhat higher at between 2.7 and 5.0 kg. As larger granules exhibit higher strengths, the tests are performed on a narrow size range (2.4–2.8 mm) of particles.

Diammonium Phosphate and Monoammonium Phosphate Fertilizer Production

The DAP produced for this test was made with clarified acid, and the final product was highly over-formulated. Although the clarification of the MGA prior to granulation resulted in only a 0.1% loss of P_2O_5 based on the dry sludge fraction, the clarification step is probably not required to make product grade. Table 13-15 summarizes the DAP quality produced.

Table 13-15. Diammonium Phosphate Quality

Parameter	Unit	Value
Nitrogen	% N	18.70
Available P_2O_5	% P_2O_5	50.32
Moisture	ground % water (H_2O)	0.77
Moisture	unground % H_2O	0.36
Hardness	lbs	7

MAP was produced from unclarified MGA and the MAP was also over-formulated. Table 13-16 summarizes the MAP quality produced.

Table 13-16. Monoammonium Phosphate Quality

Parameter	Unit	Value
Nitrogen	% N	11.80
Available P_2O_5	% P_2O_5	56.14
Moisture	ground % water H_2O	0.71
Moisture	unground % H_2O	0.33
Hardness	lbs	6

Figure 13-5 is a photograph of the MAP fertilizer produced.

Figure 13-5. Monoammonium Phosphate Fertilizer Produced

13.3.8 Conclusions from the Lower Phosphate Zone Fertilizer Test

The phosphoric acid pilot plant test conducted in July 2011 demonstrated that unweathered LPZ material can be used to produce commercial-grade phosphoric acid and granular ammonium phosphate fertilizers without the requirement of beneficiation.

It should be noted that no internal strata of material was rejected from the drill core used to prepare the composite sample tested. All material was dried and ground to 600 µm (35 mesh) prior to processing in the phosphoric acid pilot plant.

During the 90 hours of stable operation, the overall P_2O_5 was 97.0% and the rate of sulfuric consumption was 2.43 t H_2SO_4/P_2O_5. Both values are considered excellent when compared to industry standards. Filtration rates averaged 5.2 t P_2O_5 / (m^2•d) at a 26% P_2O_5 acid strength, which is acceptable. Flocculant addition was required to achieve the filtration rates noted.

The filter acid was emerald green in color and showed no signs of organic discoloration. The MAP and DAP produced were light green in color, which is typical for western US phosphate rock. The MAP and DAP produced exceeded industry specifications for nitrogen and phosphate.

Defoamer and flocculant addition was required due to the organic material present in the phosphate rock, and this should be anticipated at the commercial scale. Good control of sulphate concentration is key to successful processing of the PHA phosphate rock, avoiding excessive sulphate concentration in the phosphoric acid reactor.

13.3.9 Recommendations for Future Lower Phosphate Zone Material Testing

It is recommended that variability testing be conducted with the Jacobs pilot plant to evaluate lower grade phosphate material (% P_2O_5) and higher concentrations of organic carbon as compared to the sample tested in July 2011. The test work program would evaluate the impact of material variability on the phosphoric acid and ammonium phosphate fertilizer produced.

The batches of feed to be used for testing will be prepared from drill core supplied by PHA. These drill core samples will include LPZ phosphate material as well as lower grade phosphate material from the extremities of the mineralized zone to allow a lower grade sample to be prepared, simulating the effect of "ore dilution" from the mining process. Drill core samples will also be selected which permit testing of higher grade organic carbon as compared to LPZ mineralized samples tested in July 2011.

14.0 MINERAL RESOURCE ESTIMATE

The mineral resource for the Paris Hills Phosphate Project (the Property) comprises the Upper Phosphate Zone (UPZ), Vanadium Zone (VZ) and Lower Phosphate Zone (LPZ), which covers a plan area of 778 hectares (ha) within the 1,010.5-ha Property. The resource estimate for the principal mineralized target, the LPZ, is based on core drilling and core chemical analyses from 39 exploration holes drilled by Paris Hills Agricom Inc. (PHA) from September 2010 through June 2012. A separate resource estimate for the UPZ is based on assayed intercepts from 29 of the exploration holes. The upturned limbs of the LPZ and UPZ, as well as the VZ, are defined as Exploration Targets, for which estimates of potential mineralization are based on historical, National Instrument (NI) 43-101 non-compliant exploration data collected prior to PHA.

Item 14.1 describes a generalized “base case” underground room-and-pillar mining scenario which justifies reasonable prospects for economic extraction for LPZ and UPZ Mineral Resource estimation. A separate detailed room-and-pillar mine plan was developed as part of the December 2012 Feasibility Study (FS) for justifying Mineral Reserves in the LPZ, as summarized in Items 15 through 22.

The mineralization occurs in folded beds (i.e., zones) in two domains: (1) a gently dipping horizontal limb and (2) upturned limb. The beds dip approximately 7 degrees (°) to 22º to the northwest (N50ºW) in the horizontal limb. The horizontal limb has been the principal target of exploration drilling in 2010–2012 and comprises the best defined Mineral Resource on the Property. Although no drilling has been conducted in the upturned limb, it is projected to contain substantial mineralization based on shallow, small-scale historical mining and limited surface trenching. The horizontal limb LPZ and UPZ phosphate resources are discussed in Items 14.2 and 14.3, respectively. The Exploration Targets in the upturned limb and VZ are discussed in Items 14.4 through 14.6.

This Mineral Resource estimate was prepared by Leo J. Gilbride, P.E., Senior Consultant with Agapito Associates, Inc. (AAI), member of the Society for Mining, Metallurgy, and Exploration, Inc., and Qualified Person (QP) for this Technical Report (TR). The Mineral Resource estimate for the LPZ has an effective date of 10 December 2012. The Mineral Resource estimate for the UPZ is unchanged from the 15 August 2012 TR (AAI 2012b) and has an effective date of 15 August 2012.

14.1 Base Case Mining Scenario

14.1.1 Horizontal Limb

Underground room-and-pillar mining is defined to be the base case mining scenario in the horizontal limb of the deposit. FS-level project economics have been developed for base case mining in the LPZ, as discussed in Items 16 through 22. The FS analysis demonstrates unambiguous economic potential for LPZ mining.

Although no detailed economics have been developed for mining in the UPZ, the similar character of the bed to the LPZ implies reasonable economic potential. The UPZ is nominally twice as thick as the LPZ, corresponding to similar or lower mining costs than the LPZ. The phosphorus pentoxide (P_2O_5) grade of the UPZ is lower than that of the LPZ which will result in higher beneficiation costs. Preliminary estimates developed by AMEC (2010) limit beneficiation costs and confirm the general economic potential of the UPZ resource.

14.1.2 Upturned Limb

No base case mining scenario is identified for potential extraction in the upturned limb, which is identified as an Exploration Target. Reasonable prospects for economic extraction cannot be assumed based on the limited data available in the upturned limb. Numerous mining methods may be viable for the steeply dipping zones in the upturned limb depending upon favorable geologic conditions, ranging from open pit mining near surface to underground cut-and-fill mining, or shrinkage stoping at depth.

14.2 Lower Phosphate Zone—Horizontal Limb

14.2.1 Methodology

Figure 14-1 shows the elevation contours for the LPZ and the locations of the 39 exploration holes used in the LPZ resource estimate relative to the Property boundary and the mineralized area. The limit of the resource is defined to the south by Bloomington Canyon where the zones outcrop or subcrop along the north canyon wall and to the west by the position of the upturned limb, beyond which to the west there is no occurrence of the host Meade Peak Member. The resource area is bound to the north and east by the Property boundary. The resource persists several kilometers east of the Property, but is ultimately truncated by major normal faulting along the western margin of the Bear Lake Valley graben. The resource remains open to the north beyond the Property boundary at increasing depth.

The western limit of the horizontal limb, where it transitions into the upturned limb, is estimated from the location of the outcrop of the upturned limb. The limit is based on a horizontal offset to the east of the Meade Peak Member outcrop. The horizontal offset is scaled according to depth to the horizontal limb and ranges from approximately 80 meters (m) near Bloomington Canyon to more than 250 m near Paris Canyon. The offset definition is considered conservative. Potential exists for the horizontal limb to extend as much as 200 to 400 m, or more, further to the west depending upon the abruptness of folding and the degree of overturning. Additional drilling near and through the upturned limb is required for determining the western limit of the horizontal limb with certainty.

LPZ sample assays for 39 exploration holes drilled in 2010–2012 were compiled by PHA in a computer-based Microsoft Excel™ spreadsheet and provided to AAI for resource modeling.[4] An LPZ thickness was estimated from the gamma and core logs in a fortieth hole (PA159) and applied to the geologic model for improved definition along the eastern margin of the deposit. Core recovery was inadequate in PA159 for composite assaying. Values within the assay database were spot-checked against assay certificates and found to be of sufficient accuracy for

[4] Exploration hole database updated by PHA through 04 October 2012 and provided to AAI on 04 October 2012.

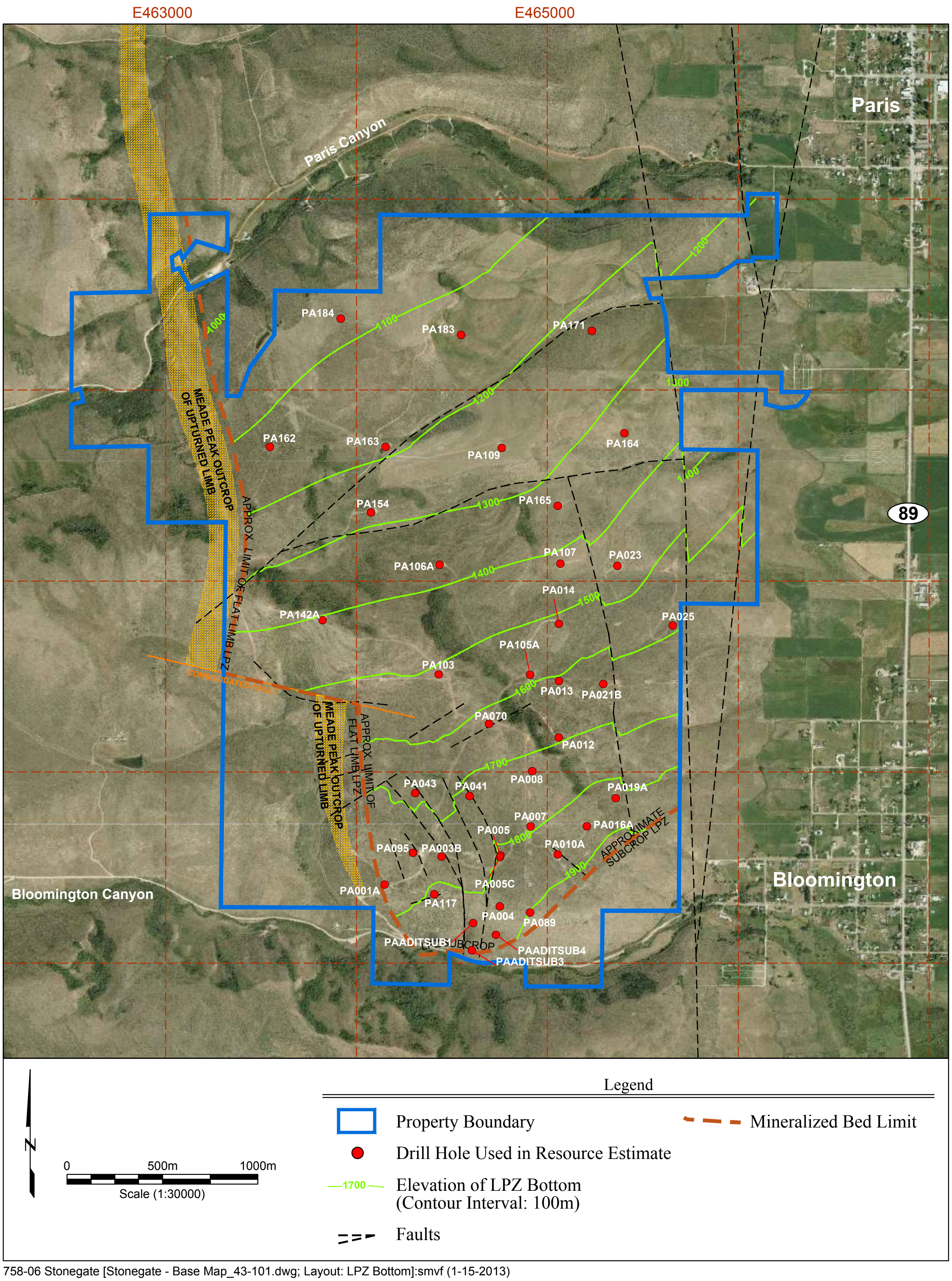


Figure 14-1. Plan Map of Lower Phosphate Zone Structure and Exploration Holes

resource modeling. Drill hole collar coordinates were surveyed by a Licensed Professional Surveyor (LPS) and provided in Universal Transverse Mercator (UTM) North American Datum of 1983 (NAD83) coordinates. Downhole directional survey data were available for 35 holes. Downhole survey data were not collected for five of the holes, which were assumed to be true vertical.

Seam correlations were made using Carlson Mining 2011 Software™ (Carlson 2011), an industry-recognized commercial-grade geologic and mine modeling software system that runs within AutoDesk Inc.'s AutoCAD 2011©. Strong continuity of the LPZ and other zones was evident in all reporting holes across the Property. LPZ tops and bottoms were picked from the sample assays and, in some holes, corroborated against natural gamma logs prepared by PHA.

The core was ordinarily sampled and assayed on 0.30-m lengths. PHA geologists attempted to split samples at lithologic contacts at the top and bottom of the LPZ to increase assay resolution wherever possible.

Quality parameters were composited as length-weighted averages of the individual assays over the LPZ thickness. The composite thickness was subject to a composite grade cutoff of 24.0 percent (%) P_2O_5 and a composite thickness cutoff of 0.5 m. In holes where sharp grade contacts were not present at the top and/or bottom of the LPZ, zone thickness was determined by maximizing thickness while maintaining a 29.5% P_2O_5 or better direct ship phosphate ore (DSO) composite grade. The composite true vertical thicknesses and coordinates for the LPZ intercepts were adjusted according to the bed local dip and downhole survey data. Composite values for the drill holes used in the resource estimate are summarized in Table 14-1.

The drill hole composites were applied to a gridded-seam model using Carlson Mining's Geology Module 2011 for calculating the resource tonnage and grade parameters. The flat-lying portion of the LPZ in the "horizontal limb" was gridded into a single layer of 20-m-square blocks of variable vertical thickness representing the local thickness of the zone. Block thickness values were estimated from neighboring drill holes (point data) using a kriging algorithm. Ordinary kriging was selected because it provides the most reliable, statistically unbiased estimator where sufficient spatial data are available. A kriging model was also developed for estimating the P_2O_5 grade in each block.

Semivariograms of zone thickness and P_2O_5 grade were generated from the LPZ composite data. No significant directionality was observed in the data. Omni-directional semivariogram models developed for the resource calculation are listed in Table 14-2. The LPZ semivariogram models are shown as blue lines in Figure 14-2. The maximum number of data points used for estimation was limited to the closest 10 points within a radius of influence (ROI) of 1,609 m.

The kriging model was compared against four other model types: inverse distance squared (ID^2), nearest neighbor (polygonal), linear interpolation (triangulation), and least squares. The kriging model was within 2% of the other models in terms of tonnage and within 1% in terms of average P_2O_5 grade. The agreement of results supports the validity of the kriging model.

Table 14-1. Drill Hole Composites Used for Mineral Resource Estimation—Lower Phosphate Zone

Drill Hole ID	Easting UTM NAD83†	Northing UTM NAD83†	Collar Surface Elevation (m)	Vertical Depth LPZ Top (m)	Vertical LPZ Thickness (m)	Core Recovery (%)	P_2O_5 (wt %)	Organic Carbon (wt %)	Acid Insoluble (wt %)	CaO (wt %)	MgO (wt %)	Fe_2O_3 (wt %)	Al_2O_3 (wt %)	Na_2O (wt %)	K_2O (wt %)	$CaO:P_2O_5$	MER
PA001A	464,147.0	4,670,811.1	1,937.9	174.4	2.01	95%	32.8	0.45	8.0	48.0	0.19	1.50	0.90	1.03	0.26	1.46	0.080
PA003B	464,445.4	4,670,957.7	1,973.4	186.8	2.29	100%	29.1	1.58	10.8	42.8	0.34	0.82	1.46	0.99	0.44	1.47	0.123
PA004	464,750.3	4,670,696.8	1,949.4	106.3	2.26	92%	31.5	0.42	11.2	44.8	0.22	0.44	1.66	0.60	0.49	1.42	0.079
PA005	464,754.7	4,670,964.7	1,977.5	163.9	1.86	94%	30.7	2.52	11.6	42.0	0.42	0.79	1.09	0.75	0.35	1.36	0.077
PA005C	464,751.2	4,670,955.3	1,977.2	162.9	1.92	100%	31.6	1.09	4.8	47.2	0.25	0.56	0.84	0.91	0.26	1.49	0.053
PA007	464,912.1	4,671,115.3	2,003.8	213.3	2.86	100%	32.1	1.06	6.2	47.6	0.25	0.46	0.95	1.04	0.31	1.48	0.052
PA008	464,920.2	4,671,405.1	2,024.4	296.7	1.85	100%	31.8	3.13	4.8	46.6	0.23	0.34	0.78	0.97	0.26	1.46	0.042
PA010A	465,053.7	4,670,968.2	1,991.6	117.5	1.81	100%	31.3	0.28	8.9	45.5	0.24	0.21	1.45	1.07	0.38	1.46	0.063
PA012	465,059.4	4,671,581.0	2,010.4	317.1	1.62	98%	31.0	0.62	5.9	46.3	0.27	0.51	1.37	1.01	0.37	1.49	0.074
PA013	465,059.9	4,671,876.5	1,991.4	383.7	1.52	100%	28.4	2.76	7.9	43.7	0.40	0.61	1.13	0.96	0.34	1.54	0.076
PA014	465,203.4	4,671,944.5	1,968.9	406.4	1.87	93%	30.6	3.11	4.4	45.8	0.27	0.78	0.83	0.86	0.28	1.50	0.062
PA016A	465,206.8	4,671,116.3	1,995.0	130.4	2.41	99%	31.2	0.43	10.2	44.7	0.21	0.76	1.85	0.93	0.36	1.43	0.095
PA019A	465,357.6	4,671,263.4	1,955.6	122.6	2.03	100%	32.2	0.70	6.1	47.3	0.27	0.26	1.02	1.17	0.29	1.47	0.049
PA021B	465,293.3	4,671,861.0	1,959.5	307.0	2.11	94%	30.1	2.84	5.2	46.3	0.24	0.50	0.80	1.04	0.25	1.54	0.052
PA023	465,444.2	4,672,391.0	1,907.2	423.1	2.70	95%	31.0	3.13	6.6	45.0	0.24	0.26	1.02	1.02	0.31	1.45	0.050
PA025	465,641.0	4,672,170.4	1,891.4	301.9	1.81	100%	29.7	3.42	4.5	45.8	0.39	0.45	0.86	0.96	0.28	1.55	0.058
PA041	464,592.4	4,671,274.2	1,997.0	282.4	1.67	96%	30.4	3.27	5.1	47.1	0.17	0.47	0.87	0.65	0.32	1.55	0.050
PA043	464,307.3	4,671,289.7	1,994.2	307.4	1.14	100%	30.0	3.13	4.1	48.1	0.28	0.46	0.71	0.99	0.25	1.61	0.049
PA070	464,694.1	4,671,652.7	2,035.4	407.2	1.36	89%	31.3	3.63	5.4	44.5	0.26	0.49	0.82	1.01	0.24	1.42	0.051
PA089	464,908.7	4,670,664.8	1,963.5	59.4	2.13	93%	33.3	0.37	4.6	48.3	0.19	0.46	0.85	0.89	0.28	1.45	0.045
PA095	464,295.6	4,670,977.6	1,970.7	225.5	1.35	100%	31.1	0.95	8.6	45.7	0.25	0.61	1.12	1.05	0.33	1.47	0.065
PA103	464,445.3	4,671,825.4	2,056.7	517.8	1.86	100%	29.6	2.58	5.3	46.2	0.27	0.45	0.86	1.02	0.27	1.56	0.054
PA105A	464,956.1	4,671,914.3	1,999.7	403.6	1.87	100%	31.2	2.48	5.1	45.6	0.25	0.50	0.76	1.10	0.24	1.46	0.048
PA106A	464,458.2	4,672,408.7	2,013.6	621.2	1.77	89%	28.6	2.80	6.2	48.2	0.25	0.57	0.78	0.55	0.24	1.68	0.057
PA107	465,099.8	4,672,438.2	1,934.4	492.4	1.65	100%	29.8	2.44	4.7	45.9	0.35	0.46	0.73	1.03	0.25	1.54	0.052
PA109	464,795.4	4,672,985.9	1,962.7	703.0	1.72	100%	29.1	3.31	4.5	45.9	0.22	0.73	0.89	0.95	0.27	1.58	0.064
PA117	464,407.1	4,670,759.9	1,939.4	129.4	1.86	100%	32.2	0.37	7.4	45.9	0.23	0.34	1.15	1.09	0.30	1.42	0.054
PA142A	463,817.6	4,672,103.3	2,075.2	642.1	2.11	100%	28.8	2.86	6.6	49.0	0.27	0.48	0.81	0.92	0.24	1.70	0.056
PA154	464,075.5	4,672,759.2	1,998.6	717.7	1.10	100%	30.4	3.48	5.4	45.2	0.41	0.44	0.80	0.72	0.27	1.49	0.054
PA159	465,689.0	4,672,747.6	1,883.8	406.3	0.78	0%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PA162	463,418.7	4,672,977.7	2,031.6	890.4	2.03	100%	24.5	3.43	4.4	43.3	3.46	0.33	0.76	0.73	0.23	1.87	0.238
PA163	464,100.9	4,673,037.9	1,976.7	777.7	1.79	97%	29.6	2.66	5.3	43.8	0.34	0.39	0.76	0.94	0.25	1.48	0.051
PA164	465,453.8	4,673,088.1	1,909.2	554.0	1.15	100%	29.2	3.37	8.0	44.2	0.90	0.60	1.01	1.03	0.30	1.52	0.088
PA165	465,098.1	4,672,765.0	1,927.6	576.9	1.85	100%	29.8	3.06	6.0	45.3	0.25	0.54	0.71	0.87	0.21	1.52	0.051
PA171	465,254.3	4,673,627.5	1,915.0	667.5	1.69	100%	31.6	3.21	6.0	45.7	0.26	0.52	0.80	0.69	0.25	1.45	0.050
PA183	464,661.5	4,673,635.6	1,956.4	796.3	1.46	86%	30.6	2.87	5.1	48.2	0.31	0.44	0.71	0.60	0.22	1.58	0.048
PA184	463,961.4	4,673,769.5	2,012.5	929.9	1.74	100%	30.1	3.02	7.4	45.8	0.43	0.41	0.73	0.73	0.23	1.53	0.054
PAADITSUE	464,611.3	4,670,609.4	1,901.3	68.9	1.19	100%	32.0	ND	9.6	45.1	0.22	0.38	1.35	0.95	0.31	1.41	0.062
PAADITSUE	464,604.0	4,670,466.9	1,872.9	9.0	2.32	87%	33.5	0.47	7.3	47.5	0.16	0.24	0.98	0.76	0.27	1.42	0.042
PAADITSUE	464,730.1	4,670,548.4	1,900.6	43.9	1.86	100%	34.2	0.53	5.6	48.3	0.16	0.35	1.06	0.61	0.24	1.41	0.046

† Coordinates of downhole intercept of LPZ. May be different than hole collar. ND = No data.

Table 14-2. Resource Model Kriging Parameters—Lower Phosphate Zone

Variable	Exploration Holes Used	Semivariogram Model Type	Nugget	Scale	Range	Orientation
Zone thickness (m)	40	Spherical	0.01	0.18	150	Omni-directional
P_2O_5 grade (% wt)	39	Linear	0.40	NA	NA	Omni-directional

Figures 14-3 and 14-4 are contour maps of the modeled thickness and P_2O_5 grade contours for the LPZ.

Grids were also created for top and bottom elevations of each seam based on drill hole intercept elevations. A polynomial algorithm, based on fifth-order polynomial smoothing of a linear interpolation estimator, was used for grid estimation. Seam conformance was invoked in the algorithm which forced the prescribed sequence of stratigraphy at all grid locations, thus improving structural accuracy in areas with weaker drill hole control. Seam overburden (depth) and interburden thickness grids were created by subtracting the respective grids. The ground surface elevation grid used for the depth calculations was generated from a commercially available United States Geological Survey (USGS) 7.14-minute digital elevation model. The three-dimensional structure represented in the model is illustrated in Figure 14-5.

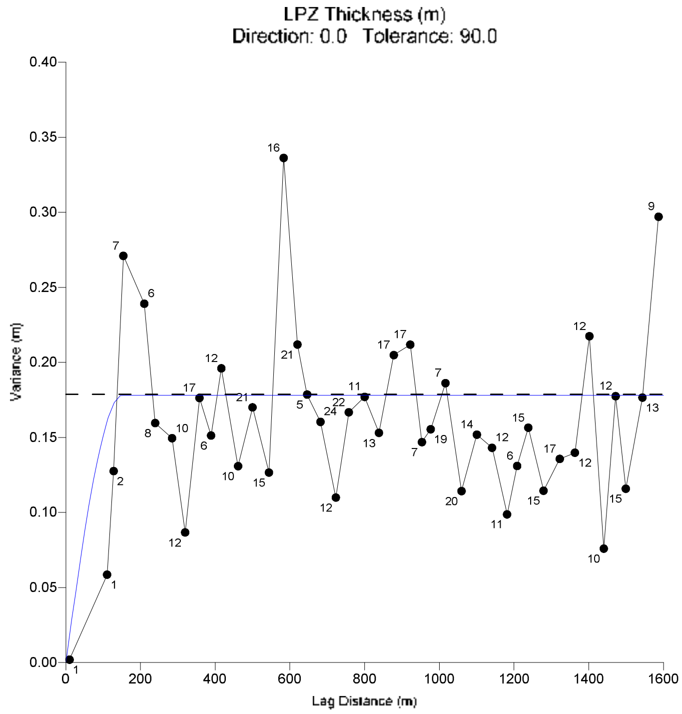
Phosphate tonnages are based on an average dry bulk density of 2.6 tonnes per cubic meter (t/m^3) derived from 91 laboratory bulk density tests conducted by Jacobs Engineering S.A. (Jacobs) on LPZ core. Tests support a 95% confidence interval of 2.60±0.14 t/m^3 for dry bulk density in the LPZ. A dry bulk density of 2.6 is considered representative for mine planning purposes. Future analyses of density variations as a function of weathering and depth from outcrop are recommended. The average as-received moisture content ranged from dry to 10.1% by weight and averaged 1.5% in 104 tests. Core was sealed in plastic sleeves in the field to preserve moisture.

Secondary phosphate quality parameters were modeled using an ID^2 algorithm. Secondary quality parameters modeled include iron/ferric oxide (Fe_2O_3), aluminum oxide (Al_2O_3), magnesium oxide (MgO), minor element ratio (MER),[5] sodium oxide (Na_2O), potassium oxide (K_2O), calcium oxide (CaO), $CaO:P_2O_5$ ratio, acid insoluble content, and organic carbon.

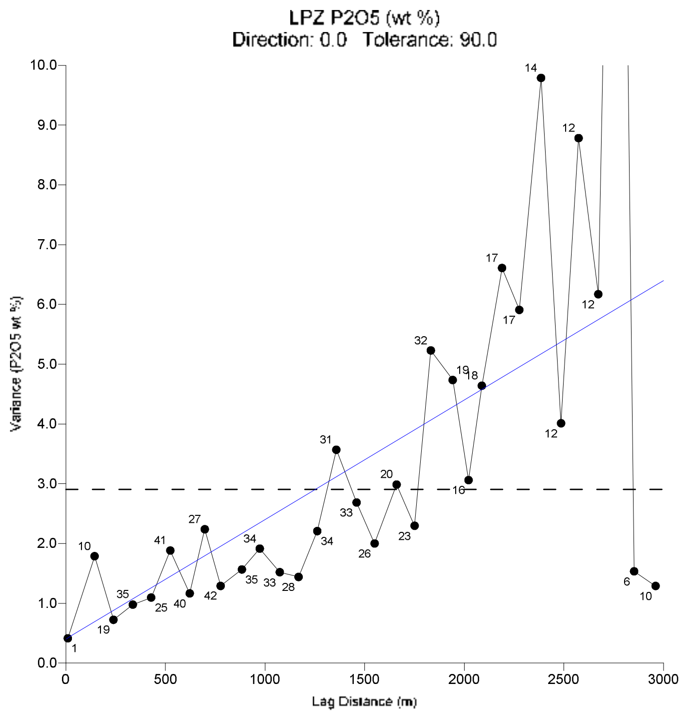
Quality grids were also calculated using an ID^2 algorithm for 0.114-m layers extending to a depth of 0.6 m beyond the LPZ into the roof and floor. The roof and floor grids were applied to estimating out-of-seam dilution (OSD) as part of the Mineral Reserves analysis.

Secondary phosphate quality parameters were modeled using an ID^2 algorithm. Secondary quality parameters modeled include Fe_2O_3, Al_2O_3, MgO, MER, Na_2O, K_2O, CaO, $CaO:P_2O_5$ ratio, acid insoluble content, and organic carbon. Complete assay information was available for all secondary parameters in 27 of the 33 holes.

[5] MER = $(Fe_2O_3 + Al_2O_3 + MgO)/P_2O_5$.



(a) Zone Thickness (m)



(b) Phosphate Grade (wt % P_2O_5)

Figure 14-2. Omni-Directional Semivariograms—Lower Phosphate Zone

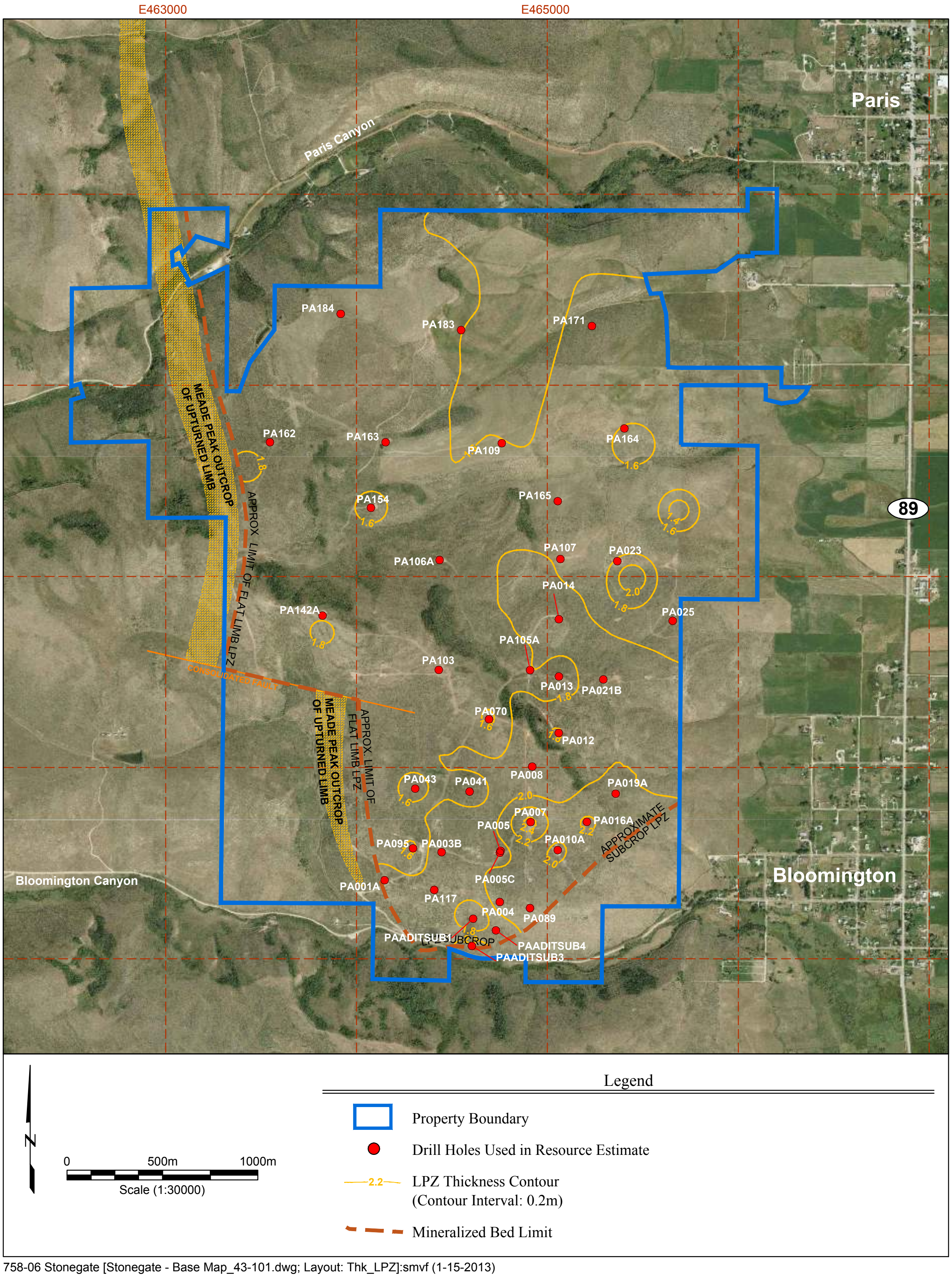
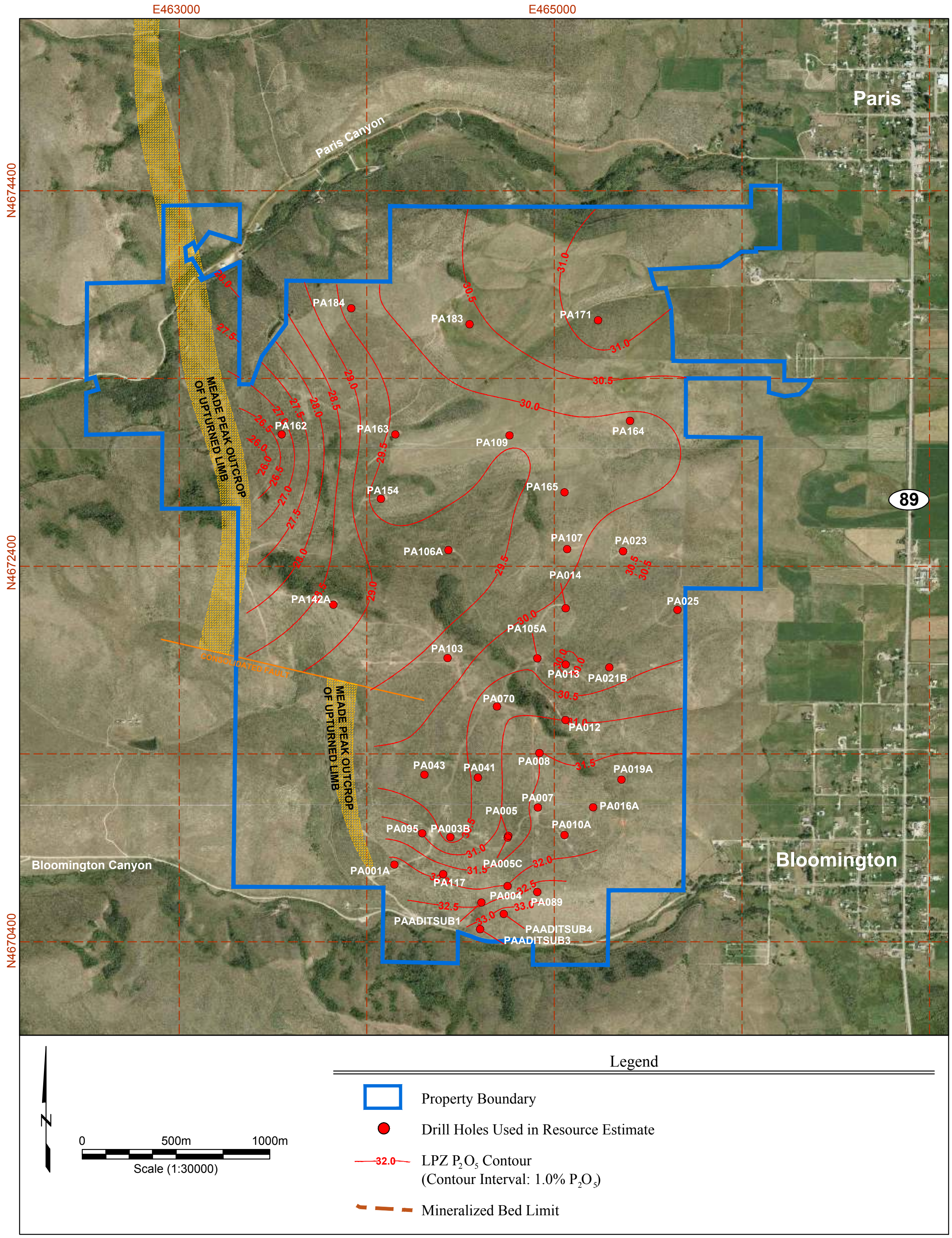
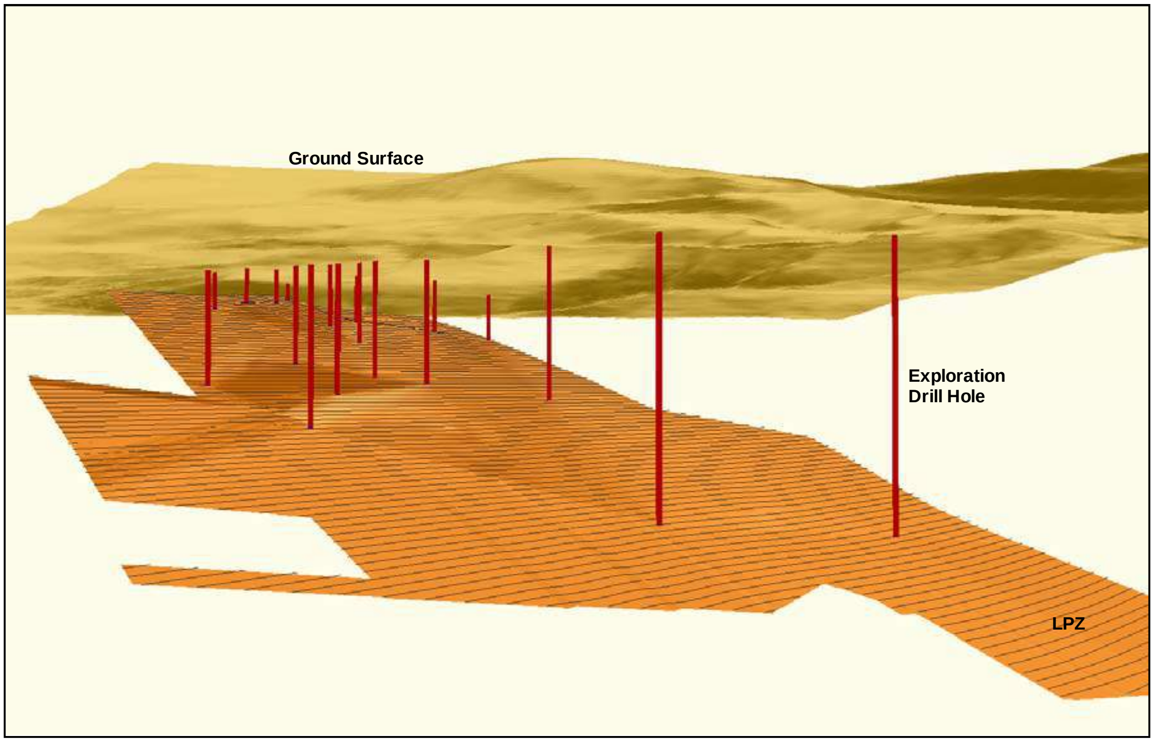


Figure 14-3. Thickness Contours—Lower Phosphate Zone

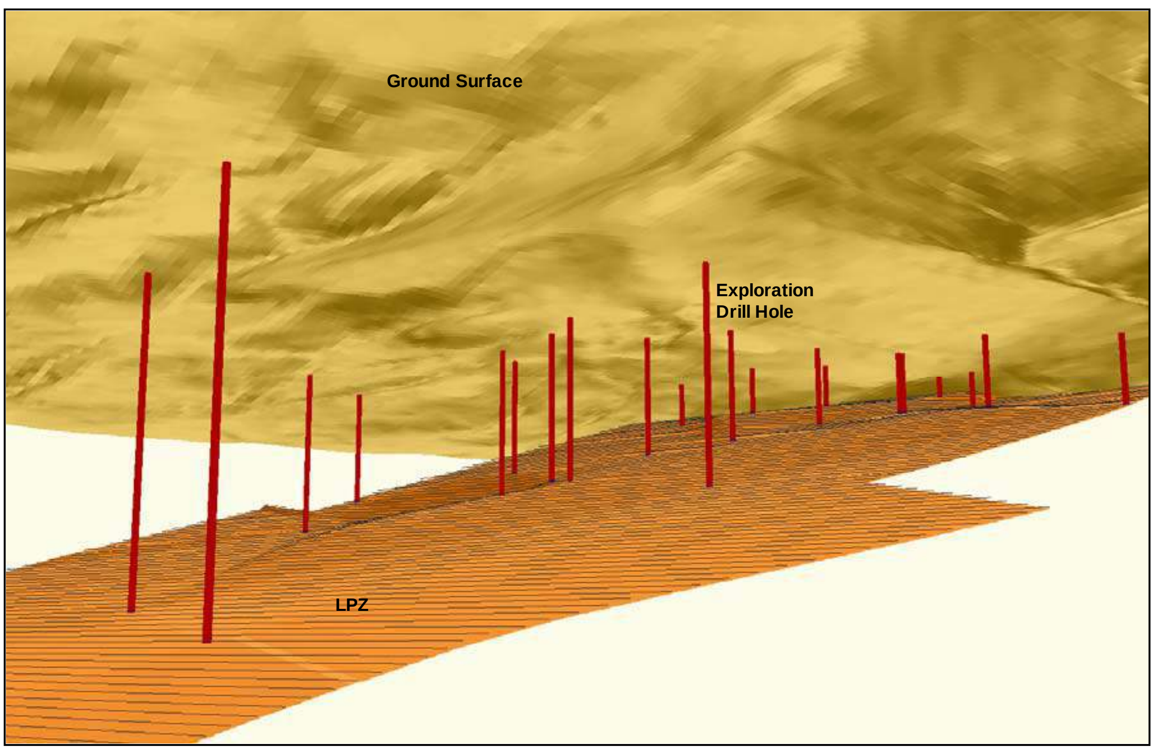


758-06 Stonegate [Stonegate - Base Map_43-101.dwg; Layout: P2O5 Contours]:smvf (1-15-2013)

Figure 14-4. P_2O_5 Grade Contours—Lower Phosphate Zone



a) Isometric Subsurface View to Southwest



b) Isometric Subsurface View Updip to Southeast

Figure 14-5. Three-Dimensional Model of Lower Phosphate Zone Horizontal Limb

14.2.2 Definitions and Applicable Standards

For this report, AAI, in accordance with NI 43-101, has used the definition of "resource" and "reserve" as published in the Canadian Institute of Mining's Definition Standards (CIMDS) on Mineral Resources and Mineral Reserves that were adopted 27 November 2010 (CIM 2010). In this standard, a **Mineral Resource** is defined as

> *… a concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base or precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.*

Mineral Resources are subdivided into classes of Measured, Indicated, and Inferred, with the level of confidence reducing with each class, respectively. Phosphate resources are reported as *in situ* tonnage and are not adjusted for mining losses or mining recovery.

A **Mineral Reserve** is defined as

> *… the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This study must include adequate information on mining, processing, metallurgical, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined. A Mineral Reserve is subdivided into two classes, "proven" and "probable," with the level of confidence reducing with each class respectively.*

The CIMDS provides for a direct relationship between Indicated Mineral Resources and Probable Mineral Reserves, and between Measured Mineral Resources and Proven Mineral Reserves. Inferred Mineral Resources cannot be combined or reported with other categories.

CIMDS states that for the reporting of industrial mineral resources and reserves, issuers are to use the above definitions. CIM provides further guidance on reporting practice under Best Practice Guidelines for Industrial Minerals adopted by CIM Council on 23 November 2003 (CIM 2003).

14.2.3 Phosphate Rock Resource Estimate

The Mineral Resource classifications applied to this resource estimate are based on the technical methodology of Sedimentary Phosphate Resource Classification System of the United States Bureau of Mines (USBM) and the USGS (Geological Survey Circular 882, 1982). The Mineral Resource calculations are compliant with CIM Best Practice Guidelines for Industrial Minerals. The resource classifications of Sedimentary Phosphate Resource Classification System (USGS 1982) are summarized as follows:

Phosphate Measured Resources—Quantity is computed from dimensions revealed by outcrops, trenches, workings, or drill holes; grade and (or) quality are computed from the results of detailed sampling. The sites for inspection, sampling, and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth, and phosphate content of the resource are well established.

Criteria for classification: The delineation of measured resources is the function of industry and often is proprietary. No criteria have been set in this paper for this resource class. The criteria generally used in industry are a sampling density of more than 64 boreholes per square mile.

Phosphate Indicated Resources—Quantity and grade and (or) quality are computed from information similar to that used for measured resources, but the sites for inspection, sampling, and measure are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for measured resources, is high enough to assume continuity between points of observation.

Criteria for classification: At least four boreholes or measured stratigraphic sections per square mile or no more than 800 m between holes.

Phosphate Inferred Resources—Estimates are based on an assumed continuity beyond measured and (or) indicated resources for which there is geologic evidence. Inferred resources may or may not be supported by samples or measurements.

Criteria for classification: At least one hole or measured stratigraphic section per square mile or no more than 1,600 m between boreholes. A greater distance between holes may be used if, in the considered judgment of the resource geologist, geologic inference allows.

The reference to “64 boreholes per square mile” (equivalent to a spacing of 200 m between holes) as an implied criterion for Measured Resources generally applies to definition drilling in advance of open pit mining. A spacing of 400 m between holes is considered sufficient for achieving the level of geologic confidence commensurate with a Measured Resource in this deposit. This is supported by a high degree of geologic continuity, relatively uniform structure in the horizontal limb, and limited grade and thickness variability in the LPZ across the Property. While seismic and drill hole data indicate the presence of some post-depositional faulting in the horizontal limb, bed continuity is evident across the faults.

Table 14-3 summarizes the resource classifications applied to the LPZ resource defined in terms of equivalent radial distance (or ROI) around a drill hole.

Table 14-4 summarizes the LPZ Mineral Resource for the Property. The resource is reported on a dry tonnage basis. Resource classification areas are shown in plan view on the map in Figure 14-6.

Table 14-3. Resource Classification Criteria Applied to the Lower Phosphate Zone

Resource Classification	Composite Grade Cutoff (% P_2O_5)	Zone Thickness Cutoff (m)	Distance from Drill Hole
Measured	24.0	0.5	Located within 200 m radius from an exploration hole
Indicated	24.0	0.5	Located between 200 m and 400 m radius from an exploration hole
Inferred	24.0	0.5	Located between 400 m and 800 m radius from an exploration hole

Table 14-4. Mineral Resource of the Lower Phosphate Zone—Horizontal Limb (Effective Date 10 December 2012)

	Average Thickness (m)	Resource Area (sq km)	In-Place Tonnes[1,2] (millions)	P_2O_5 (wt %)	Fe_2O_3 (wt %)	Al_2O_3 (wt %)	MgO (wt %)	MER	Na_2O (wt %)	K_2O (wt %)	CaO (wt %)	CaO:P_2O_5	Acid Insoluble (wt %)	Organic Carbon (wt %)
Measured	1.8	3.30	15.4	30.4	0.50	0.93	0.38	0.060	0.90	0.28	45.9	1.51	6.3	2.4
Indicated	1.7	3.27	14.4	29.6	0.49	0.83	0.49	0.061	0.85	0.26	45.9	1.55	5.8	2.9
Total M&I	**1.7**	**6.57**	**29.8**[3]	**30.0**	**0.50**	**0.88**	**0.43**	**0.061**	**0.88**	**0.27**	**45.9**	**1.53**	**6.0**	**2.7**
Inferred	1.6	1.10	4.6	29.9	0.48	0.81	0.56	0.063	0.81	0.25	45.8	1.53	5.9	3.1

1 Average *in situ* bulk density of 2.6 t/m^3.
2 Zone thickness cutoff 0.5 m, composite grade cutoff 24.0% P_2O_5, excludes OSD.
3 Mineral Resource includes Mineral Reserves

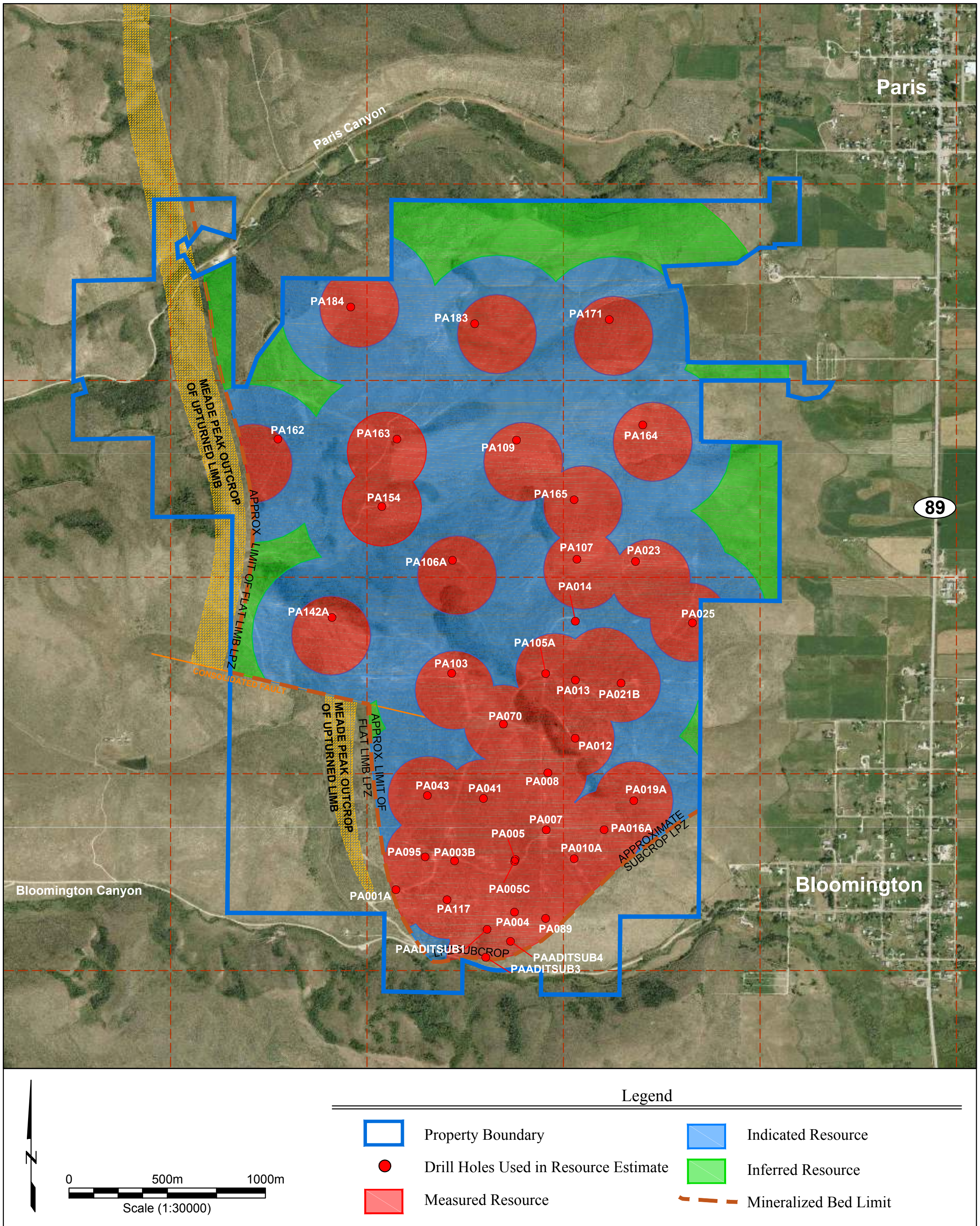
The estimated LPZ *in situ* phosphate grade and secondary quality parameters are relatively consistent over the Property and of sufficient quality for the manufacture of marketable fertilizer products. The LPZ is of high enough P_2O_5 grade, on average, to support the possibility for mining a direct ship product (without the need for beneficiation). Direct ship mining depends substantially on the ability to control OSD with underground mining and tolerance in the market for quality variances caused by OSD.

14.3 Upper Phosphate Zone—Horizontal Limb

The UPZ resource was calculated following the same methodology described for the LPZ (Item 14.2). The UPZ resource estimate is unchanged from the 15 August 2012 TR (AAI 2012b) and has an effective date of 15 August 2012. The UPZ resource is based on the 29 holes shown in Figure 14-7. Composite assays for the exploration holes applied to the resource model are summarized in Table 14-5. Modeled UPZ structure is shown in Figure 14-7.

Figure 14-8 presents the semivariograms of zone thickness and P_2O_5 grade for the UPZ drill hole composites. No significant directionality was observed in the data. The omni-directional semivariogram models developed for the resource calculation are summarized in Table 14-6. The maximum number of data points used for estimation was limited to the closest ten points within a radius of influence of 1,609 m.

Figures 14-9 and 14-10 are contour maps of the modeled thickness and P_2O_5 grade contours for the UPZ.



Notes: Drill holes are shown at surface locations. Center of resource circles are shown based on the drill hole Lower Phosphate Zone intercept. Any difference between collar location and Lower Phosphate Zone intercept is due to downhill drill hole elevation.

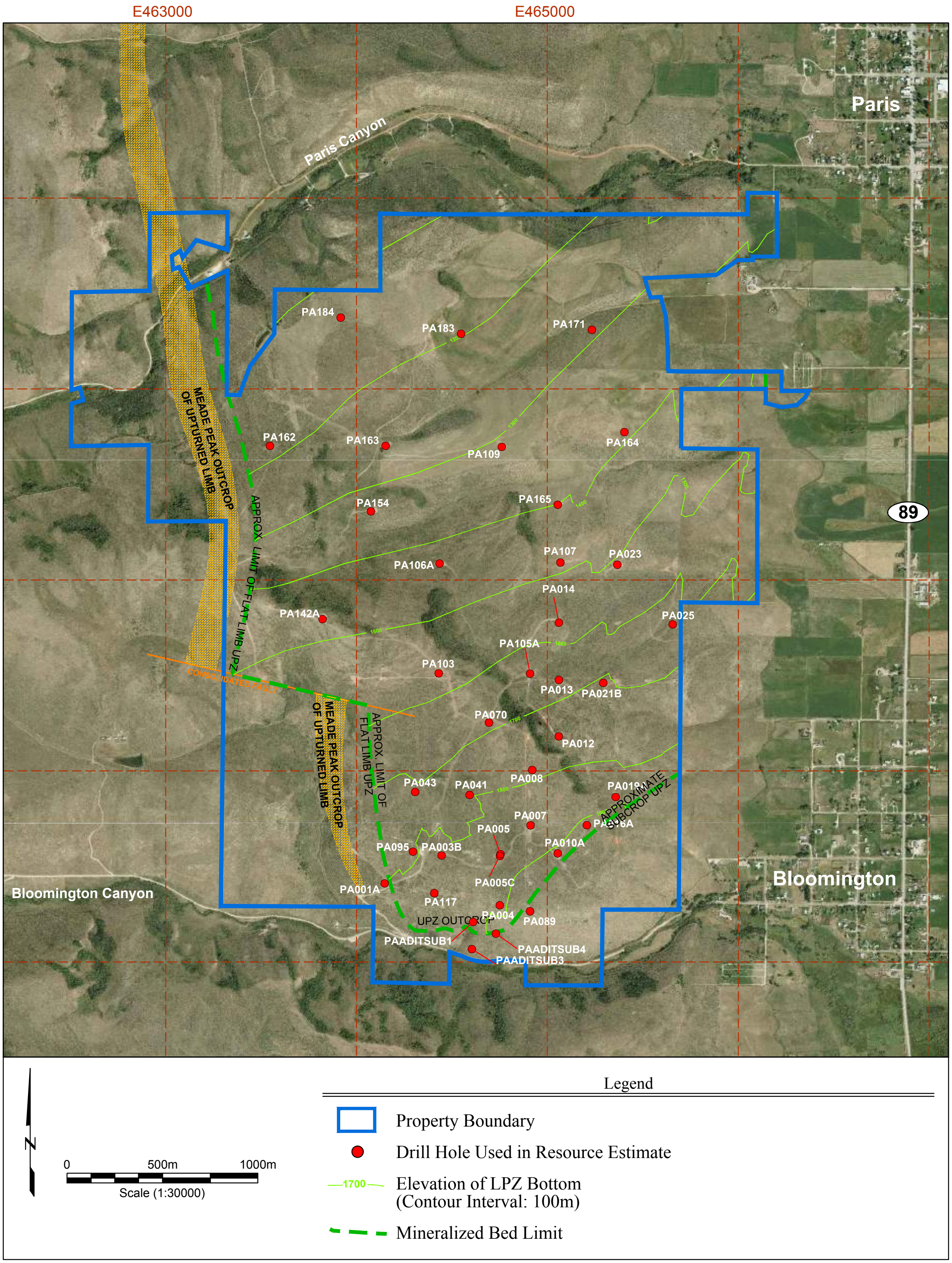
758-06 Stonegate [Stonegate - Base Map_43-101.dwg; Layout: Resource Class]:smvf (1-15-2013)

Figure 14-6. Resource Classification Areas—Lower Phosphate Zone

Table 14-5. Drill Hole Composites Used for Mineral Resource Estimation—Upper Phosphate Zone

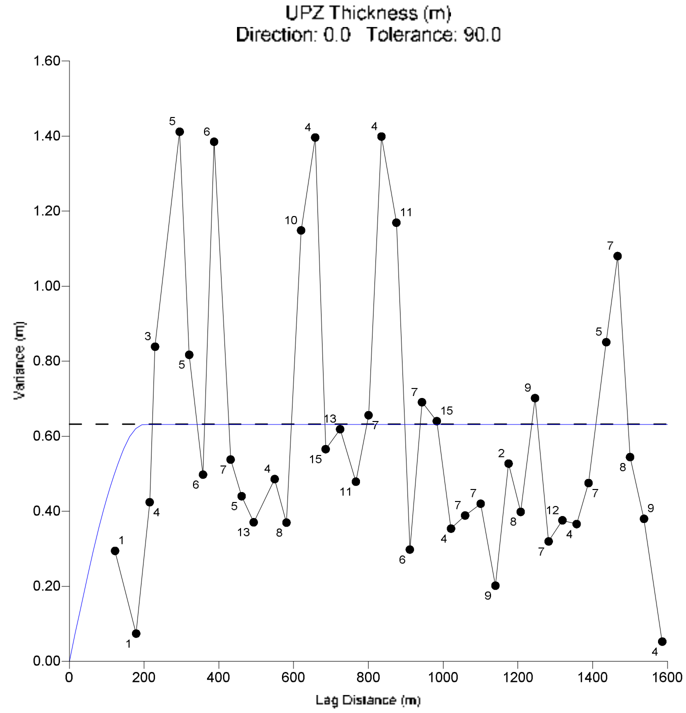
Drill Hole ID	Easting UTM NAD83†	Northing UTM NAD83†	Collar Surface Elevation (m)	True Vertical Depth UPZ Top (m)	True Vertical UPZ Thickness (m)	Core Recovery (%)	P_2O_5 (wt %)	Organic Carbon (wt %)	Acid Insoluble (wt %)	CaO (wt %)	MgO (wt %)	Fe_2O_3 (wt %)	Al_2O_3 (wt %)	Na_2O (wt %)	K_2O (wt %)	$CaO:P_2O_5$	MER
PA005C	464,751.1	4,670,955.3	1,977.2	108.6	3.87	98%	27.0	1.38	15.1	41.5	0.68	1.05	1.56	0.60	0.23	1.64	0.174
PA007	464,911.0	4,671,116.3	2,003.8	143.5	5.71	100%	21.6	4.13	13.5	40.8	1.04	0.95	1.29	0.40	0.20	2.12	0.280
PA008	464,922.9	4,671,411.8	2,024.4	237.5	3.10	99%	22.9	8.52	14.5	39.5	0.59	0.92	1.53	0.42	0.23	1.73	0.134
PA012	465,059.3	4,671,581.0	2,010.4	254.5	3.93	100%	21.6	4.71	12.2	41.7	1.42	0.92	1.33	0.39	0.22	2.73	0.529
PA013	465,059.9	4,671,876.5	1,991.4	317.1	4.11	100%	22.9	4.76	11.6	43.3	0.80	0.83	1.08	0.40	0.18	2.18	0.135
PA014	465,147.2	4,672,032.4	1,968.9	351.1	3.73	95%	23.1	4.07	9.7	44.5	0.44	0.69	0.87	0.39	0.15	2.01	0.096
PA016B	465,204.4	4,671,115.9	1,995.3	79.1	3.10	88%	31.4	0.38	14.9	41.4	0.20	0.70	2.24	0.48	0.28	1.32	0.102
PA019A	465,357.0	4,671,266.1	1,955.6	70.1	4.21	96%	29.3	0.45	17.4	41.1	0.19	1.23	2.07	0.42	0.23	1.40	0.126
PA020	465,373.5	4,671,580.2	1,951.3	220.2	2.64	99%	24.3	0.82	23.1	39.1	0.60	1.23	1.70	0.38	0.21	1.84	0.312
PA021B	465,292.3	4,671,864.7	1,959.5	246.0	2.89	97%	24.0	3.74	15.2	43.6	0.23	1.02	1.46	0.37	0.24	1.84	0.123
PA023	465,425.4	4,672,400.4	1,907.2	370.1	4.03	87%	22.5	3.79	9.4	45.0	0.47	0.65	0.90	0.40	0.15	2.07	0.094
PA024	465,670.8	4,671,869.1	1,921.7	207.2	5.16	98%	21.1	2.86	11.4	42.0	1.54	0.69	0.94	0.31	0.16	3.66	0.777
PA041	464,597.3	4,671,283.5	1,997.0	225.2	3.73	100%	21.5	3.44	12.0	41.2	0.89	0.80	1.12	0.35	0.19	2.71	0.159
PA065	464,368.5	4,671,650.8	2,020.7	380.9	5.09	98%	20.2	2.32	14.5	42.1	1.41	0.88	1.23	0.32	0.17	7.24	2.219
PA070	464,695.3	4,671,652.6	2,035.4	353.9	4.96	100%	21.1	3.15	13.3	41.1	1.77	0.85	1.18	0.33	0.17	2.09	0.241
PA095	464,296.6	4,670,979.4	1,970.7	179.8	2.99	100%	21.4	3.11	10.9	42.7	1.33	0.73	0.94	0.36	0.17	2.49	0.203
PA103	464,442.6	4,671,843.3	2,056.7	469.2	4.21	98%	22.9	3.12	12.8	41.9	1.19	0.90	1.22	0.35	0.18	2.15	0.279
PA105A	464,946.9	4,671,923.0	1,999.7	348.1	3.35	97%	22.2	3.15	12.9	41.0	0.71	0.81	1.18	0.33	0.19	1.93	0.129
PA106A	464,456.1	4,672,417.3	2,013.6	561.5	4.11	98%	22.1	3.69	13.6	40.7	1.04	0.90	1.26	0.34	0.24	1.87	0.152
PA142A	463,817.2	4,672,116.8	2,075.2	581.0	3.30	100%	21.0	2.98	9.7	42.9	1.18	0.63	0.91	0.30	0.15	2.97	0.214
PA154	464,084.6	4,672,751.5	1,998.6	652.0	3.34	98%	22.6	3.47	12.4	41.0	1.01	0.76	0.91	0.36	0.18	1.89	0.134
PA159	465,684.7	4,672,755.0	1,883.8	348.5	2.71	97%	21.9	3.58	13.7	40.4	0.50	0.87	1.27	0.30	0.21	1.91	0.118
PA162	463,434.4	4,672,992.0	2,031.6	838.3	3.19	100%	22.1	3.02	11.0	42.4	0.97	0.68	0.94	0.28	0.16	2.54	0.172
PA163	464,115.8	4,673,044.9	1,976.7	716.2	2.72	100%	24.2	3.48	12.6	41.9	0.75	0.76	0.96	0.36	0.18	1.75	0.109
PA164	465,442.9	4,673,108.0	1,909.2	499.1	3.35	99%	23.2	3.35	11.4	42.4	0.43	1.25	1.16	0.32	0.21	1.95	0.134
PA165	465,095.5	4,672,768.1	1,927.6	511.0	4.08	100%	22.1	3.19	10.4	42.5	0.69	0.69	0.94	0.31	0.17	2.36	0.126
PA171	465,252.0	4,673,639.2	1,915.0	608.5	2.70	100%	23.4	3.07	10.6	42.7	0.95	0.71	1.11	0.27	0.21	2.03	0.135
PA183	464,658.0	4,673,639.1	1,956.4	736.0	3.73	100%	22.6	3.61	12.6	42.9	0.92	0.88	1.02	0.29	0.21	3.64	0.130
PA184	463,960.4	4,673,767.9	2,012.5	868.0	3.98	100%	21.8	3.67	13.5	40.3	1.17	0.84	1.12	0.25	0.25	2.10	0.203

† Coordinates of downhole intercept of UPZ. May be different than hole collar.

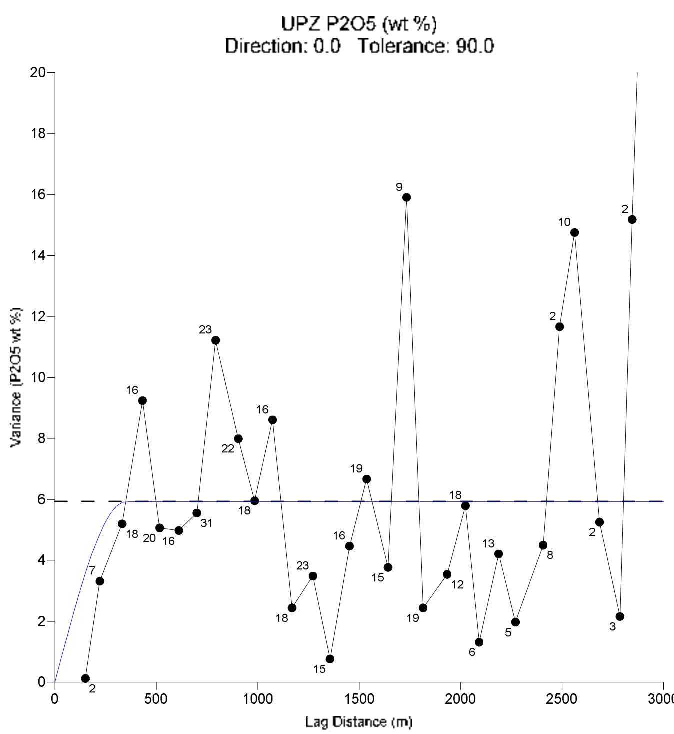


758-06 Stonegate [Stonegate - Base Map_43-101.dwg; Layout: UPZ Bottom]:smvf (1-15-2013)

Figure 14-7. Plan Map of Upper Phosphate Zone Structure and Exploration Holes



(a) Zone Thickness (m)



(b) Phosphate Grade (wt % P_2O_5)

Figure 14-8. Omni-Directional Semivariograms—Upper Phosphate Zone

Table 14-6. Resource Model Kriging Parameters—Upper Phosphate Zone

Variable	Exploration Holes Used	Semivariogram Model Type	Nugget	Scale	Range	Orientation
Zone thickness (m)	29	Spherical	0.01	0.63	200	Omni-directional
P_2O_5 grade (% wt)	29	Spherical	0.01	5.93	350	Omni-directional

Table 14-7 summarizes the resource classifications applied to the UPZ resource. The UPZ Mineral Resource is presented in Table 14-8. The corresponding resource classification areas are shown on the map in Figure 14-11.

The UPZ thickness and *in situ* quality are relatively consistent over the Property. The quality of the UPZ is not sufficient, on average, to support the possibility for mining a direct ship product and some beneficiation will be required to produce a saleable product.

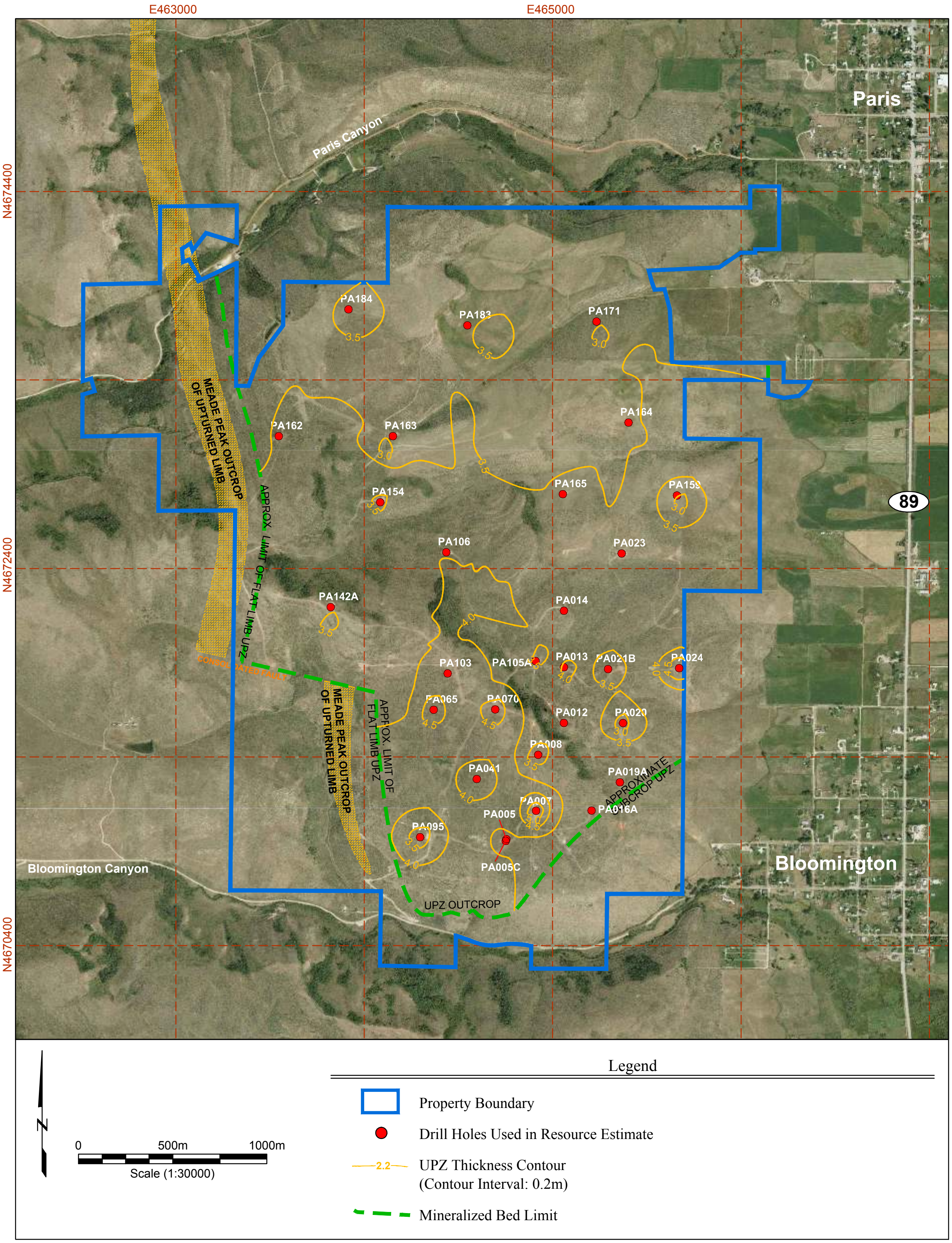
Table 14-7. Resource Classification Criteria Applied to the Upper Phosphate Zone

Resource Classification	Composite Grade Cutoff	Zone Thickness Cutoff	Distance from Drill Hole
Measured	20.0% P_2O_5	1.5 m	Located within 200-m radius from an exploration hole
Indicated	20.0% P_2O_5	1.5 m	Located between 200-m and 400-m radius from an exploration hole
Inferred	20.0% P_2O_5	1.5 m	Located between 400-m and 800-m radius from an exploration hole

Table 14-8. Mineral Resources of the Upper Phosphate Zone—Horizontal Limb (Effective Date 15 August 2012)

	Average Thickness (m)	Resource Area (km^2)	In-Place Tonnes†,‡ (millions)	P_2O_5 (wt %)	Fe_2O_3 (wt %)	Al_2O_3 (wt %)	MgO (wt %)	MER	Na_2O (wt %)	K_2O (wt %)	CaO (wt %)	CaO:P_2O_5	Acid Insoluble (wt %)	Organic Carbon (wt %)
MEASURED	3.8	2.92	28.4	22.8	0.85	1.20	0.88	0.129	0.35	0.20	41.8	2.36	12.8	3.4
INDICATED	3.7	3.34	31.8	22.6	0.82	1.09	0.90	0.125	0.33	0.19	42.0	2.40	12.2	3.4
TOTAL M&I	**3.7**	**6.26**	**60.3**	**22.7**	**0.84**	**1.14**	**0.89**	**0.127**	**0.34**	**0.20**	**41.9**	**2.38**	**12.5**	**3.4**
INFERRED	3.5	1.05	9.4	22.6	0.82	1.07	0.87	0.122	0.30	0.20	42.1	2.38	11.9	3.4

† Average *in situ* bulk density of 2.6 t/m^3.
‡ Zone thickness cutoff 1.5 m, composite grade cutoff 20.0% P_2O_5, excludes out-of-seam dilution.



758-06 Stonegate [Stonegate - Base Map_43-101.dwg; Layout: Thk_UPZ]:smvf (1-15-2013)

Figure 14-9. Thickness Contours—Upper Phosphate Zone

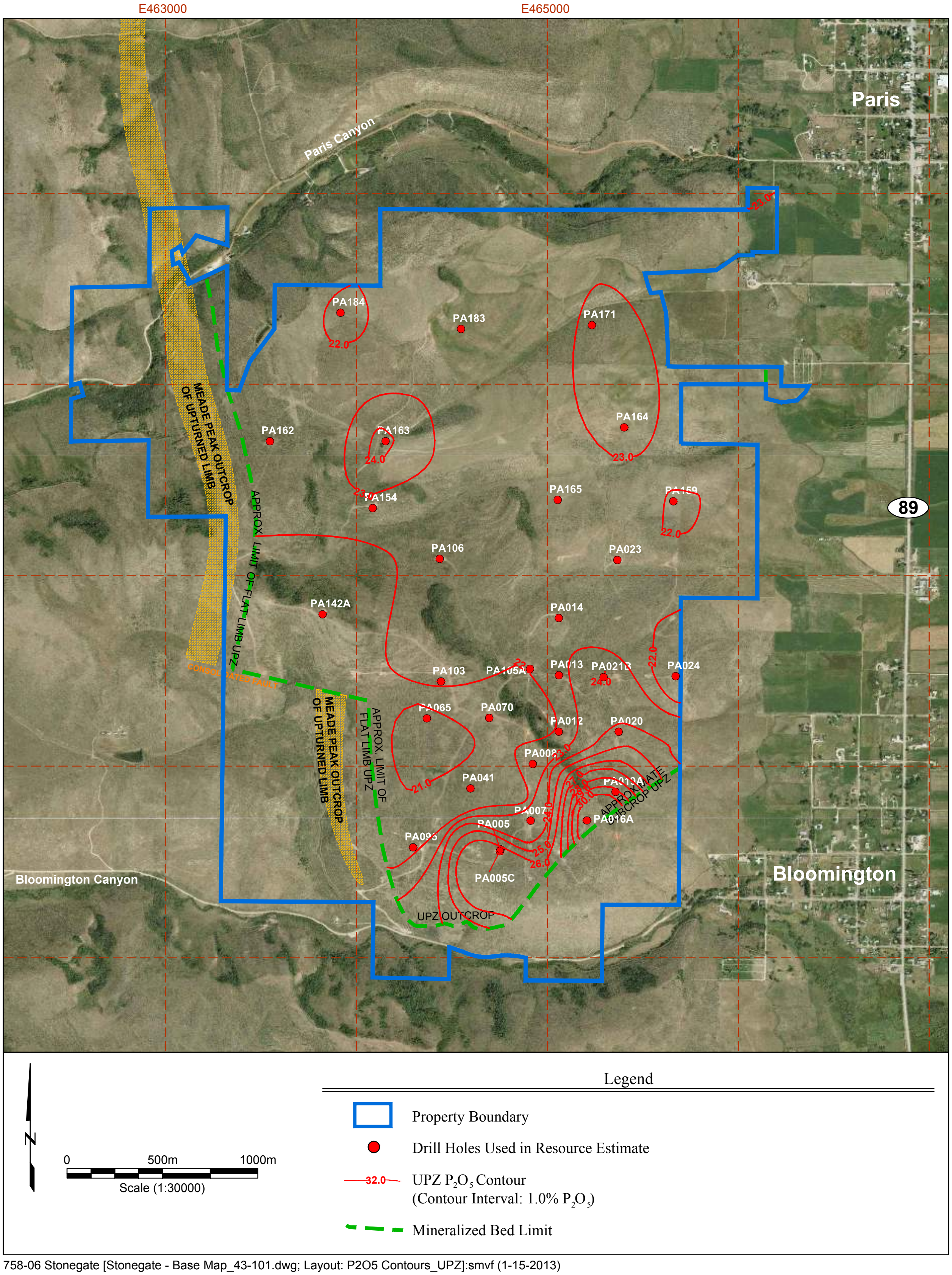
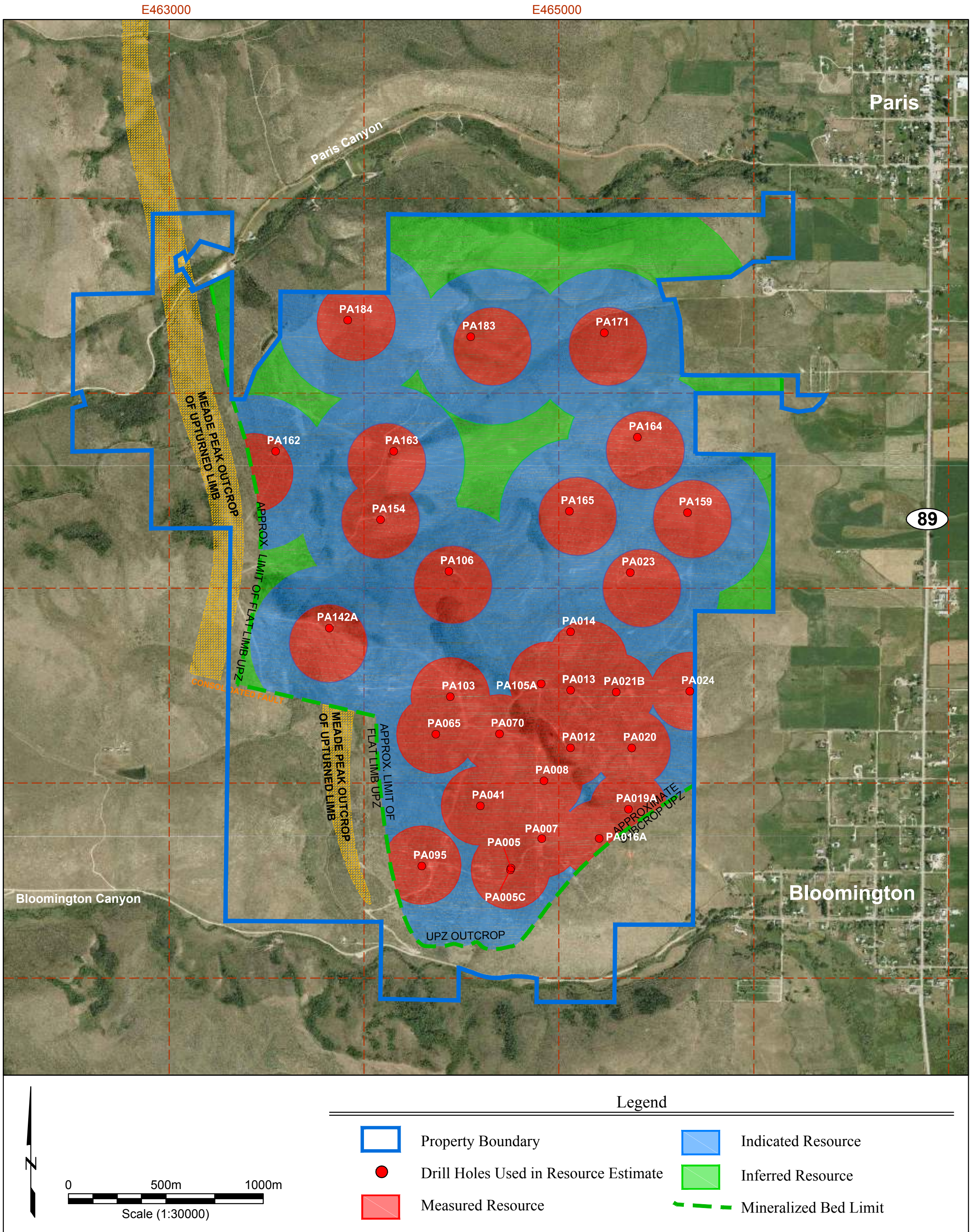


Figure 14-10. P_2O_5 Grade Contours—Upper Phosphate Zone



Notes: Drill holes are shown at surface locations. Center of resource circles are shown based on the drill hole Upper Phosphate Zone intercept. Any difference between collar location and Upper Phosphate Zone intercept is due to downhill drill hole elevation.

758-06 Stonegate [Stonegate - Base Map_43-101.dwg; Layout: Resource Class_UPZ]:smvf (1-15-2013)

Figure 14-11. Resource Classification Areas—Upper Phosphate Zone

14.4 Lower Phosphate Zone—Upturned Limb

The upturned limb is expected to contain significant phosphate mineralization. However, insufficient exploration information is available to support the estimation of a Mineral Resource. Three historical trench samples along the outcrop in Little and Paris Canyons confirm the persistence of the LPZ in the upturned limb. No drill holes penetrate the upturned limb. Seismic analysis to date has produced no useful information about the geometry of the upturned limb. The degree of structural deformation, geometry of folding, and impacts to the character and mineability of the LPZ at depth and updip are not adequately understood. In the opinion of the QPs, these unknowns introduce sufficient geologic uncertainty to preclude estimating a Mineral Resource, particularly to the north where the upturned limb reaches depths of more than 1,000 m.

Expectations are that the mineralized beds of interest persist through the upturned limb. An estimate of potential mineralization is made based on the character of the mineralization in the adjacent horizontal limb and the estimated geometry of the upturned limb. The LPZ is projected to contain between 7 and 10 Mt of phosphate mineralization over its approximately 3-km strike length across the Property. The tonnage range accounts for potential thinning or thickening of the LPZ due to structural deformation, as well as a range of folding possibilities from upright to overturned. The average grade is projected to range between 28.0% and 32.0% P_2O_5, similar to that in the horizontal limb and assuming a 28.0% P_2O_5 composite cutoff. Localized enrichment from weathering effects is likely near the outcrop.

Table 14-9 summarizes the projected LPZ Exploration Target in the upturned limb. Actual tonnes and grade could be more or less than projected because of the recognized geologic uncertainties.

Table 14-9. Lower Phosphate Zone—Upturned Limb Exploration Target

P_2O_5 Cutoff (wt %)	In-Place Tonnes (millions)	P_2O_5 (wt %)
24.0	7 to 10	28.0 to 32.0

The reader is cautioned that the potential quantity and grade of the LPZ-Upturned Limb Exploration Target is conceptual in nature and there has been insufficient exploration to define it as a Mineral Resource, and it is uncertain if further exploration will result in the determination of a Mineral Resource under NI 43-101. The Exploration Target is not being reported as part of any Mineral Resource or Mineral Reserve.

14.5 Upper Phosphate Zone—Upturned Limb

Like the LPZ, the UPZ is anticipated to persist in the upturned limb. The UPZ Exploration Target in the upturned limb is projected to contain between 14 and 20 million tonnes (Mt) of phosphate mineralization averaging between 21.0% and 25.0% P_2O_5, assuming a 20% P_2O_5 cutoff. Table 14-10 summarizes the UPZ Exploration Target. The ranges of the estimate

Table 14-10. Upper Phosphate Zone—Upturned Limb Exploration Target

P_2O_5 Cutoff (wt %)	In-Place Tonnes (millions)	P_2O_5 (wt %)
20.0	14 to 20	21.0 to 25.0

reflect uncertainty associated with key assumptions, including the geometry and potential for economic extraction in the upturned limb, possible variability of laboratory measurements, density, and possible dilution introduced by RC drilling.

The reader is cautioned that the potential quantity and grade of the UPZ Exploration Target is conceptual in nature and there has been insufficient exploration to define it as a Mineral Resource, and it is uncertain if further exploration will result in the determination of a Mineral Resource under NI 43-101. The Exploration Target is not being reported as part of any Mineral Resource or Mineral Reserve.

14.6 Vanadium Zone

The QPs consider there to be significant vanadium and phosphate mineralization contained in the VZ. The VZ was not targeted for exploration or coring as part of PHA's 2011 exploration program, although extensive drilling and limited test mining in the VZ was conducted historically by others. The historical VZ exploration data are considered unreliable for use in estimating an NI 43-101 compliant Mineral Resource.

AMEC (2010) estimated that the VZ contains on the order of 39.9 Mt of mineralization averaging 0.79% V_2O_5 and 9.7% P_2O_5 in the horizontal and upturned limbs combined, assuming a 0.50% V_2O_5 cutoff. The QPs consider the estimate sufficient for use as the basis of an Exploration Target.

The VZ Exploration Target, including the horizontal and upturned limbs, is projected to contain between 32 and 44 Mt of phosphate mineralization averaging between 0.70% and 0.80% V_2O_5 and 8.0% and 11.0% P_2O_5, assuming a 0.50% V_2O_5 cutoff. Table 14-11 summarizes the VZ Exploration Target.

Table 14-11. Vanadium Zone Exploration Target

V_2O_5 Cutoff (wt %)	In-Place Tonnes (millions)	V_2O_5 (wt %)	P_2O_5 (wt %)
0.50	32 to 44	0.70 to 0.80	8.0 to 11.0

The reader is cautioned that the potential quantity and grade of the VZ Exploration Target is conceptual in nature and there has been insufficient exploration to define it as a Mineral Resource, and it is uncertain if further exploration will result in the determination of a Mineral Resource under NI 43-101. The Exploration Target is not being reported as part of any Mineral Resource or Mineral Reserve.

15.0 MINERAL RESERVE ESTIMATES

A Feasibility Study (FS) for room-and-pillar mining in the horizontal limb of the Lower Phosphate Zone (LPZ) at the Paris Hills Phosphate Project (the Property) was completed by Stonegate Agricom Ltd. (Stonegate) in accordance with National Instrument (NI) 43-101 standards and Canadian Institute of Mining's Definition Standards (CIMDS) FS definition. The methodology used was to determine a suitable mining method based on deposit type, geologic structure, ore zone thickness and ore grade, equipment types, and marketing requirements.

The Mineral Reserves stated in this Technical Report (TR) are based on the FS completed in December 2012. The Mineral Reserve estimate for the LPZ has an effective date of 10 December 2012.

The base case mining method selected is the room-and-pillar method, with partial pillar extraction,[6] similar to coal, trona, and potash mining. This method has the highest chance to develop an underground mine with the productivity and grade control necessary to direct ship crushed run-of-mine (ROM) ore (phosphate rock concentrate) at capital and operating cost necessary to make the project economic. This mining method fits the following parameters:

- Geologic type — Moderate (some faulting)
- Deposit type — Underground mining
- Seam dip — 7 degrees (°) to 22°
- Minimum mining height — 1.5 meters (m) (equipment constrained)
- Product — Crushed ROM phosphate rock concentrate

Mine projections were developed based on the deposit parameters, geotechnical analysis, and equipment constraints. Production scheduling and ore grade determination were modeled using Carlson Mining 2013's Underground Mining Module (Carlson 2013). Carlson, historically referred to as SurvCADD™, is the predominate mine planning software used by US underground operators in bedded seam deposits, including coal and trona, and is well suited for planning in the horizontal limb of the Paris Hills Agricom Inc. (PHA) phosphate deposit.

Mine projections were developed in AutoCAD 2013™ based on the LPZ resource model grids discussed in Item 14. The resource model grids describe true bed thickness, elevation, depth of cover, dip, and the following quality parameters: phosphorus pentoxide (P_2O_5), iron/ferric oxide (Fe_2O_3), aluminum oxide (Al_2O_3), magnesium oxide (MgO), potassium oxide (K_2O), calcium oxide (CaO), CaO/P_2O_5, sodium oxide (Na_2O), minor element ratio (MER), acid insolubles, and organic carbon content.

The mine layout was limited to Measured & Indicated (M&I) Mineral Resources in accordance with the definition of Mineral Reserves under NI 43-101. Mining was constrained by the property boundary, the projected western limit of the horizontal limb, outcrop and subcrop locations along Bloomington Canyon, and major fault projections. Mining within the M&I Resources area was additionally constrained by low ore grade areas and thin LPZ bed

[6] Also called retreat mining, second mining, pillar extraction, and depillaring.

thickness areas, particularly those areas influenced by drill holes PA162 and PA164. The mine projections are shown in Figure 15-1.

Mine timing was developed in Carlson based on bed volumetrics, production rates at each miner (unit) section, work schedules, and recovery factors for primary and secondary mining. Each miner section was scheduled by year for the life of the mine.

Production data from the Carlson model were compiled and post-processed in an Excel spreadsheet. Out-of-seam dilution (OSD) was calculated based on bed thickness and a minimum mining height of 1.5 m. Dilution tonnes considered the cross-dip of the entries on a grid cell by grid cell basis, relative to the maximum inclined working angle of the mining equipment (8.5°). Except for the thicker areas, some mining of the roof and floor is required in the corners of each entry. The bed cross-dip versus equipment limit angle effect on dilution is illustrated in Figure 15-2.

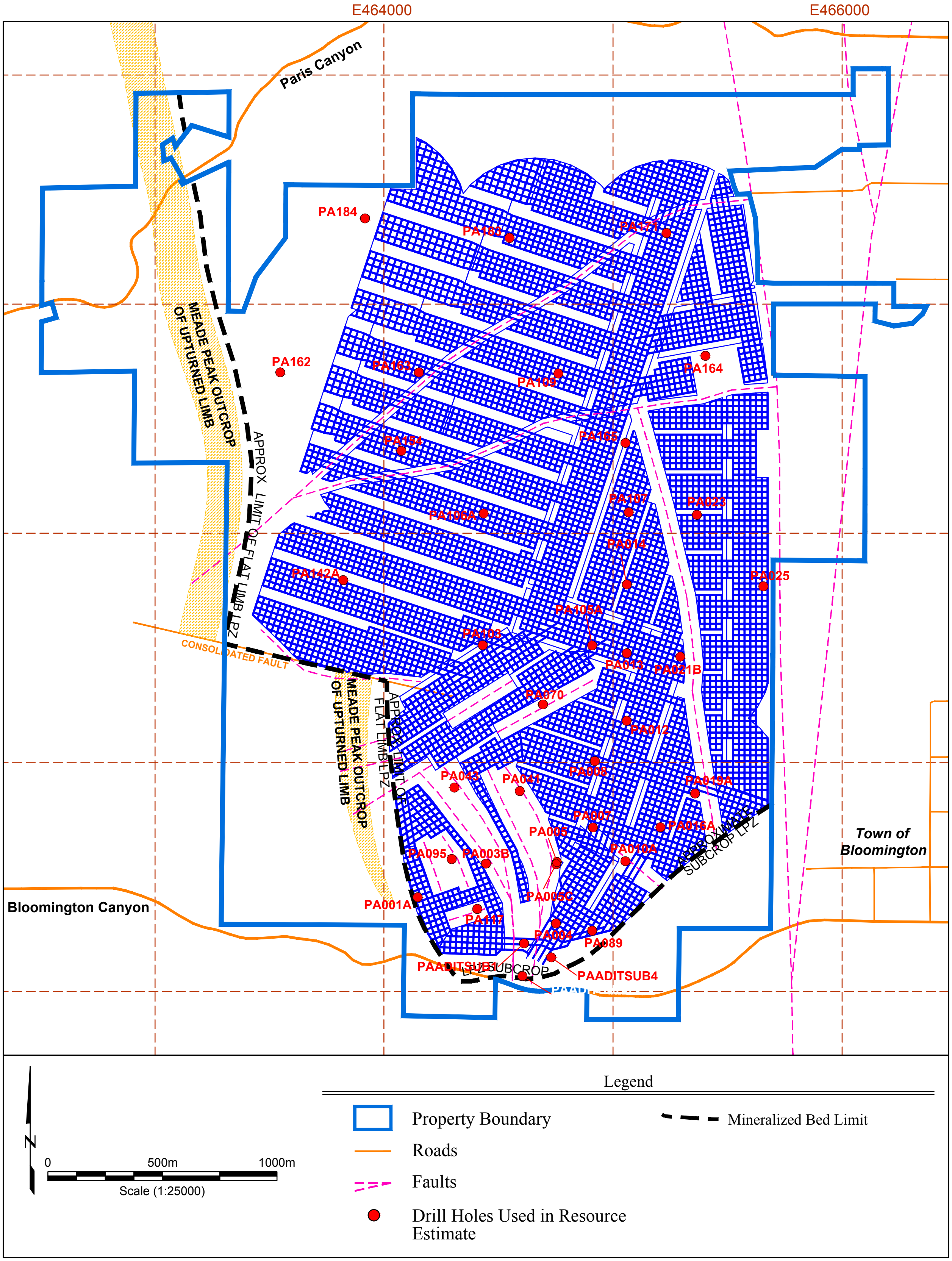
The bed cross-dip versus equipment limit angle impacts the amount of dilution in the ROM ore. An algorithm was developed in Excel to compute the optimal geometry of mining for maximizing grade and tonnes based on the grade of the immediate roof and floor. An additional 0.15 m of roof material was assumed to be cut out or to fall out, on average, from above the miner cut before the installation of roof support based on anticipated weak roof conditions. The final head grade and mined tonnes were calculated as the mixture of rock cut in-seam and out-of-seam, and fallout from the roof.

Results were summarized in the form of monthly, annual, and life-of-mine production for economic analysis.

Mine tonnage, timing, and ore grade were determined, a capital and operating cost budget was prepared, and a pre-tax and after-tax cash flow analysis was conducted to determine economics. A marketing study was commissioned by PHA for the Preliminary Feasibility Study (PFS) and was updated for the FS by PHA, as summarized in Item 19. In addition, project environmental and permitting requirements were identified (Item 20) and preliminary geotechnical and hydrologic studies were conducted (Item 24).

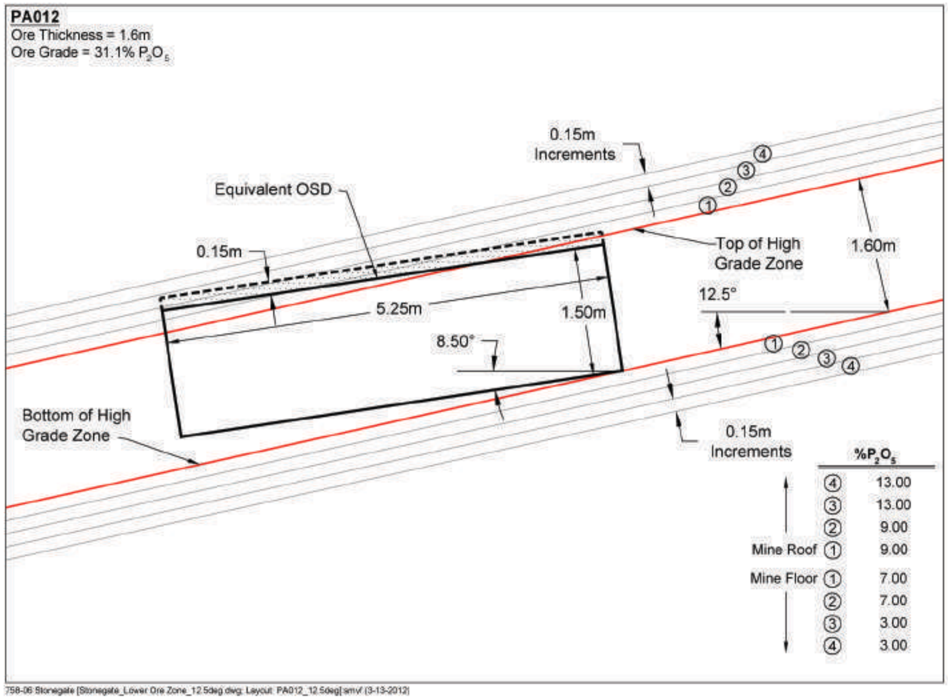
Table 15-1 states the M&I tonnage converted to Proven and Probable Reserve tonnage. No Inferred tonnes are included in the M&I tonnes or Proven and Probable Reserves. See Figure 14-7 for the Measured and Indicated Resource areas that were converted to Proven and Probable Reserves. Figure 15-3 shows the mine projections, surface topography, and depth of cover for the underground mine. Figure 15-4 shows the LPZ thickness and P_2O_5 grade (core hole, undiluted).

The retreat mine plan achieves a global LPZ volumetric extraction ratio within the mine footprint of 58.4 percent (%), excluding OSD. Within the mine footprint, 3.7 million tonnes (Mt) of LPZ are left unmined as protective barriers along faults. Excluding the fault barriers, the volumetric extraction ratio of the remainder of the mine rises to 67.7%, based on 7.5 Mt of LPZ left unmined in the roof and floor due to entry slope, unmined production pillars, remnant pillar stumps left in retreated sections, and permanent mains and interpanel barriers.

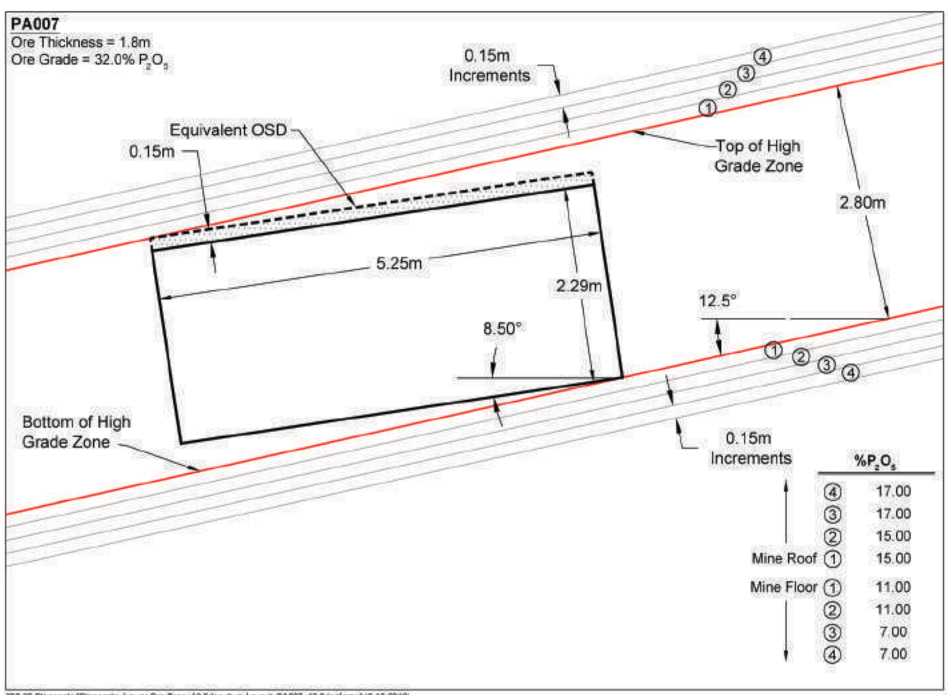


758-06 Stonegate [Stonegate - Base Map_43-101.dwg; Layout: Mine Projections_TR]:smvf (1-18-2013)

Figure 15-1. Mine Projections



(a) Core Hole PA012



(b) Core Hole PA007

Figure 15-2. Cross-Slope Entry Diagram

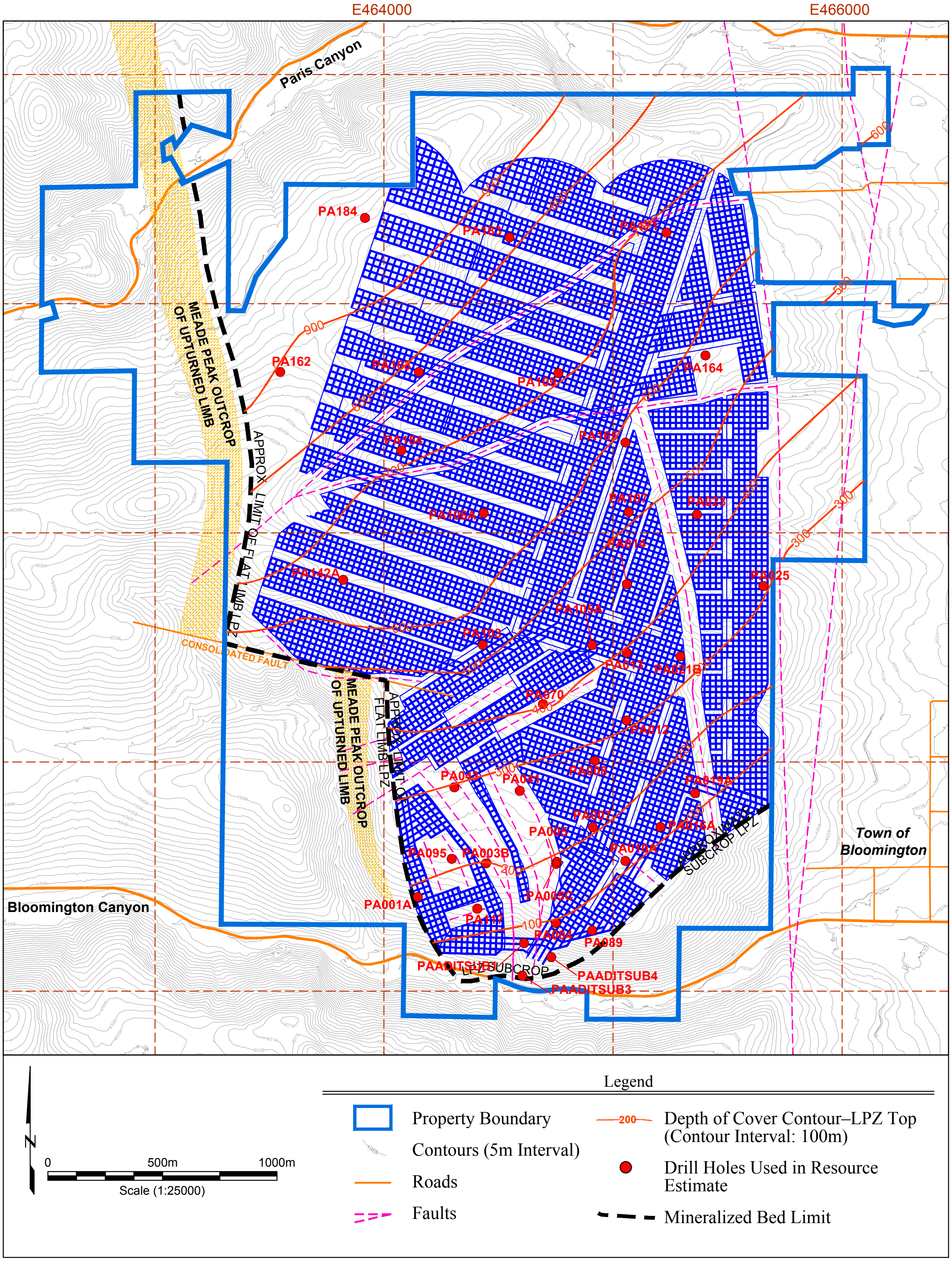


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Figure 15-3. Mine Projections—Depth of Cover and Surface Topography

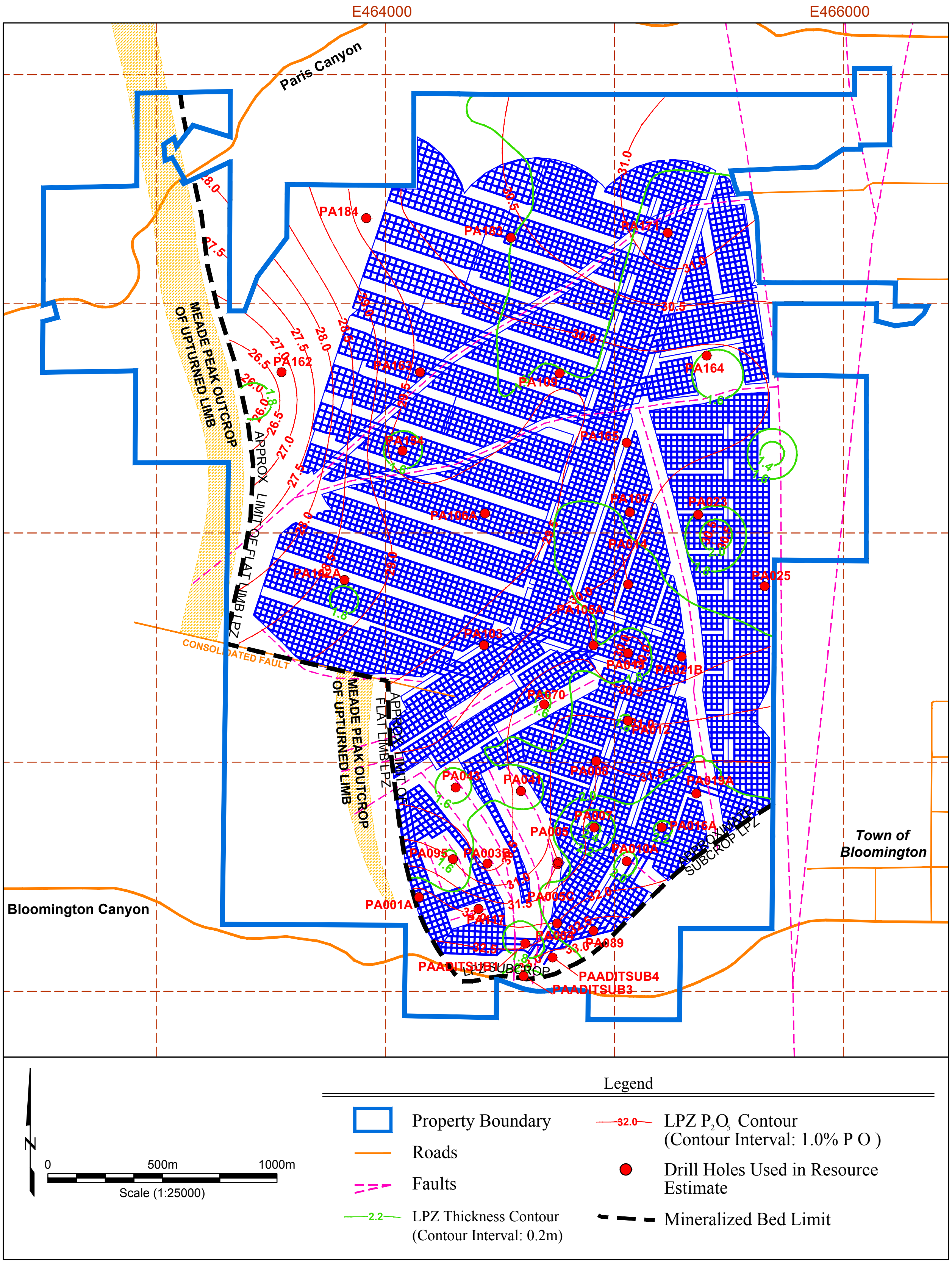


Figure 15-4. Mine Projections—Lower Phosphate Zone Thickness and P_2O_5 Grade, Undiluted

Table 15-1. Mineral Reserve of the Lower Phosphate Zone—Horizontal Limb (Effective Date 10 December 2012)

	Tonnes †, ‡ (millions)	Mining Thickness (m)	Grade (wt %)	Fe_2O_3 Grade (wt %)	Al_2O_3 Grade (wt %)	MgO Grade (wt %)	MER	Na_2O Grade (wt %)	K_2O Grade (wt %)	CaO Grade (wt %)	CaO/P_2O_5 Ratio	Acid Insoluble (wt %)	Organic Carbon (wt %)
Proven	7,956,329	1.57	29.89	0.53	0.95	0.41	0.06	0.89	0.29	45.53	1.52	6.70	2.46
Probable	8,747,371	1.55	29.20	0.53	0.87	0.50	0.07	0.84	0.27	45.54	1.56	6.50	2.91
Reserves	**16,703,700**	**1.56**	**29.53**	**0.53**	**0.91**	**0.46**	**0.06**	**0.86**	**0.28**	**45.54**	**1.54**	**6.59**	**2.69**

† Average *in situ* bulk density of 2.6 t/m^3.

‡ Minimum mining height of 1.5 m + 0.15 m dilution.

Various risks are associated with mining the Reserves which are independent of geologic confidence. Mineral Reserves could be adversely affected by mining conditions, notably steep dip, weak strata, and groundwater inflows. Ore grade could be adversely affected by mining conditions and continuous miner operator differentiation of LPZ vertical extents. Permitting delays would adversely impact the project implementation schedule but should not impact Mineral Reserves. Legal challenges to United States Bureau of Land Management (BLM) leasing could reduce available Mineral Reserves. Reduced productivity would increase operating and capital costs, adversely affecting Project economics. Unfavorable court decisions on permit challenges could result in not receiving necessary permits.

The Qualified Person (QP) has reviewed the FS and is satisfied that the CIMDS' modifying factors have been adequately addressed; therefore, all measured tonnes are presently classified as Proven tonnes.

16.0 MINING METHODS

The December 2012 Feasibility Study (FS) is based on underground room-and-pillar mining with partial pillar extraction in the Lower Phosphate Zone (LPZ). This mining method was selected because the LPZ is a tabular, strata-bound deposit, suitable for mining by heavy-duty type coal mining equipment in the LPZ ore bed with bed thickness averaging about 1.6 meters (m).

The underground mine will use the room-and-pillar mining method with partial pillar extraction. Pillars will be sized for 25-m centers to a depth of 850 m and 29-m centers beyond 850 m deep to a maximum depth of 1,100 m. The mine will feature drum-type continuous miners, shuttle cars, roof-bolting machines, feeder-breakers, and mobile roof supports (MRS) for production equipment. At full production, a total of six continuous miners will be employed in three supersections on development and retreat pillar splits. Three of the continuous miners will function as single sections when pillaring.

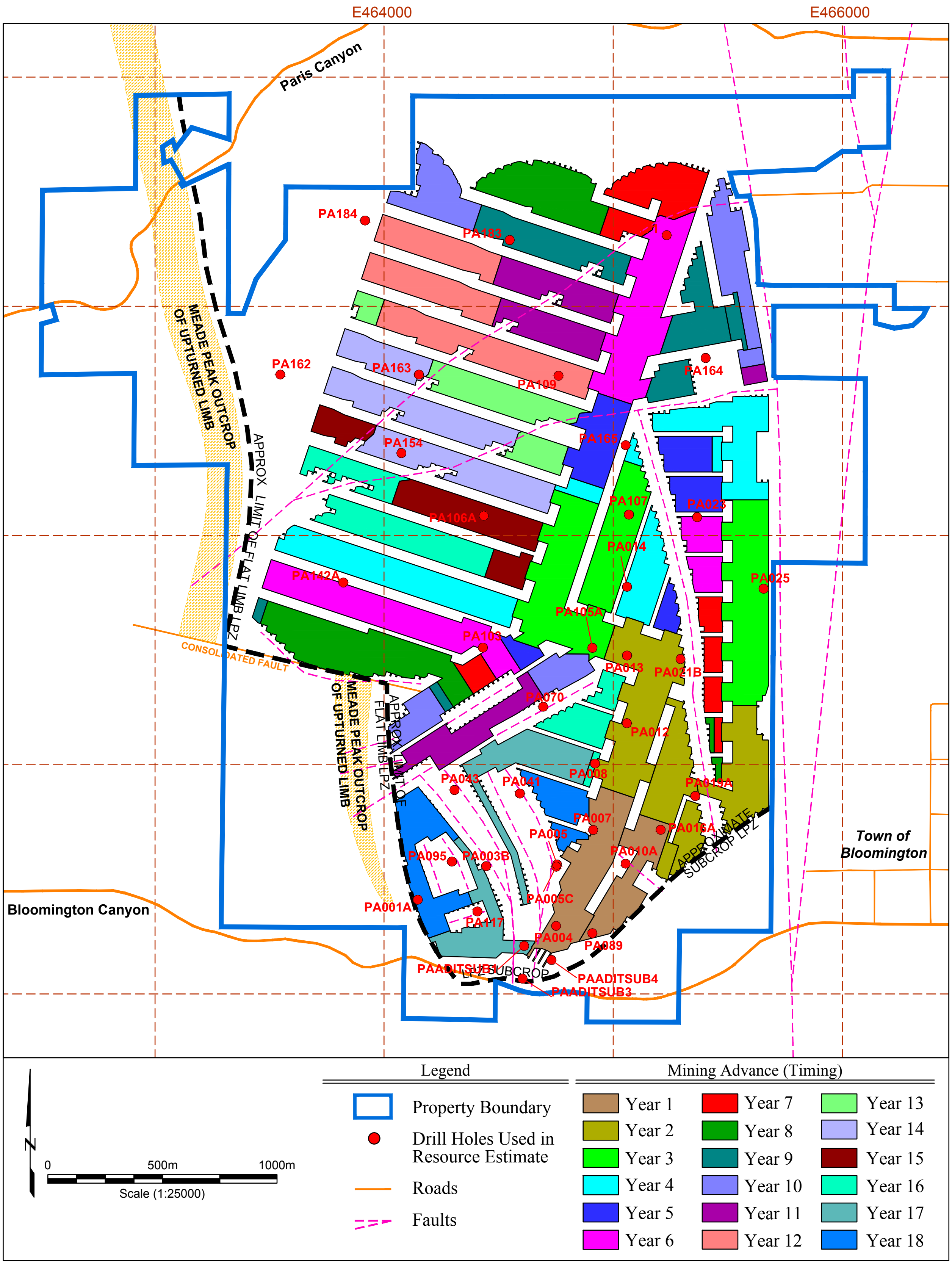
The annual production is targeted at a nominal 1.0-million tonnes per annum (Mtpa) design mining rate. Underground ore haulage is by 1.2-m-width belt conveyors. Electrical power for the underground mine is provided by a 12,470-volt (V) distribution system, with appropriate step-down transformers located throughout the mine workings for the mobile and stationary electrically powered equipment. Mine drainage water (MDW) will be pumped to the surface and treated prior to reuse or injection via wells.

The ramp-up of mining production will take 2 years to reach the designed production rate. There will be 2 years of site development prior to initiating phosphate rock production. The mine life is estimated to be 19 years, producing a total of 16.7 million tonnes (Mt) of phosphate rock ore at an average grade of 29.5 percent (%) phosphorus pentoxide (P_2O_5) (diluted). Figure 16-1 shows the mine schedule for advance mining, and Figure 16-2 shows the mine schedule for retreat operations. Table 16-1 summarizes production and ore grades by year.

Geotechnical analysis indicates that mine ground support can be achieved with resin-anchored rockbolts, metal straps, and wire mesh. Supplemental support can be provided with cable bolts, trusses, timbers, and cribs. Steel sets may be needed for limited areas in long-life entries.

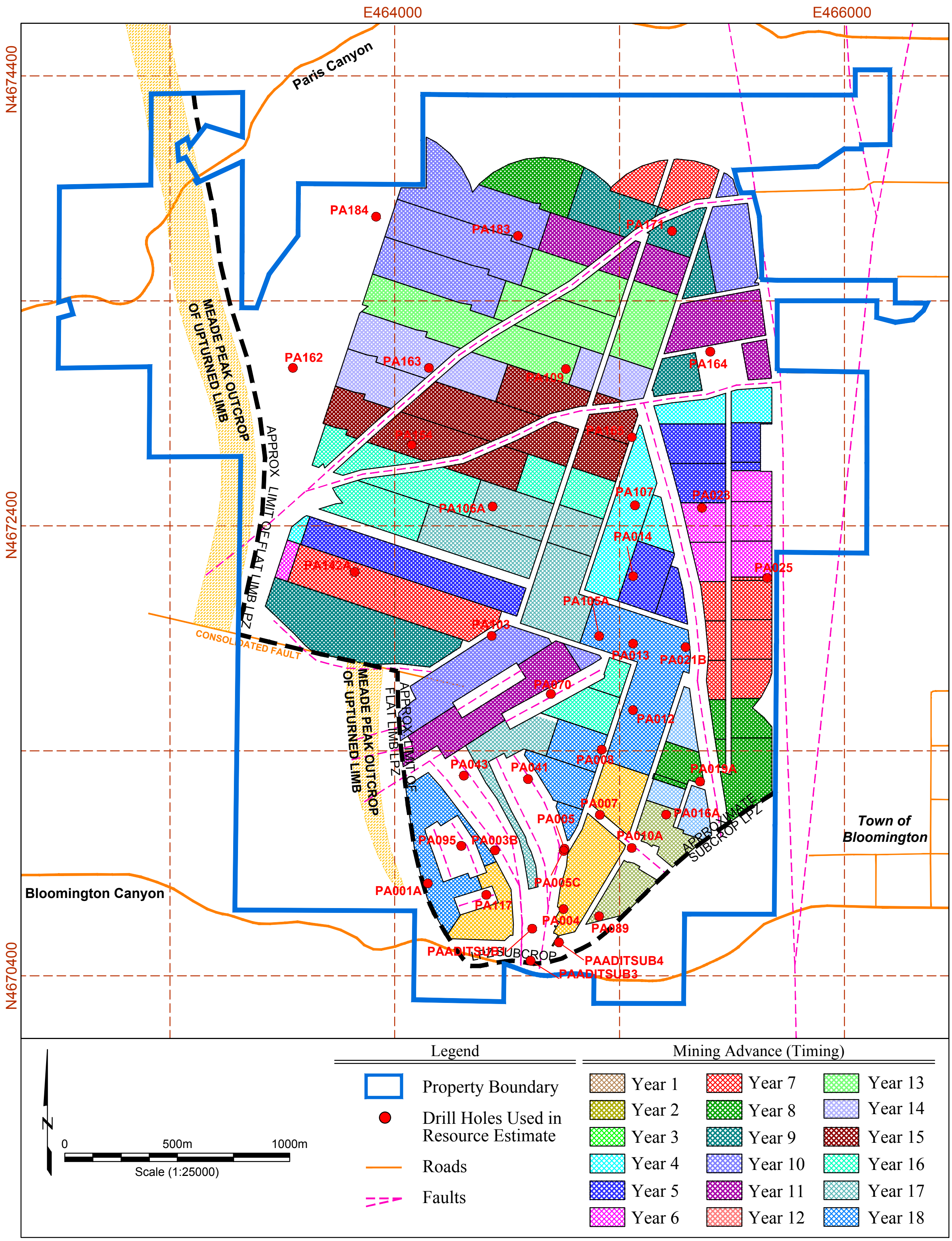
Groundwater hydrologic analysis indicates that dewatering in advance of mining will be required at rates up to 1,043 liters per second (lps). This water will be direct injected into the aquifer away from the mine site to prevent returning inflows, as described in Item 24.0.

Mining dilution factors include 0.15 m of out-of-seam dilution (OSD) when the LPZ thickness is less than approximately 2 m. Below this bed thickness, the targeted mining height will be 1.5 m. Above about 2 m, the minimum mining height will be increased so that the mining height plus 0.15 of OSD will still be less than or equal to the LPZ height, which prevents falling material from diluting the mined material.



758-06 Stonegate [Stonegate - Base Map_43-101.dwg; Layout: Timing_Advance_TR]:smvf (1-23-2013)

Figure 16-1. Mine Schedule—Advance



758-06 Stonegate [Stonegate - Base Map_43-101.dwg; Layout: Timing_Retreat_TR]:smvf (1-23-2013)

Figure 16-2. Mine Schedule—Retreat

Table 16-1. Annual Phosphate Rock Production and Quality

Project Year	Ore Production (tonnes)	Thickness (m)	Quality P_2O_5 (wt %)	Fe_2O_3 (wt %)	Al_2O_3 (wt %)	MgO (wt %)	MER	Na_2O (wt %)	K_2O (wt %)	CaO (wt %)	CaO/P_2O_5 Ratio	Acid Insoluble	Organic Carbon
1	318,872	1.6	31.84	0.48	1.23	0.25	0.061	0.90	0.34	46.03	1.45	7.87	0.86
2	740,097	1.5	30.76	0.50	1.18	0.31	0.065	1.00	0.32	45.71	1.49	7.10	1.51
3	885,428	1.6	29.96	0.52	0.97	0.32	0.060	0.95	0.29	45.31	1.51	6.53	2.43
4	916,260	1.5	28.46	0.57	0.90	0.57	0.072	0.91	0.28	44.68	1.57	7.41	2.97
5	986,810	1.5	28.62	0.56	0.90	0.48	0.068	0.90	0.28	45.03	1.57	7.04	2.98
6	902,858	1.5	29.34	0.49	0.90	0.39	0.061	0.90	0.28	45.53	1.55	6.61	3.05
7	999,153	1.6	29.68	0.52	0.87	0.36	0.059	0.88	0.27	46.07	1.55	6.27	2.90
8	941,867	1.5	29.58	0.49	0.92	0.50	0.065	0.86	0.27	46.19	1.56	6.76	2.50
9	970,639	1.5	29.40	0.53	0.85	0.50	0.064	0.80	0.26	46.15	1.57	6.62	3.02
10	1,019,776	1.6	29.73	0.52	0.86	0.49	0.063	0.83	0.26	45.45	1.53	6.76	2.99
11	926,500	1.6	29.70	0.54	0.86	0.45	0.062	0.81	0.27	45.64	1.54	6.45	3.00
12	1,005,129	1.6	29.64	0.48	0.78	0.50	0.059	0.76	0.24	45.83	1.55	5.96	3.00
13	975,220	1.6	29.35	0.55	0.84	0.43	0.062	0.84	0.26	45.24	1.54	5.71	3.06
14	941,188	1.6	28.57	0.47	0.81	0.73	0.070	0.82	0.26	44.60	1.56	5.79	2.98
15	991,810	1.5	28.26	0.55	0.85	0.72	0.075	0.76	0.26	45.25	1.60	6.14	3.06
16	1,008,273	1.5	28.91	0.50	0.88	0.58	0.068	0.82	0.27	45.62	1.58	6.24	2.91
17	1,010,616	1.6	30.04	0.58	0.95	0.30	0.061	0.89	0.29	45.71	1.52	6.94	2.35
18	960,763	1.7	30.95	0.61	1.05	0.27	0.062	0.96	0.32	45.82	1.48	7.21	1.75
19	202,441	1.6	31.89	0.59	1.44	0.25	0.072	0.25	0.34	56.79	1.78	8.08	0.25
Total	**16,703,700**	**1.6**	**29.53**	**0.53**	**0.91**	**0.46**	**0.064**	**0.85**	**0.28**	**45.67**	**1.55**	**6.59**	**2.69**

Underground mining production equipment consists of the following:

- Six continuous miners (drum type)
- Nine shuttle cars
- Three belt conveyor feeder-breakers
- Six roof bolters
- Six section power centers
- Three section switch houses
- Three section scoop tractors (low-seam load-haul-dump [LHD])
- Three section forklifts
- Twelve MRS units

All electrical-powered production equipment will be United States Mine Safety & Health Administration (MSHA) "permissible."

Various types of underground and mobile support equipment will provide for supply materials transport, underground belt conveyor construction, equipment transport, mine drainage water pumping, and maintenance. Typical underground support equipment includes:

- Outby scoop tractor (low-seam LHD)
- Supply tractors with grading and lifting attachments
- Personnel carriers

- Maintenance vehicles
- Supply trailers
- Specialty trailers, such as belt material carriers, pipe trailers, high-voltage cable tubs
- Mine drainage pumps and pipelines
- Belt conveyor fire detection system
- Miner (personnel) tracking system
- Mine monitoring and control system
- Communications system
- Mobile diesel-powered generators for moving self-propelled electrical-powered equipment long distances
- Firefighting equipment
- High-voltage distribution system
- Mine firefighting and dust suppression water supply pipelines

17.0 RECOVERY METHODS

Beneficiation of the mined Lower Phosphate Zone (LPZ) phosphate ore will not be required, as discussed in Item 13. For this reason, the only processing of LPZ phosphate ore that is required is to prepare the rock to a suitable crush size for transport to potential phosphate rock customers.

Run-of-mine (ROM) phosphate rock will be conveyed from the underground mine at a size no greater than 250 millimeters (mm) to the surface. For the purpose of the Feasibility Study (FS), the final phosphate rock product size is assumed to be 100 percent (%) less than 6.35 mm to fulfill three key objectives:

- Produce a phosphate rock product which can be efficiently transported by truck and railroad.
- Produce a suitable phosphate rock product which minimizes fines generation (–500 microns [µm]) (35 mesh) in the crushing circuit and therefore avoids a potential loss of phosphate fines (i.e. revenue) during truck and railway transport.
- Produce a phosphate rock product which is fine enough to feed to a ball mill located at an ammonium phosphate fertilizer plant.

Many ammonium phosphate fertilizer manufacturers who must source phosphate rock from external suppliers, have the capability of grinding phosphate rock to –500 µm (35 mesh) or finer in order to optimize the phosphoric acid reaction time. Phosphate rock concentrate sourced from external suppliers will avoid fine grinding of phosphate rock concentrate when possible to minimize fines losses during shipping and potential dust problems when handling.

Any crushing circuit, either permanent or portable, could be specified to be sufficiently flexible in capacity and fineness of crush if required by the customer. Marketing efforts targeting potential customers would work to identify these specific requirements prior to finalizing a design or request for proposal from a contract crushing company.

The moisture content is expected to average 8% by weight moisture. Ideally, lower moisture content is desired to avoid additional non-revenue generating transport costs by truck, rail, and possibly ocean vessel. Management of moisture will depend to a large extent on the dust control requirements and groundwater conditions underground, and to a lesser extent for the needs of the crushing and screening facility.

Beneficiation would be required in the Upper Phosphate Zone (UPZ) to produce a marketable product. Presently, no plans exist to mine the UPZ.

18.0 PROJECT INFRASTRUCTURE

The mine surface operations are located primarily on three graded and improved benches comprised of Benches A, B, and C. Bench A consists of four portal entries for mine exhaust, belt conveyor, travelway, and intake ventilation. Bench B is for ore management and comprises the run-of-mine (ROM) and crushed ore stockpiles, crushing facilities, haul truck loading area, truck scale, and equipment and supply storage buildings. Bench C is for equipment maintenance and mine administration and includes the mine warehouse and shop, mine offices, miner's dry, assay lab, and employee/visitor parking areas.

Other primary surface facilities include the administration building, helipad, process water ponds, a permanent mine waste rock storage facility, and an electrical substation. These facilities are shown in Figure 18-1. Benches A, B and C, the process water ponds, and the electrical substation are planned to be fenced along their perimeters for increased security and safety. The mine benches and adjacent facilities have been located on the site to minimize the impact to an identified sage-grouse lek (mating ground) as much as practicable and to reduce the visual as well as socio-environmental impact to the surrounding communities from the mining activities.

A permanent haul road will be constructed from United States Highway 89 (US 89) to the mine. Initially, the haul road will be graded and graveled until Project Year 2 when the roadway will be widened and surfaced with asphalt. An intersection will also be constructed at the union of the mine haul road and US 89 and located between the cities of Paris and Bloomington, Idaho.

Major and minor access roads will be constructed on-site and at widths necessary to accommodate heavy mine equipment and mine operation motor vehicles. A major access road will connect Bench A to Bench B, and minor roads will be provided for access to other primary surface facilities and dewatering wells.

The mine will receive electrical service from Rocky Mountain Power via a 69-kilovolt (kV) branch line originating at an existing north-south 69-kV line running along the west side of Bear Lake, east of Bloomington. This new power line will terminate at the main mine substation located at the top of the north side of Bloomington Canyon, to the east of Bench B. The substation will consist of a main transformer to step the 69-kV transmission voltage down to the desired 12.47-kV mine distribution voltage.

It is anticipated the mine will receive its potable water supply from the city of Bloomington's culinary water system. A small potable water pump station will be constructed below the city's storage tanks and will transfer potable water to the mine's potable water tank. The storage tank provides gravity head for showers, restrooms, and the potable uses at the general administration building, assay lab, mine offices, miner's dry, maintenance shop, and office trailer located near the haul road truck scales as well as other surface locations as needed.

The mine's freshwater system (non-potable) will supply water for firefighting, surface dust control, and underground operations. The primary source of supply will be from the mine dewatering system and the second source of supply will be from the stormwater runoff storage pond. Stormwater from bench runoff containment and conveyance systems will be directed

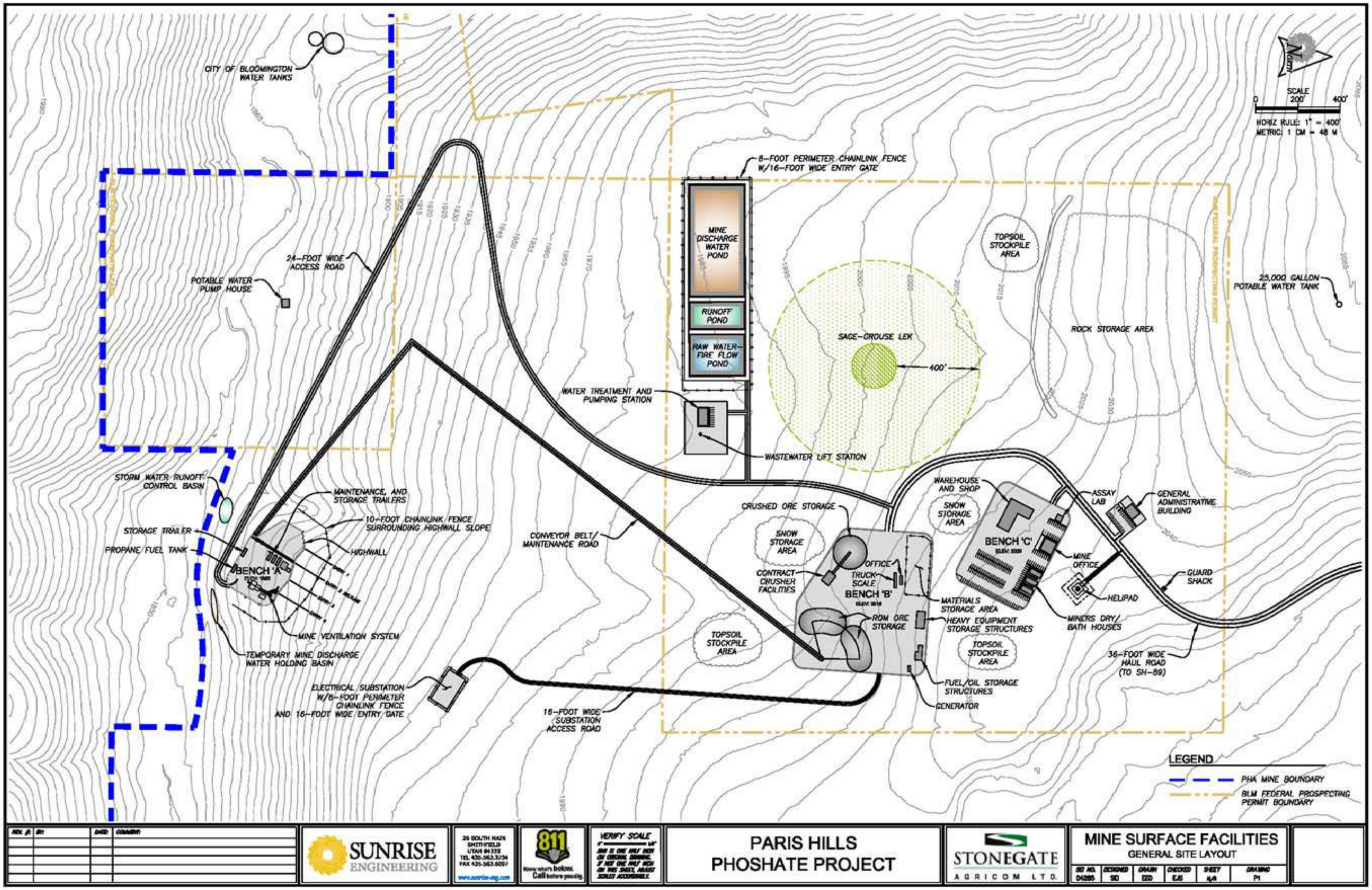


Figure 18-1. Mine Surface Facilities

through a sediment trap with cleanout ramp into the runoff control pond. Non-potable water from the raw water/fire flow pond will be pumped to surface fire hydrants, belt conveyors, and crushing operations as required.

Mine drainage water (MDW) from the mine workings will be pumped to the MDW pond where the suspended solids will be settled out. Both settled MDW and water from the raw water/fire flow pond will be returned by gravity and will be used for the underground mining operation as needed for makeup volume. MDW in excess of that lost through evaporation or used in the mine operations will be treated by process of reverse osmosis (RO) in the water treatment and pumping station, and eventually injected back into the aquifer via the well injection array located east of Bloomington.

Wastewater will be collected from the general administration building, assay lab, mine offices, miner's dry, maintenance shop, and office trailer located near the haul truck scales and treated via a prefabricated package wastewater treatment plant located in the process water and pump station.

Dewatering of the aquifers in advance of mining will be required for mine safety, ore grade control, and equipment operating considerations. Groundwater pumped from the dewatering wells is planned to be directly introduced back into the aquifer located west of the cities of Bloomington and Paris via injection wells.

The mine operations will require an MDW pond, a runoff control pond and a raw water/fire flow storage pond. The MDW pond will have sufficient storage capacity and retention time for settling of suspended solids and act as a buffer for RO treatment plant downtime. The raw water/fire flow pond will be the primary water storage facility for the mine's firefighting and dust suppression water. In the event mine operations call for additional water, it can be directed to the MDW return line via valving in the water treatment and pumping station. The MDW and raw water/fire flow ponds will be lined.

The general administration office, mine office, and miner's dry buildings will be functionally designed, pre-engineered modular structures. Their construction will be typical of that used by many mines in the United States of America (USA or US). The general administration office spaces will be used for administrative personnel, including the mine manager, mine foreman, human resources personnel, reception, visitors, training, and recordkeeping. The mine office spaces will be used generally for the operating and maintenance foreman and shift foreman offices, the first-line production and maintenance supervisor's report rooms, first-aid treatment room, and health and safety lab and safety inspectors' office.

The mine is expected to be wet and muddy, so each miner's dry will have a street clothes locker area, shower and sanitary facilities area, and a mine clothes area. The mine clothes area features overhead baskets for hanging mine clothes to permit drying between work shifts and well-ventilated half-height lockers for boots, miner's belt, and tool pouch storage.

The warehouse and maintenance building will consist of a shop with two bays, overhead bridge cranes, and the tools and equipment typical for that of a heavy equipment repair shop. An equipment wash-down pad with grease trap used to filter out solids and grease from the wash bay will be located adjacent to the building. Contiguous to the shop is the mine warehouse. The warehouse will include a restroom, break room, and shared office space for the purchasing manager, warehouse supervisor, and attendants. The warehouse area will house mine operation inventory that needs to be in a climate-controlled environment. An underground section power center will be located in the shop and will be capable of providing power to serve as a backup to the underground units in operation.

The combination fuel and oil storage structure will consist of two separate but contiguous storage spaces. One area will be for three hydraulic oil and/or diesel fuel tanks and the other area will be for storing containerized and bulk lubrication oils, greases, and hydraulic fluid. Diesel fuel storage will be provided for the heavy above-ground and underground equipment.

A mine portal office trailer and security guard stations will be provided for mine operations. These structures will also be pre-engineered modular structures. The mine portal office trailer will serve as a shelter, forward critical consumables storage, and first-aid/Emergency Medical Technical (EMT) equipment storage location for the mine portal area.

Security guard stations will be located on the main access road near the US 89 intersection, and the other will be situated near the general administration offices.

The water treatment and pumping station is located near the process water storage ponds. This facility houses the fire flow pumps, RO water supply and discharge pumps, potable water pumps, RO package treatment plants, and package wastewater treatment plant. Mine personnel will be able to govern the water treatment and pumping station's operations from the mine offices located on Bench C through supervisory control and data acquisition (SCADA) systems.

The on-site assay lab is planned for commissioning in Project Year 3. The assay lab features a sample preparation area, an analytical area, and a small storage area for sample inventory. The lab will be equipped to analyze the key parameters of phosphate rock quality and to perform some environmental analysis for water quality monitoring. The lab facility will also include the lab manager's office.

A permanent mine waste rock disposal area will be constructed northwest of Bench C. This area will be developed in stages over the life of the mine as rock volume dictates. As the pile is being constructed, concurrent reclamation will be done by covering and revegetating the slopes to control water infiltration and surface erosion. Runoff captured in the containment berm will be directed via conveyance ditch along the haul and access roads, with the flow eventually reporting to the sedimentation pond. If necessary, additional mine waste rock storage can be constructed north of this area.

Runoff and snowmelt from benches and other select improved surfaces will be collected and conveyed via on-site swales, ditches, and channels to the regional sediment trap and cleanout ramp, and then to the runoff control pond. Off-site stormwater will be diverted around the mine surface facilities via earthen berms, ditches, and conveyance conduits such that the pre-existing conditions of natural surface flows can be maintained as much as practicable.

19.0 MARKET STUDIES AND CONTRACTS

Phosphate commonly refers to the compound phosphorus pentoxide (P_2O_5) which is found in sedimentary and igneous deposits in various locations around the world. The largest end use for phosphate rock is the fertilizer industry with an estimated 88 percent (%) of 2010 total consumption. Phosphate is one of the three key nutrients (the others being nitrogen and potassium) that are essential to healthy plant growth. There is no substitute for phosphate in plant nutrition, and phosphate rock is the only world-scale raw material available for the production of the fertilizers required for food production.

Commercial grades of phosphate rock vary from about 27.5% to 36.6% P_2O_5, with a grade of about 30% or higher being typical. The grade of most mined ore is below the commercial-grade range and, therefore, requires processing or beneficiation before it can be used or sold. But some mined ore is of high enough grade that it requires only crushing before being sent direct to market. Such high-grade ores are referred to as direct ship phosphate ore (DSO).

The majority of the phosphate rock (80% to 85%) produced in a given year is consumed in vertically integrated downstream processing operations associated with the mine. These operations typically manufacture phosphoric acid, which is used to produce fertilizer end-products such as diammonium phosphate (DAP), monoammonium phosphate (MAP), and triple superphosphate (TSP). Phosphate rock is also used to manufacture non-phosphoric acid derived products like single superphosphate (SSP) and a small amount is used by farmers for direct application to the soil.

Phosphate rock prices are primarily influenced by the market for its primary derivatives, namely phosphate fertilizers, which in turn are influenced by a number of factors at various points in the value chain, including crop prices, agricultural practices, government policies, and weather conditions.

The long-term fundamentals for phosphate fertilizer demand and prices are positive in the period 2010 to 2020. The relatively high concentration of supply in the international rock market is dominated by the Office Chérifien des Phosphates (OCP) (Morocco) and will continue to enable miners to increase their share of the phosphate fertilizer margins as the market allows.

The Paris Hills Agricom Inc. (PHA) phosphate rock exhibits superior characteristics versus many of the rock concentrates currently consumed, and the phosphate content is typical of currently consumed products. A number of vertically integrated rock consumers, particularly those in the southeast United States of America (USA or US), consume rock that grades below 30% P_2O_5, which would suggest that the grade of PHA rock concentrate (likely to be around 29.5%) would meet the grade requirements of potential buyers. In addition, none of the impurities in the PHA concentrate are likely to prevent the product from being amenable to consumption within the plants of these operations.

PHA commissioned a third-party marketing study (CRU Strategies [CRU] 2012) in support of the March 2012 Preliminary Feasibility Study (PFS) (Agapito Associates, Inc. [AAI] 2012a). PHA updated the CRU study in December 2012 for application to the Feasibility Study (FS) (AAI et al. 2012b) including identification of relevant market changes that have occurred since the CRU report was submitted, noting amendments to the marketing plan, and providing an updated phosphate rock price forecast for use in financial modeling.

Leo Gilbride, a Qualified Person (QP) and author of this report, reviewed the third-party marketing study and PHA updated and confirmed that the information addresses the relevant topics of market demand, pricing, transportation, and competition. The QP confirms that the market study's findings support the assumptions used for this Technical Report (TR).

Relevant updates to the marketing study as of December 2012 are:

- Global phosphate rock supply and demand in 2012 has been broadly in line with the expectations put forward in the CRU report. CRU's overarching views for the remainder of the forecast period are little changed from their original report. Therefore, it is deemed unnecessary to provide new regional supply/demand/ trade forecasts. It is worth noting, however, that CRU now includes the Paris Hills Phosphate Project (the Property) in their listing of "probable" projects.[7]

- Agrium Inc. will close their Kapuskasing mine in Ontario in 2013, replacing the rock requirements at Redwater with imported product from Morocco.

- The average benchmark phosphate rock price forecast over the period 2014–2020 is now US$12 per tonne (/t) higher over the forecast period.

- Significant new marketing opportunities have been identified in both North America and Asia.

- The expected freight on board (FOB) mine netback price in the base case is revised slightly higher to $165/t (from $160/t in the CRU report).

19.1 Global Phosphate Market

The global phosphate rock and phosphate fertilizer market has cooled over the course of 2012, due to historically elevated pricing dampening demand, while uncertainties in a number of markets due to drought conditions have led some buyers to hold off on purchasing. This "wait-and-see" approach is also a function of buyers expecting a slight easing of pricing over the Northern Hemisphere winter months.

Of particular note has been the nearly 20% reduction in phosphate demand expected in India in 2012. This is a function of the marked changes made to the subsidy rates for phosphate (and potash) fertilizers. This has resulted in phosphorus (P) and potassium (K) fertilizer retail prices spiking this year, making these fertilizers more expensive than historically (when the retail price was fixed and the subsidy rate was adjusted based on international prices), and this has

[7] CRU places projects within the following categories: Committed (e.g. project is financed and under construction); Probable (project is likely to be commissioned in the near term, based on CRU's assessment of a number of project characteristics); Speculative (either at a very early stage or deemed less likely to move forward due to unfavorable project characteristics).

translated to reduced demand. It is expected that yield losses due to lower application rates of phosphate will reverse this demand contraction over the next few years.

Overall, phosphate rock demand is expected to be roughly flat versus 2011. Unrest in the Middle East, as well as ramp-up problems at the Ma'aden plant in Saudi Arabia, has subdued available rock supplies, which has led to prices holding flat to slightly lower than those prevailing at the start of 2012. CRU had forecast a slightly greater decline to rock pricing in 2012, but the robustness of the current environment and the expectation of a higher cost base going forward has resulted in a higher baseline phosphate rock price forecast than what was utilized in the Paris Hills PFS (AAI et al. 2012a). In response to this, PHA is utilizing a slightly higher benchmark phosphate rock price forecast.

19.2 North American Phosphate Market

The CRU marketing report provided an overview of the North American phosphate rock market, detailing the various producers and consumers of phosphate rock. Of particular importance, the report noted that Agrium Inc.'s Kapuskasing, Ontario, Canada mine was expected to close in 2014–2015 due to depletion of the reserve. Agrium Inc. subsequently has announced that the mine will be exhausted in 2013, and has already begun to take shipments of Moroccan phosphate rock to supply their Redwater, Alberta, Canada fertilizer complex. Agrium Inc. has announced that they expect to continue to rely on imported Moroccan phosphate rock over the medium term. In addition, Agrium Inc.'s Conda operation in Idaho will require a new supply of phosphate rock within several years when resources are depleted at their current mine.

It is important to put this development in perspective:

- North America phosphate rock demand is around 32 million tonnes per annum (Mtpa), with the USA accounting for all but the roughly 900,000 t consumed by Agrium Inc.'s Redwater plant in Alberta.
- Around 90% of North American rock demand is met by domestic production, with the remainder imported from Morocco and Peru.
- There has been a conspicuous trend over the past decade towards increased reliance on imported phosphate rock, due to a lack of available domestic supplies. It is anticipated that the North American industry will continue to increase their reliance on merchant phosphate rock.

The announcement by Agrium Inc. to shift reliance to imported rock (as well as The Mosaic Company's continuation of their import program of Moroccan phosphate rock to both Louisiana and Florida) will continue to push higher the reliance of USA rock consumers on imported product—that is unless a new source of domestic supply is brought on stream. See Figure 19-1 for a comparison of North American phosphate rock production to imports.

In addition, J. R. Simplot Company has announced a roughly 30% expansion of their downstream phosphate fertilizer plant at Rock Springs, Wyoming. They also announced there is

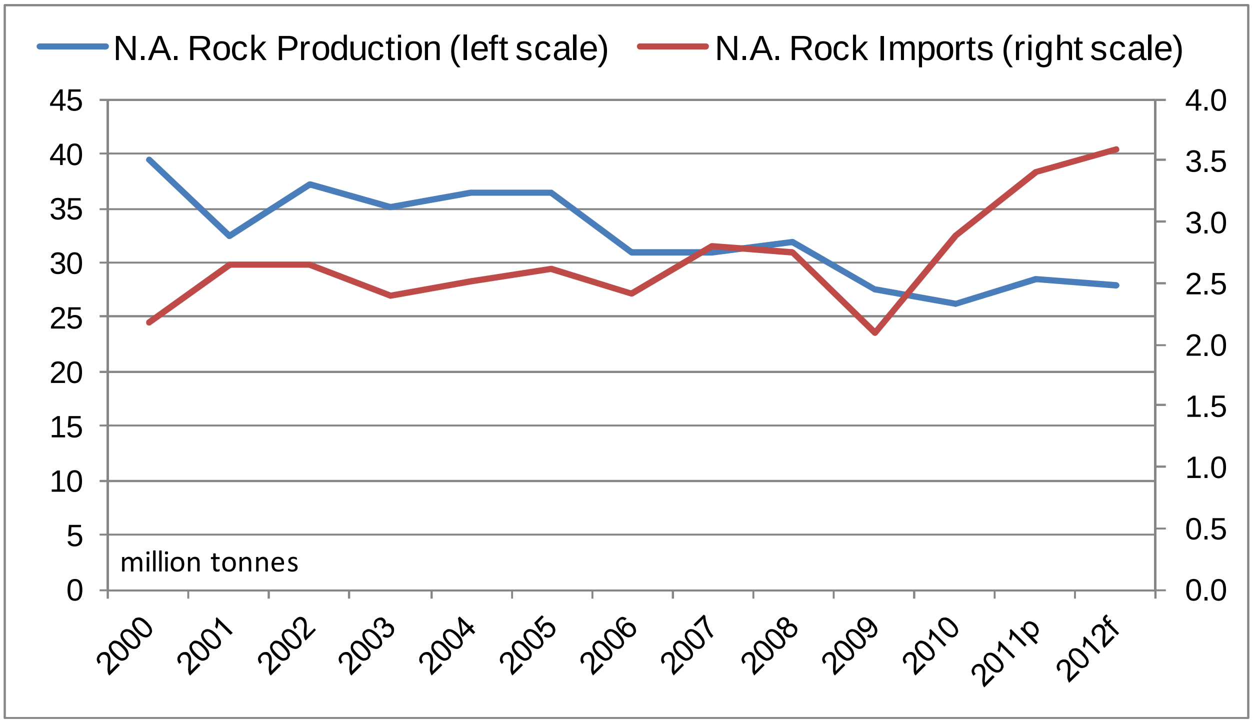


Figure 19-1. North American Phosphate Rock Production and Imports (p = preliminary, f = forecast; Source: IFA, PHA estimate for 2012)

adequate phosphate rock capacity at their Vernal, Utah operation to supply the increased feedstock required, though it underscores the growing demand for phosphate rock in western North America.

Lastly, The Mosaic Company's protracted legal dispute over the permitting of the South Fort Meade mine in Florida was concluded in February 2012, and it is expected that they will be able to mine the vast majority of their reserves at that mine.

These developments do not change the fundamental supply picture for phosphate rock in North America going forward, as presented in the CRU (2012) report.

Further, PHA updated the reserve/resource estimates of North American phosphate rock mining assets currently producing or under study. The main takeaway from the CRU report remains; namely, that the North American phosphate industry is likely to continue to see a steady decline in phosphate rock production as existing mines are depleted. In Florida, there is little scope for new mining areas to be opened (with the exception of The Mosaic Company's Ona and DeSoto tracts, though the extent to which these can/will be permitted remains in question). In the western US, there are several proposed relatively small mines planned, though they primarily are located within federal oversight, and therefore most of these projects are likely to face very long lead times to develop (probably upwards of 10 years).

Thus, PHA continues to see a substantial opportunity over the medium term for a new merchant supplier of phosphate rock to enter the North American market, particularly considering the relatively lower logistical costs to serve consumers in the west and with the ability to move into production in a much shorter timeframe (and with significantly lower permitting risk).

19.3 Market Forecasts

As noted above, the phosphate market has cooled in 2012, though this is from a very high base set in 2011. Most importantly, the demand drivers remain in place for a strong 2013. With regard to CRU's supply and demand forecasts for phosphate rock made in early 2012, the forecast remains little changed with three main exceptions:

- Chinese demand has been revised higher for the base year, 2011, and this increase is carried through to the end of the forecast period.
- Indian demand is lower in 2012 than previously forecast; though this "lost" volume is made up over the next few years so that there is little change to the demand forecast in the latter years of the forecast period.
- Supply from the Middle East, particularly Syria and Saudi Arabia, is now expected to underperform earlier expectations in the 2012–13 period, with the supply shortfall offsetting the weaker than expected demand in India during this period.

Because these changes have little bearing on the market opportunities or threats to the Project, PHA has not endeavored to amend the CRU supply/demand/trade forecasts.

In terms of new phosphate rock projects, there have been relatively few changes to CRU's forecasts. Of note, however, is that of the approximately 80 projects being tracked by CRU, they consider only about 30% to be firm or probable, with the remainder considered speculative. The Paris Hills Project is now considered by CRU (2012) to be "probable," meaning that based on CRU's scoring criteria, the Paris Hills Project is likely to move forward into production within their 5-year forecast horizon.

With regard to pricing, CRU's (2012) latest predictions indicate a modest upward revision in their expected phosphate rock benchmark pricing going forward (by an average of about $12/t over the medium term) versus the forecast provided in their earlier report. This equates to an FOB Moroccan benchmark price that is now forecast to average over $160/t during the forecast period.

The upside and downside risks to the price forecast remain in place from the CRU report. Prices for agricultural commodities, which are the main demand-side determiner of phosphate pricing, remain well above their historical norms. Moreover, the futures contract prices for these commodities show little expectation that there will be any more than rather modest pricing erosion. On the supply side, the major phosphate producers continue to exercise supply discipline to keep the market more-or-less in balance, and they have made no indications that this behavior is likely to change. As such, PHA continues to agree with the CRU price forecast stipulating that, while rock prices may ease in the near term, the downside is likely limited, and over the life of the project, pricing should remain at/near levels seen in recent years.

19.4 Paris Hills Phosphate Concentrate Specifications and Value

The CRU analysis of the Paris Hills phosphate specifications and expected impact on product pricing was based on the composite sample from the Jacobs Engineering S.A. (Jacobs) Acidulation Testing Report (Jacobs 2011c). Further delineation of the PHA phosphate rock reserve has resulted in more precision with regard to the average grade and impurity levels of the rock concentrate, in particular, showing that the average grade is lower and the carbon content higher than the composite analysis published in the Jacobs report. The potential for this was anticipated by CRU and was accounted for, at least in part, in their secondary calculation of the expected price of PHA rock concentrate that was then used as the basis of their forecast PHA rock price.

The main difference between the chemical specifications utilized in the CRU report and now is the higher organic carbon content. There was an error in the chemical specifications which Jacobs had reported (0.8% carbon [C]), as the value should have been reported as 1.7% C. Further, now that additional metallurgical results are available from subsequent drilling, the average organic carbon content has been determined to be 2.7%. PHA anticipates that this may require price discounting of PHA concentrate, particularly if sold into particular export markets for use in phosphoric acid production. However, it is also known that phosphate rock with carbon contents of up to 3% are currently marketed in South Asia for phosphoric acid production into the Southeast Asian direct application fertilizer markets (where organic content may be considered a positive attribute), as well as in the western US (where most phosphate rock consumed is of comparable organic carbon content). These markets are discussed in greater detail later in this section.

PHA followed the methodology that CRU utilized in their “value in use” calculations, arriving at a new expected discount versus benchmark rock pricing that will likely apply to PHA concentrate. Rather than being on par with the Bayovar benchmark, PHA concentrate is expected to trade at about a 10% discount (Table 19-1).

19.5 PHA Marketing Plan

The CRU marketing report concluded that the most likely sales outlet for PHA concentrate would be to North American consumers (in particular those located in the western US and Canada), as they are both geographically near to the Project, as well as particular consumers being relatively resource constrained with regard to phosphate rock. At an average 29.5% P_2O_5, the PHA rock could be blended with lower-grade ore at existing mining operations in the western US to improve the average feedstock grade, as well as extend the life of said mines. Moving further afield, CRU identified overseas markets that could act as an outlet for any volumes not consumed domestically, namely the Asian markets. In addition, PHA has since identified in greater detail the potential for selling rock into the direct application fertilizer market.

Table 19-1. Paris Hills Phosphate Rock Expected Value versus Benchmark

	PHA Value in Use (assumptions for Paris Hills LPZ)[1]	Premium/Discount Applicable (versus Bayovar phosphate rock)
P_2O_5	29.5%	3.2% discount
SiO_2	6.6%	1.6% discount
R_2O_3	1.4%	0.2% premium
MgO	0.5%	0.2% premium
F	3.2%	Not applicable
Cl	200 ppm	4% premium
Cd	<40 ppm	Not applicable
C (org)	2.7%	9.5% discount[2]
Total Projected Premium/Discount		**9.9% discount**

1. Fluorine (F), chlorine (Cl), and cadmium (Cd) values are based on original composites used in Jacob's testing (presented in the PFS). Other values are based on additional drilling/metalurgical results

2. The price discount of approximately 10% is derived by assuming a 0.5% discount per 10 basis points of organic carbon above the Bayovar specification. PHA believes this discount is sufficiently high, noting that many potential buyers will use Paris Hills rock as part of a blend, or are already utilizing a phosphate rock with similar organic content.

Chemical Abbreviations:

P_2O_5 = phosphorus pentoxide	F = fluorine
SiO_2 = silica dioxide	Cl = chlorine
R_2O_3 = (Al_2O_3 + Fe_2O_3)	Cd = cadmium
MgO = magnesium oxide	C = carbon

19.5.1 Marketing to Southeast Asia

Confirming that the carbon content was indeed higher than the results utilized for the PFS, PHA concludes that there may be significant marketing opportunities for its rock in Southeast Asia for use as a direct application (DA) fertilizer (primarily in the recently strong growth market serving oil palm plantations). DA rock is particularly well-suited for use in acidic soils on plantation crops.

The main criteria in judging the suitability of a phosphate rock for use in DA are the grade/solubility of the rock. Typical grades are at/near 30% P_2O_5, with solubility falling within the “medium” category outlined in Table 19-2.

Jacobs, utilizing the same composite sample used in their acidulation study (Jacobs 2011c), analyzed Paris Hills rock using the International Fertilizer Development Center (IFDC)’s citric acid and formic acid solubility tests. Of note is that PHA rock meets the grade criteria for DA and would fall into the category of a medium-reactivity phosphate rock. As such, it should be well suited for this market. Moreover, as noted in the PFS, there is a viable logistical avenue whereby PHA rock could be exported out of a West Coast US port to Southeast Asia.

Table 19-2. Classification of Paris Hills Rock for Direct Application (after Diamond 1979)

Rock Potential as a DAPR Fertilizer	Solubility (% P_2O_5)		
	Neutral Ammonium Citrate	Citric Acid	Formic Acid
High	> 5.4	> 9.4	> 13.0
Medium	3.2–4.5	6.7–8.4	7.0–10.8
Low	< 2.7	< 6.0	<5.8
Paris Hills Rock Concentrate	Not applicable	7.8	9.9

DAPR = direct application phosphate rock

While the DA market, estimated at about 3 Mtpa, is relatively small with respect to overall demand for phosphate rock, there are relatively few suppliers. Of note:

- There have been supply disruptions from North African suppliers in recent years.
- The quality of the Egyptian product has been low/inconsistent (and has prompted a number of buyers to look towards alternative suppliers).
- Christmas Island product is likely to exit this market in the next few years upon depletion of their reserves. Phosphate Resources exports about 0.5 Mtpa of phosphate rock.

Taken together, the above market conditions would imply that the total PHA rock production volume could possibly be placed into this market subset alone.

Another important aspect of the market for DA rock, particularly in Southeast Asia (which totals about 1.2 Mtpa), is that the majority of sales are made through traders. This means that a new supplier such as PHA is not particularly disadvantaged versus incumbent suppliers when attempting to penetrate the market. In fact, this characteristic may improve the opportunities for a supplier such as PHA, as it could allow a trading house an opportunity for backward-integration into a phosphate rock production asset (an opportunity that is not really possible with respect to most other DA rock producers).

19.5.2 Marketing Plan

As noted above, PHA believes that the marketing plan submitted by CRU in their report for the PFS (AAI et al. 2012a) remains valid. This includes their position that PHA phosphate rock is a saleable phosphate concentrate, including to both geographically near consumers (Agrium Inc., Monsanto, and J. R. Simplot Company) as well as further afield (e.g. in the export market). Moreover, internal market analysis by PHA suggests that the marketing opportunities could well prove more robust than those put forward in the PFS.

19.6 Netback Price Forecast

The CRU report dealt with developing delivered cost estimates for PHA rock to various target markets to illustrate competitiveness, and subsequently deriving a netback price forecast (FOB mine). PHA has made little revision to the CRU methodology, with the main exception being a greater weighting placed on the prospects of selling to geographically near consumers. PHA therefore essentially replicates (with updated information) what was produced by CRU.

Table 19-3 presents delivered cost estimates to PHA's main target customers. The operating cost estimate is now approximately $70/t (as per the new engineering estimates in this FS), which is just $3/t higher than the estimates provided by CRU. In addition, a breakout has been added of the cost to move from FOB mine to the proposed rail loadout (FOB train). Also in Table 19-3, for geographically near rock consumers, the cost of crushing at site has been removed, as it is expected that these consumers would undertake this process within their existing processing plants.

Table 19-3. Delivered Cash Costs to Target Markets

Target Company/Plant		Delivered Cost
Agrium Inc.	Redwater, Alberta	$105
	Conda, Idaho	$75
Monsanto	Soda Springs, Idaho	$74
J. R. Simplot Company	Pocatello, Idaho	$76
CF Industries	Plant City, Florida	$129
Mississippi Phosphates	Pascagoula, Mississippi	$119
FOB Export	Port of Longview, Washington / Port of Portland, Oregon*	$94

Production and handling cost in US$ to FOB mine gate and FOB train cost estimates provided by AAI for FS. Note: It is assumed that crushing at mine site is not required for shipments to nearby consumers.
Adapted from CRU marketing report in PFS (AAI et al., 2012a) (Table 6.6), updated by PHA.

Pricing of PHA phosphate rock, as per the CRU marketing report, was made on the basis of import-parity. That is to say that one would expect that PHA rock would be priced to be competitive with imported products.

Further, the underlying thesis remains from the CRU report: while PHA rock will have a higher cost base, it will be very competitive versus current import parity pricing.

In addition, the Project is located in a safe mining jurisdiction (thereby providing a secure supply source) and also presents an opportunity for a potential rock buyer to backward integrate into rock production (e.g. by securing an equity stake, an opportunity that is not available from the current main merchant rock supplier, OCP of Morocco).

The projected netback pricing (FOB mine) has been updated (for prospective buyers in the CRU report) and is broadly on par with the CRU forecast, with the newly-ascribed additional discount to PHA rock pricing based on the higher carbon content being offset by adding Monsanto and Simplot to the listing of prospective local buyers.

Also of note is that potential sales to the southeast US market continue to be included in the netback forecast, despite the fact that netbacks will be significantly higher in the export market (where adequate markets have been identified to sell the entirety of PHA production).

Table 19-4 provides the average expected netback (FOB mine gate) price forecast for the 2012–2020 period, followed by average pricing for use in the financial modeling of the Project. The results are very similar to those derived in the CRU report.

Table 19-4. Netback (FOB mine) **Price Forecast**
(US$ per tonne, dry-basis, 29.5% P_2O_5 average)

	All Targets	Local Market[1]	Local and Export
2012p	$138	$164	$156
2013	$129	$159	$148
2014	$127	$159	$148
2015	$127	$161	$149
2016	$126	$162	$148
2017	$127	$164	$150
2018	$130	$168	$154
2019	$132	$172	$157
2020	$135	$176	$161
Average for 2012-2020 Forecast Period	**$130**	**$165**	**$152**

1. Geographically-near consumers (i.e. Agrium, Monsanto and J. R. Simplot Company)
Adapted from CRU. Updated/amended by PHA.

Updated average netback (FOB mine) prices for use in the financial modeling are provided below:

High case = US$175/t:

This is derived primarily by looking at the US$177/t expected average netback price when selling to local buyers in the Idaho market. This high-case pricing also could be realized by stronger than currently anticipated phosphate markets in general.

Base case = US$165/t:

This is derived in a similar fashion to the base-case price provided in the CRU report, namely by utilizing the approximate average netback price from the "Local Market" category.

Conservative case: US$150/t:

This is derived in a similar fashion to the conservative-case price provided in the CRU report, namely by utilizing the approximate average netback price from the "Local Market & Export" category.

Low case: US$140/t:

Utilizing US$140/t should be sufficiently low to illustrate the robustness of the Project, remembering that even during the lows of the phosphate rock market during the Great Financial

Crisis in 2009, pricing FOB Morocco fell (briefly) to US$90/t. An equivalent import-parity price to Idaho consumers would have been in excess of US$150/t.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACTS

Paris Hills Agricom Inc. (PHA) proposes to initiate mining on the state and private lands as a Phase 1 project permitting plan, which would not require a federal phosphate lease and would avoid triggering a National Environmental Policy Act of 1969 (NEPA) project permitting process. Once mining is permitted by the State of Idaho, Phase 2 of the overall project permitting plan will be initiated. Phase 2 of the permitting plan would require applying for the federal phosphate lease and associated NEPA process.

20.1 Existing Environment

20.1.1 Wildlife

The following wildlife occurs in the Project area and are considered key species based on their importance to hunting (big game) or environmental sensitivity:

- Bonneville cutthroat trout
- Big game (mule deer and elk)
- Greater sage-grouse

The Project lies within sage-grouse (*Centrocercus urophasianus*) key habitat that may support nesting populations (United States Bureau of Land Management [BLM] 2010). The proposed mine is within an area that provides suitable habitat for a variety of migratory birds which likely utilize the area during migration and breeding periods. PHA will evaluate and avoid potential "take" of migratory birds through project modification and seasonal restrictions. In accordance with the Migratory Bird Treaty Act, a survey was conducted to determine if active nests are located within the Project area at five planned exploration drill pads on 06 June 2012. No nests were observed at or within 30.5 meters (m) of any pad locations.

Stream surveys conducted by the Idaho Department of Fish and Game (IDFG) and others indicate that Bonneville cutthroat trout, a BLM sensitive species, inhabit Bloomington Creek (IDFG 2011). Bonneville cutthroat have also been found in Paris Creek. Short segments of Bloomington and Paris Creeks are located within the southern and northwestern portions, respectively, of the Project area and both streams include Riparian Conservation Areas (RCAs). Runoff from disturbed areas is the primary issue related to surface water quality and management since there is no direct discharge planned for these creeks.

Bear Lake and the Bear Lake National Wildlife Refuge occur approximately 4.8 kilometers (km) to the east of the Paris Hills Phosphate Project (the Property) and consist of a large marsh known as the Dingle Marsh at the north end of Bear Lake. Lake trout and cutthroat trout are found in Bear Lake in addition to four other endemic species. The four endemic species found in Bear Lake provide forage for the cutthroat and lake trout. These include the Bonneville cisco, Bonneville whitefish, Bear Lake whitefish, and Bear Lake sculpin. Bald eagles winter in and around Bear Lake (United States Fish and Wildlife Service [USFWS] 2011). Due to the design features such as drainage controls, the proposed Project will not impact Bear Lake or the National Wildlife Refuge.

An assessment of BLM threatened, endangered, and sensitive (TES) species was conducted on a portion of the PHA Property for the exploration plan Environmental Assessment (EA). The field surveys occurred between 16 and 19 May 2011. Three TES species, greater sage-grouse (*Centrocercus urophasianus*), sage sparrow (*Amphispiza belli*), and Brewer's sparrow (*Spizella breweri*) were observed. Most of the proposed mine surface area falls within key sage-grouse habitat as identified by the BLM. A known sage-grouse lek near the proposed mine site was inactive during the surveys and no other leks were identified within approximately 0.8 km of the Property. The other two sparrow species are relatively common in sagebrush habitats and are not expected to be impacted by the proposed Project.

PHA has committed to several mitigation measures in their exploration plan which will be carried through mining operations in order to effectively address and mitigate potential TES impact issues. The greater sage-grouse is a candidate for federal listing and is a higher profile species based on the USFWS's potential listing of the species in 2014. If the species is listed, PHA may have to implement additional mitigation strategies during mining operations. Currently, PHA has implemented various measures to minimize impacts to sage grouse and suitable habitat.

20.1.2 Wetlands

Potential wetlands were identified and are mapped in Figure 20-1. The proposed surface disturbances are not within wetlands and the haul route will utilize the existing United States Highway 89 (US 89); therefore, the proposed Project will not impact wetlands. No other biophysical components are considered of concern due to lack of impacts to any other resources.

20.1.3 Surface Water

Two perennial streams, Paris Creek and Bloomington Creek, occur within the Paris Hills Project area that currently have surface water beneficial use designations assigned by the Idaho Department of Environmental Quality (IDEQ) (Idaho Administrative Procedures Act [IDAPA] 2010). Section 303(d) of the Clean Water Act requires states to identify streams and lakes that do not meet water quality standards and to establish total maximum daily loads (TMDLs) for the listed pollutants. Paris and Bloomington Creeks have not been identified as impaired water bodies (IDEQ 2011).

PHA began surface water monitoring at the Property in 2010 and has continued monitoring through 2012. Fifteen surface water monitoring locations were established (Figure 20-1). There have been no selenium concentrations above water quality (WQ) standards or Human Health Criteria (HHC) WQ standards. Only one sample was above Criteria Continuous Concentration (CCC)/Criteria Maximum Concentration (CMC) WQ standards.

Gain-loss surveys were performed for Paris and Bloomington Creeks in 2012 to evaluate interconnection between surface water and groundwater. Bloomington Creek was determined to be losing volume, most likely due to water diversions for the city of Bloomington, while Paris Creek was determined to be gaining volume in the sections between the first three sites (GLS-PC1 to GLS-PC3) and losing volume between the last two (GLS-PC3 to GLS-PC4).

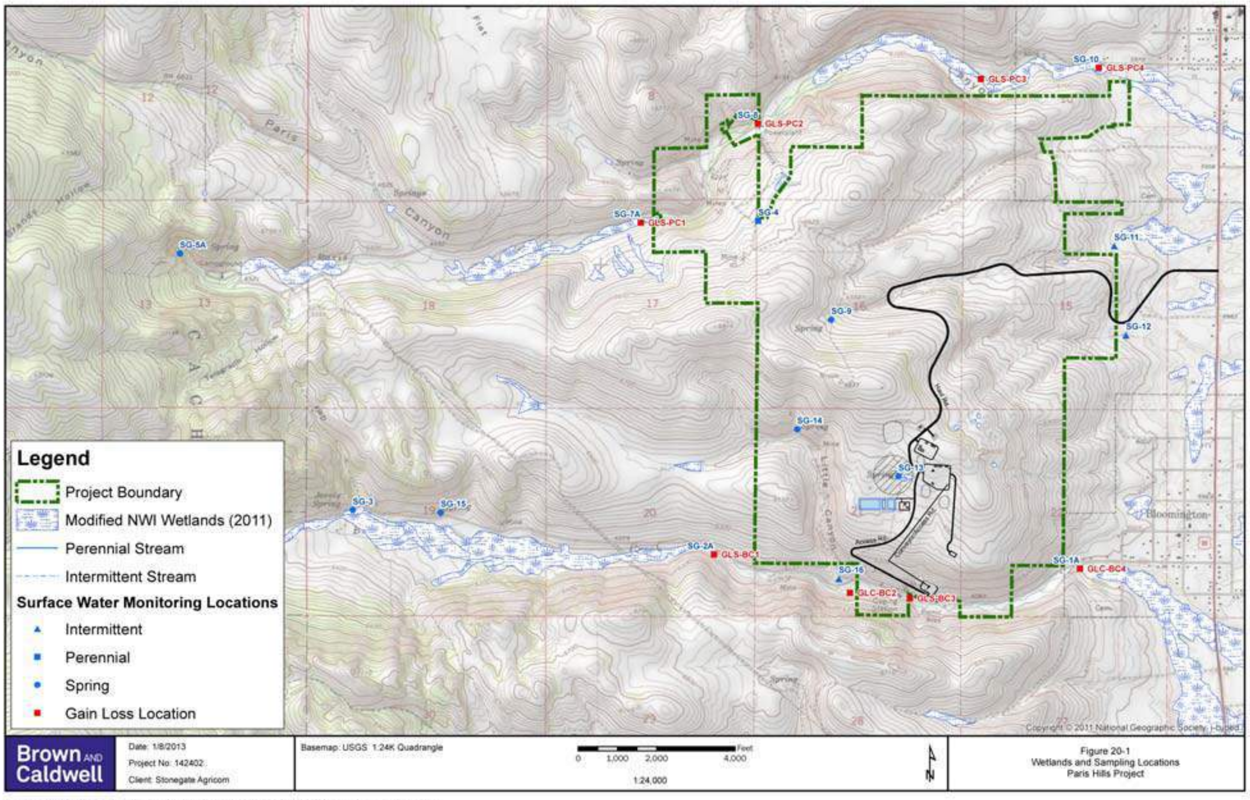


Figure 20-1. Wetland and Sampling Locations

20.1.4 Groundwater

Groundwater depths in the Project area range from near surface for perched local-scale flow systems in the Wasatch Formation to more than 250 m for the regional flow system in the Wells Formation. The elevation of the regional water table near the center of the Project Area is about 1,820 m. The underground workings will extend more than 700 m below the regional groundwater level at the north end of the Project area and will require active dewatering by pumping from up to 17 extraction wells, as discussed in Item 24.

Preliminary water quality data indicate that groundwater in the Wells Formation has low concentrations of dissolved solids (180 milligrams per liter [mg/l]) and meets Idaho groundwater quality standards for all tested constituents except manganese. Field measurements of specific conductance indicate that the dissolved solids content of groundwater from the Rex Chert Member and Dinwoody Formation is similar to the Wells Formation. Groundwater in the Meade Peak Member is expected to have poorer quality compared to adjacent aquifers, but the unit is a regional aquitard and is not expected to contribute significant water to dewatering wells or underground workings. IDEQ, Idaho Department of Water Resources (IDWR), and the BLM have indicated that they will not require monitoring of Meade Peak groundwater to support permitting studies for the Project.

A baseline groundwater characterization study will be required to support permits to allow mining. Initial consultation with the agencies indicates that the requirements to establish a baseline will be similar to those applied under NEPA. A draft groundwater study plan was submitted to IDEQ, IDWR, and BLM for review in September of 2012. The plan was favorably received and the agencies requested minor revisions.

A water quality monitoring network for the mining area was completed in December 2012. Monitoring of groundwater levels began shortly after installation of the first pair of nested vibrating wire piezometers (VWPs) in 2011. Sampling of monitoring wells began in November 2012 after the installation of MW-1W. The first complete round of groundwater monitoring data will be available in early 2013. Regular semi-monthly (i.e., every other month) monitoring of the network will begin in February 2013. Installation of the aquifer test pumping well is scheduled for the second quarter of 2013. The study plan addendum for characterization of the dewatering discharge disposal area is in progress with field work scheduled to begin in the first quarter of 2013.

A numerical model of groundwater flow and contaminant fate and transport will be required to support the point of compliance (POC) application and NEPA permitting. The current groundwater model for evaluation of mine dewatering (Item 24) will be used for this purpose and will be expanded and refined as new data become available to support the environmental impact analysis.

20.1.5 Geochemistry

Phosphate deposits at Paris Hills are typical of a well-studied class of ore bodies hosted by the Meade Peak Member of the Phosphoria Formation in Southeast Idaho. Selenium is the principal element of environmental concern in the region and has been the subject of intensive study by the United States Geological Survey (USGS) and other researchers. Cadmium, iron, manganese, nickel, sulfate, zinc and other metals are also known to be mobile in seepage from phosphate mine waste rock and the Project will require baseline geochemical characterization studies to support permit applications and evaluations of potential environmental impacts. A draft geochemistry study plan was submitted to IDEQ, IDWR, and BLM for review in September of 2012. The agencies requested only minor revisions and the baseline geochemistry study is currently in progress. The results of the baseline geochemistry study will be used to support environmental impact studies for permitting and for the POC application.

20.2 Permitting/Regulatory Requirements

Existing permits are in place to support mineral exploration activities. A two-phased permitting scenario is planned for future mining. During Phase 1, the proposed plan will not mine the BLM Federal Phosphate Lease, thus avoiding federal authorization triggering the NEPA process. Once mining has started, Phase 2 will permit mining on the federal phosphate lease via the NEPA process.

20.2.1 Existing Permits

Currently PHA has obtained the necessary permits to undertake the exploration program and collect baseline data information, as summarized in Table 20-1. PHA will renew or modify the permits as future activities require.

Table 20-1. Existing PHA Permits

Permit Name	Permit Number	Effective Date	Expiration Date
EPA's Industrial Multi-Sector General Permit	IDR05CM39	09 August 2011	No expiration as long as SWPPP is updated per new activities
IDL Exploration Permit	TP-80-2176	21 October 2010	31 December 2013
IDL Exploration Permit	TP-80-2177	21 October 2010	31 December 2013
IDL Exploration Permit	TP-80-2178	21 October 2010	31 December 2013

IDL = Idaho Department of Lands

PHA's current Multi-Sector General Permit (MSGP) covers all stormwater and some non-stormwater discharges for the industrial activities (SWPPP), while the stormwater discharges during construction activities are covered under the Construction General Permit (CGP). This permit was obtained to authorize the ongoing exploration program. PHA developed a Surface Water Pollution Prevention Plan (SWPPP) as required by the United States Environmental Protection Agency (EPA) to control surface water runoff. Best Management Practices (BMPs) are required to mitigate potential sources of pollution (Idaho Department of Labor 1992). Mulch-straw, broadcast seeding, diversion ditches/dikes, interceptor trenches, certified weed-free straw bale barriers, silt fences, sediment traps, sumps, culverts, berms, sumps and roadway surface water deflectors are all currently being used on-site to mitigate runoff.

20.2.2 Phase 1 Permitting

Phase 1 will permit initial Project development and early mining on non-federally owned lands, thereby precluding the NEPA process. Phase 1 permitting will consist of state, county, and local permits and federal multi-sector permits where class EAs have been previously undertaken. All surface infrastructure will be located on non-federally owned lands. The Project will prevent discharge of any effluent to surface water and use injection wells for managing treated groundwater, process water, and diverted groundwater. PHA does not expect to impact wetlands during development and will not require a review of the Project by the United States Army Corps of Engineers (USACE).

Phase 1 activities requiring permits and/or approvals are as follows:

- Conditional Use Permit (CUP)
- Building permits
- Electrical power
- Air quality
- Highway right-of-way
- Railroads
- Water quality
- Reclamation
- Hazardous waste
- IDL lease application
- United States Mine Safety & Health Administration (MSHA) requirements

PHA has developed plans for acquiring the Phase 1 permits according to the Phase 1 permitting timeline shown in Figure 20-2.

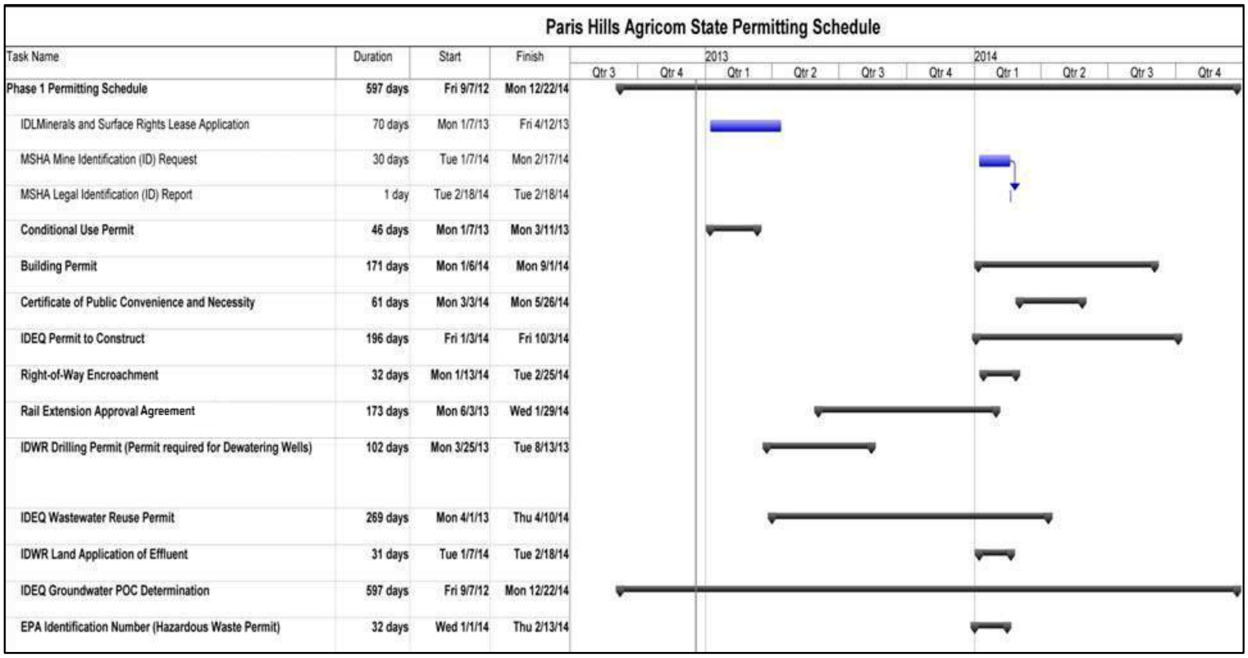


Figure 20-2. Phase 1 Permitting Schedule

Prior to commencement of mining activities, PHA will be required to file an application with the Planning and Zoning Administrator to obtain a CUP. Prior to construction of surface facilities such as the mine facilities building (MFB) and power line, PHA will be required to obtain a building permit and a Certificate of Convenience and Necessity (COCN) from Bear Lake County. A permit to construct (PTC) will be required for the proposed operating facilities prior to construction of buildings, structures, and installations that emit, or may emit, pollutants into the air. Anticipating the need to make improvements on US 89 for trucking of ore, PHA will need to coordinate with Idaho Transportation Department (ITD) in order to obtain a permit for right-of-way encroachment. Due to the length of time required to obtain approval and construct a rail loadout facility and rail extension, PHA will initiate the rail extension approval process the second quarter of 2013.

Dewatering will be required in advance of underground mining. PHA will apply for three separate permits through IDWR during the second quarter of 2013 for dewatering and injection wells. Permits include drilling permits, an appropriation permit to dewater, and injection well permits for injection wells. Water from the dewatering wells will be dispersed through land application and injection wells. Permitting for dewatering will be a phased process with additional permits added as needed, continuing throughout the first 5 years of mining. PHA plans to retain the mine's process water on-site with retention basins and/or land application (e.g. sprinkler systems) for the mine's firefighting and dust suppression, ensuring a zero-discharge operation (avoiding the need for an National Pollution Discharge Elimination System [NPDES] permit).

PHA will be required to obtain a wastewater reuse permit for the retention and infiltration of process waters and/or land application of process wastewater. To be in accordance with the Ground Water Quality Rule, PHA will obtain a POC determination from IDEQ. PHA initiated the POC process in the fourth quarter of 2012.

PHA anticipates generating less than 100 kilograms (kg) of hazardous waste or 1 kg of acutely hazardous waste in any calendar month, mainly comprising solid and liquid waste from mine water treatment facility. PHA will apply for an EPA Identification Number as a Hazardous Waste Generator through IDEQ if more than 100 kg of hazardous waste is generated in any calendar month.

20.2.3 Phase 2 Permitting

PHA will initiate the Phase 2 NEPA permitting process to allow mining on the federal estate. The anticipated Phase 2 timeline is summarized in Figure 20-3. The federally-owned mineral estate (IDI-0012982) is held by Earth Sciences, Inc. (ESI) and managed by the BLM. PHA has an agreement with ESI to conduct exploration activities on ESI's lease. Once exploration is completed, PHA is expected to apply for a competitive phosphate lease on lands associated with exploration license IDI-37055 and a preference right lease on lands associated with prospecting permit IDI-36773.

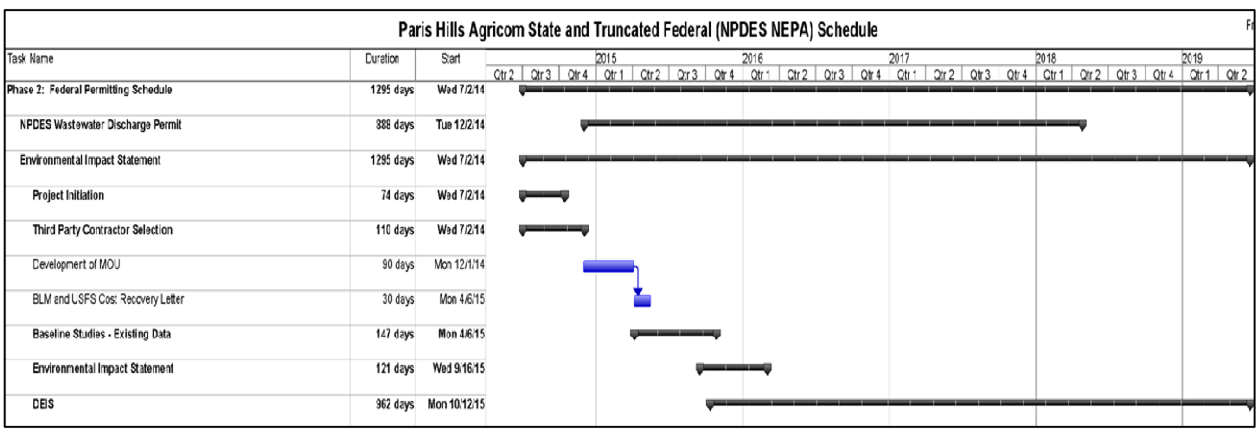


Figure 20-3. Phase 2 Permitting Schedule

PHA submitted the Paris Hills Exploration Drilling Plan (Stone 2010) to the BLM in July 2010. An EA was completed in August 2011 (BLM 2011). A Finding of No Significant Impact (FONSI) was signed by the BLM on 01 August 2011 which allowed for drilling on Federal Phosphate Lease IDI-012982 and issuance of a Prospecting Permit IDI-036773 and Exploration License IDI-037055.

Phase 2 permitting will require an Environmental Impact Statement (EIS). The Phase 2 timeline anticipates beginning the EIS in late-2014 and concluding with a BLM decision (Record of Decision) in 2019. BLM will serve as the lead federal agency with IDEQ, and potentially the USACE, as cooperating agencies. USACE will likely participate as a cooperating agency due to the location of the Project and the potential of the federal phosphate lease to impact waters of the US or wetlands which are under USACE's jurisdiction.

An NPDES Wastewater Discharge Permit is anticipated to be required by Year 4 based on the potential for direct discharge of MDW to waters of the US, or overflow from detention ponds to waters of the United States of America (USA or US). Discharge is subject to IDEQ Water Quality Standards including anti-degradation, beneficial uses, and, if appropriate, criteria as determined by 303(d) listing and/or TMDL. The process for applying and receiving a permit is extensive and requires significant planning and coordination with EPA Region 10, the permitting authority for NPDES in Idaho. Once an NPDES permit is obtained, the sewage treatment plant effluent can be discharged to the receiving environment.

The Phase 2 permitting and NEPA process is estimated to cost on the order of US$1 to US$2 million.

20.3 Reclamation

Project closure and reclamation are governed by the IDL on state and private land and the BLM on federal land. Due to the nature of this project, the majority of activities will occur underground, keeping surface disturbances to a minimum. The Project is estimated to result in 55.41 hectares (ha) of surface disturbance.

20.3.1 Idaho Department of Lands Reclamation Requirements

State and private land reclamation will be conducted in accordance with the Idaho Surface Mining Act, Title 47, Chapter 15, Idaho Code (State of Idaho Legislature 2011) which requires the operator of a surface mine to obtain an approved reclamation plan and bond. The Surface Mining Act, passed in 1971, states that any person who conducts surface mining of minerals for ultimate or immediate sale, in either the natural or processed state, must first have an approved reclamation plan.

The IDL is the lead agency for implementing the anti-degradation policy for surface mining and is responsible for the review and approval of the Operations Closure Plan (Plan) to be prepared by PHA. The IDL may solicit comments from the IDFG, IDWR, and IDEQ. A site review with these agencies may be conducted prior to plan approval, if necessary. The review typically takes from 30 to 60 days.

Reclamation activities will be designed to protect resources long-term. Success will be demonstrated through vegetation community structure, percent ground cover, species diversity, and evaluation of the selenium content in soils and vegetation in the reclaimed areas. Analysis of the selenium content will only be necessary within the mine waste rock disposal facility and portal area since these are the only areas that will contain mine waste rock. It is anticipated that post-mining uses of both public and private lands will be similar to pre-mining uses.

Reclamation of surface features will include the removal of all surface structures such as backfilling and the re-grading of all disturbed areas to conform to the natural topography, unless otherwise approved by the managing agency. This work will be designed to minimize erosion and increase the likelihood of seedling success. Disturbed areas will be reseeded with a mix approved by the IDL.

The Feasibility Study (FS) estimates reclamation for the Project to cost US$2.8 million and to take approximately 18 months to complete.

The reclamation plan requires a performance bond in the form of a surety bond, or an annual payment to the Reclamation Fund, cash, a Certificate of Deposit, or a Bank Letter of Credit. The IDL and the mine owner will agree at the time of plan approval on a bond amount for lands to be affected during the next 12-month period. The bond will be reevaluated on a yearly basis to establish a new bond amount based on disturbed areas. The aggregate amount of the surety bond for the Project is estimated to be US$3.2 million (AAI et al. 2012b).

20.3.2 United States Bureau of Land Management Reclamation Requirements

A portion of the underground mining operation is within federal lease land. Reclamation for this portion of the mine will be in accordance with BLM requirements and are contained in Chapter IX of the BLM Handbook 3042-01 “Solid Minerals Reclamation Handbook” (BLM 1992); 43 CFR §3595 “Protection Against Mining Hazards” (2011); and IDL’s “Best Management Practices for Mining in Idaho” (1992).

The BLM (1992) Handbook 3042-01 states the closure plan would be reviewed by an experienced underground mining engineer to ensure the plan meets the applicable state and federal requirements. The engineer will make an inspection of the closure site after completion to ensure the closure remains adequate. An on-site investigation would be conducted by a qualified biologist to determine if bats or other wildlife inhabit any remaining underground workings

The BLM closure plan is required to contain the following items:

1. Detailed description of the proposed method of closing the portal(s).

2. Geographic report including a map showing the location of the portal(s) in relation to all man-made facilities, other mines, roads, and rivers which may be affected by the influence the portal(s) may have on future surface uses. This report must include all anticipated subsidence.

3. Geologic report including maps of all strata, faults, fracture and joint patterns, geologic structure, potential subsidence and any other features which may influence the abandonment.

4. Hydrologic report of all aquifers, including the quantity and quality of waters present, maximum and minimum flow rates, potential for contamination, solubility of mineral present, anticipated head which will develop if the workings flood, and any other relevant matters. In the event of subsidence, potential for subsidence features to act as a conduit for surface waters to enter the underground workings must be given consideration.

20.4 Social-Economic Considerations

The proposed mine is located near the communities of Paris and Bloomington in Bear Lake County, Idaho. In 2009, the population of Paris was 483 **p**ersons and Bloomington was 224 persons. Community facilities include the historic Bear Lake Stake Tabernacle built in 1889, the Bear Lake County District Public library, the Paris Elementary School, two Church of Latter Day Saints' churches, and the Bear Lake County Sherriff's office.

Historically, the Shoshone and Bannock tribes lived in and traveled through the area. In 1867 and 1868, the Fort Hall and Wind River Valley Reservations were established and all other lands in Idaho and Wyoming were relinquished by the Shoshone (Driggs 1970). The Bannock were assigned to the Fort Hall Reservation in 1869 (Manning and Deaver 1992). Today, approximately 32 persons (0.5 percent [%]) of American Indian descent live in Bear Lake County. To date no issues have been identified by the tribes and none are expected as a result of the proposed Project.

Data from the Idaho Labor Market (Idaho Department of Labor 2011) stated approximately 3,370 persons comprise the Bear Lake County civilian labor force, of which, 5.4% are currently unemployed. The largest non-farm industries are leisure and hospitality, government, and trade.

Average employee income for the Paris Hills phosphate mine employees would be higher than the median income in Bear Lake County, and this would have a significant economic impact on established and new businesses which service the mine and local communities. The tax base and income for the towns of Paris, Bloomington, and Montpelier would increase as a result of the Project going into production. It is conservatively estimated that total annual income in Bear Lake County could increase by more than 30% once the Paris Hills phosphate mine is in full production. PHA will average US$31 million in annual labor costs, a 40% increase over the County's US$78 million per annum per capital income.

PHA presently employs local residents and utilizes local businesses, including services such as food and beverage, supplies, welding, construction of roads, housing, and truck repairs.

PHA is well received by the local community, including the City Councils of Paris, Bloomington, and Montpelier, and the Bear Lake County and Regional Commissions. PHA staff members have regularly attended City Council meetings in Paris, Bloomington, and Montpelier. PHA representatives have met with City Council members, agency and department heads, landowners, and members of the general public. The municipalities, county governments, Regional Commission, and local news media receive all news releases issued by PHA. PHA staff conducted two Community Open House Events since the Property was acquired.

The PHA management team and Project have been complimented, on the record, before all local governmental subdivisions for the positive contributions made to the region and the potential going forward. Especially noted and commended are the transparency of the operation, timeliness of reporting, and the responsiveness to community concerns and requests.

21.0 CAPITAL AND OPERATING COSTS

All dollars in the economic models and cost estimates are in 2012 United States of America (USA or US) dollars unless otherwise noted. The mine production schedule developed from the Feasibility Study (FS) mine planning process provides the basis for the estimates and timing of the operating and capital costs. The cost of purchasing and operating the equipment combined with the labor costs establishes the cost structure for the project economics. Sensitivity analyses were completed to provide a range of economic results with variances in operating cost and revenue units from the base case. Numbers stated in tables are rounded such that differences may appear between individual and total values, or between tables.

21.1 Operating Cost

Operating costs are expressed in terms of dollars per dry tonne. Operating costs include a direct and indirect component. Ongoing recurring costs are part of the normal mining operation and are considered direct costs. These cost items are dependent on the ore production rate and will include labor, materials, power, and fuel. Indirect or fixed costs are independent of the rate of production and include such items as administration, leases, and property taxes.

The mine operating cost components with the weighted average cost per dry tonne are listed in Table 21-1. The operating cost estimate by year is included in Table 21-2 and graphically in Figure 21-1.

For the FS, labor costs were zero-base budgeted (ZBB).[8] Where detail was available, operating costs were estimated using engineering and design. Other costs, including operating materials and supplies, maintenance materials and repair, underground diesel and lube, and administrative costs, were factored by averaging several room-and-pillar mines' costs as provided by Agapito Associates, Inc. (AAI). Ground control costs were based on preliminary engineering design. Power and fuel costs and underground rock work were determined on an engineered and factored basis. Mine drainage system maintenance and repair costs, surface facilities cost, and user/disposal fees were estimated by Sunrise Engineering, Inc. (Sunrise) with input from Paris Hills Agricom Inc. (PHA) based on the preliminary design.

21.1.1 Mine Operating Cost

The operating costs associated directly with mine production include labor with supervision, operating materials and supplies, maintenance materials and repairs; power and fuel; receding face (see Item 21.1.1.5); mine drainage water (MDW) treatment; underground construction rock handling; and crushing to specifications. The detail of the cost estimate basis is included in each of the following sections.

[8] Zero-based budgeting (ZBB) is the practice of building a budget as if it is being undertaken for the first time. The budget does not build on incremental budgeting nor use factored historical or previously developed budgets. It is especially adaptable to discretionary cost areas in which service and support are the primary outputs (Horngren 1984).

Table 21-1. Preliminary Operating Cost Weighted Average

Item	$/tonne	Percentage of Cost
Labor	$32.37	46.6%
Operating supplies		
Ground control	$5.40	7.8%
Other operating supplies	$2.44	3.5%
Underground repair and maintenance		
Section cables	$1.20	1.7%
Other maintenance and repair	$2.99	4.3%
Surface mobile equipment	$0.81	1.2%
Power and fuel		
Electric power	$9.00	13.0%
Diesel fuel/oil/lube underground	$0.66	0.9%
Propane	$2.61	3.8%
Receding face	$2.73	3.9%
Mine drainage water system	$0.31	0.5%
Administrative	$2.67	3.8%
User/disposal fee	$0.05	0.1%
Contract crushing	$5.13	7.4%
Surface structures	$0.54	0.8%
Underground rock handling	$0.57	0.8%
Operating Cost Without rail	**$69.49**	**100.0%**

21.1.1.1 Labor—Labor is a significant operating cost. It accounts for over 45 percent (%) of the cash operating cost. Skilled miner's hourly straight time wage averages $30 per hour. Beyond the hourly cost paid to the employee, the company cost includes: workers compensation insurance, Social Security taxes, Medicare taxes, and other benefits such as health insurance and retirement/savings plan contributions. The assumptions of Idaho's employment tax structure are included in Table 21-3. The other benefits category[9] is assumed at 20% of straight time wages.

Labor is estimated from the headcount details of hourly underground, hourly surface and salary underground, and surface personnel required to match the production schedule. Personnel are classified as either hourly, salary exempt or salary non-exempt. Hourly classifications are shown in Table 21-4. Classifications "A" through "C" refer to the hourly wage classification of multi-skilled miner, skilled miner, or semi- skilled miner, respectively. A multi-skilled miner

[9] Other benefits include employee life insurance, health insurance, savings plans (401[k] or similar plans), flexible benefits plans, relocation cost for key employees, etc.

Table 21-2. Operating Cost Summary

	Year									
Item	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Tonnes of ore	318,872	740,097	885,428	916,260	986,810	902,858	999,153	941,867	970,639	1,019,776
Tonnes of rock	75,660	71,518	91,748	32,760	32,178	61,338	22,110	10,440	13,910	9,678
Labor	$55.55	$36.11	$33.72	$32.94	$30.76	$33.80	$31.05	$33.30	$32.31	$30.42
Operating supplies										
Ground control	$6.04	$5.87	$5.84	$5.62	$5.24	$5.69	$5.21	$5.53	$5.38	$5.24
Other operating supplies	$2.58	$3.20	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40
Underground repair and maintenance										
Section cables	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20
Other maintenance and repair	$3.50	$3.25	$3.25	$2.95	$2.95	$2.95	$2.95	$2.95	$2.95	$2.95
Surface mobile equipment	$1.81	$1.23	$0.76	$0.80	$0.74	$0.81	$0.73	$0.78	$0.75	$0.72
Power and fuel										
Electric power	$4.79	$4.96	$6.18	$8.25	$8.03	$9.42	$9.49	$9.42	$9.94	$9.35
Diesel fuel/oil/lube underground	$0.30	$0.50	$0.50	$0.65	$0.65	$0.65	$0.65	$0.65	$0.75	$0.75
Propane	$2.11	$1.82	$3.05	$2.94	$2.73	$2.99	$2.70	$2.86	$2.78	$2.64
Receding face	$37.67	$12.39	$12.86	$7.94	$0.19	$2.28	$0.62	$0.30	$0.22	$0.32
Mine drainage water system	$0.12	$0.05	$0.08	$0.31	$0.31	$0.34	$0.32	$0.34	$0.34	$0.32
Administrative	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67
User/disposal fee	$0.14	$0.06	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05
Contract crushing	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13
Surface structures	$1.02	$0.50	$0.53	$0.53	$0.51	$0.55	$0.50	$0.53	$0.52	$0.49
Underground rock handling	$3.37	$1.74	$2.24	$0.82	$0.47	$1.58	$0.31	$0.27	$0.25	$0.15
Total Cost Per Tonne Without Rail—ROM Ore	**$127.99**	**$80.69**	**$80.46**	**$75.22**	**$64.02**	**$72.51**	**$65.98**	**$68.37**	**$67.63**	**$64.80**

Table 21-2. Operating Cost Summary *(concluded)*

	Year									
Item	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**Weighted Average**
Tonnes of ore	926,500	1,005,129	975,220	941,188	991,810	1,008,273	1,010,616	960,763	202,441	
Tonnes of rock	20,955	13,165	19,654	22,767	14,726	12,239	8,667	11,745		
Labor	$33.45	$30.73	$30.95	$32.07	$30.43	$29.94	$29.87	$28.41	$51.45	$32.37
Operating supplies										
Ground control	$5.45	$5.32	$5.24	$5.37	$5.23	$5.27	$5.27	$5.16	$4.93	$5.40
Other operating supplies	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.40	$2.44
Underground repair and maintenance										
Section cables	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20
Other maintenance and repair	$2.95	$2.95	$2.95	$2.95	$2.95	$2.95	$2.95	$2.95	$2.95	$2.99
Surface mobile equipment	$0.79	$0.73	$0.75	$0.78	$0.74	$0.73	$0.72	$0.76	$2.28	$0.81
Power and fuel										
Electric power	$10.44	$10.18	$10.01	$9.84	$9.30	$9.22	$9.01	$8.79	$15.70	$9.00
Diesel fuel/oil/lube underground	$0.75	$0.75	$0.75	$0.75	$0.75	$0.65	$0.65	$0.50	$0.50	$0.66
Propane	$2.91	$2.68	$2.76	$2.86	$2.72	$2.67	$2.00	$1.40	$2.00	$2.61
Receding face	$0.37	$0.20	$0.34	$0.35	$0.39	$0.14	$0.26	$0.02		$2.73
Mine drainage water system	$0.37	$0.34	$0.35	$0.35	$0.33	$0.33	$0.32	$0.33	$1.32	$0.31
Administrative	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67	$2.67
User/disposal fee	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.23	$0.05
Contract crushing	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13	$5.13
Surface structures	$0.54	$0.50	$0.51	$0.53	$0.51	$0.50	$0.50	$0.52	$2.18	$0.54
Underground rock handling	$0.34	$0.22	$0.20	$0.25	$0.17	$0.20	$0.03	$0.26		$0.57
Total Cost Per Tonne Without Rail—ROM Ore	**$69.80**	**$66.04**	**$66.26**	**$67.55**	**$64.96**	**$64.03**	**$63.03**	**$60.56**	**$94.93**	**$69.49**

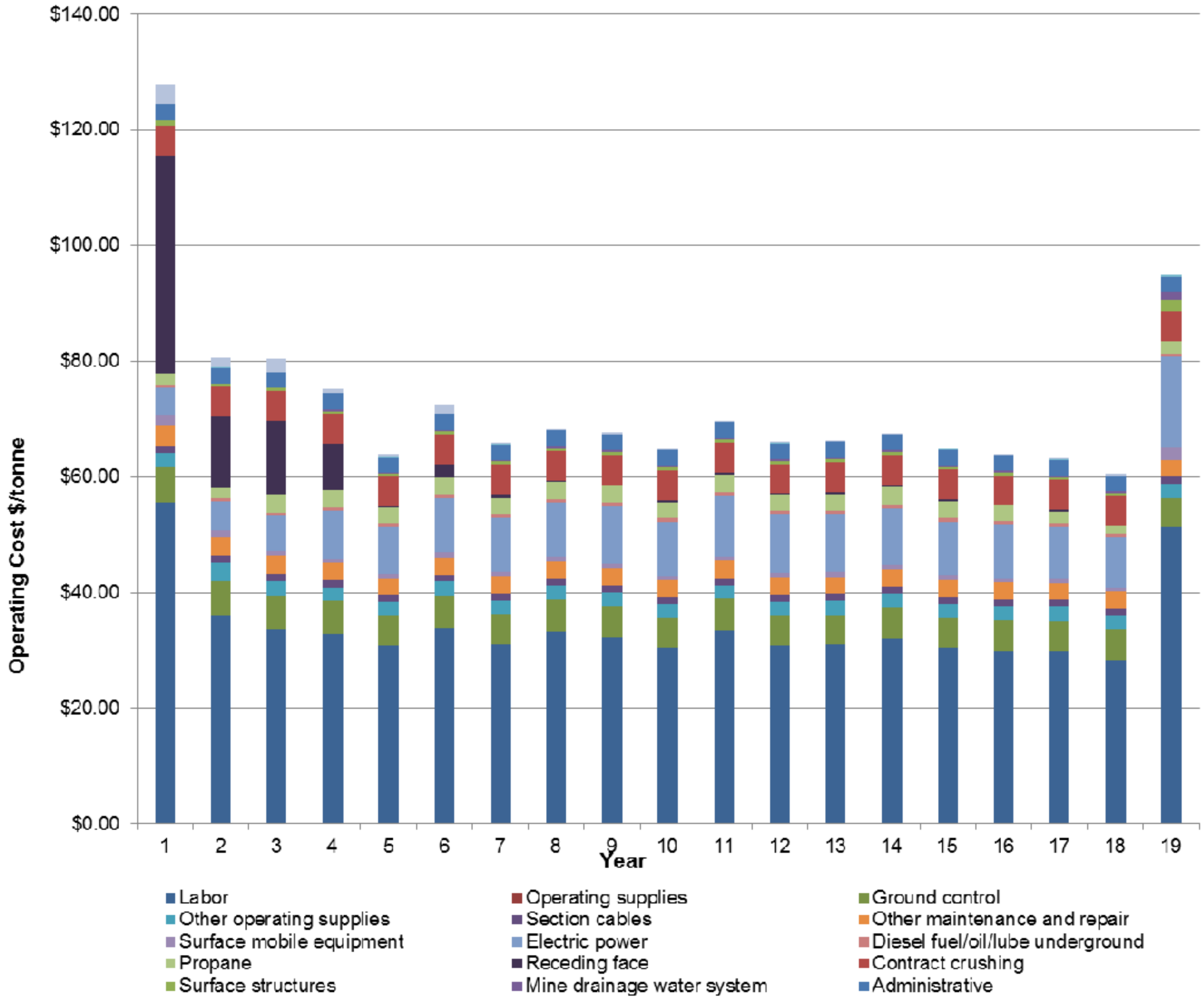


Figure 21-1. Operating Cost by Production Year

Table 21-3. Employment Tax Structure

Category	Percent (%)	Notes
Workers compensation	6.80%	Rate per $100 of payroll, $300 minimum/employee
Social Security	6.20%	Wage cap at $106,800
Medicare	1.45%	No wage cap
Unemployment	3.36%	Wage cap at $33,300
Other benefits	20.00%	Percent of straight time wages

Table 21-4. Hourly Wage and Classification Assumptions

Classification	Category	Hourly Straight Time Wage ($/hour)
A	Multi-skilled Miner	$32.00
B	Skilled Miner	$30.00
C	Semi-skilled Miner	$28.00

Note: Wage rates represent hourly straight time wage.

(A) classification also includes surface electricians and diesel mechanics. The semi-skilled miner classification (C) includes surface positions except for electricians and diesel mechanics.

The annual personnel costs including benefits are summarized in Table 21-5. The summary includes each category of underground and surface hourly and salary. Tables 21-6 shows the peak personnel cost per tonne by job categories. Costs include both salary and burden.

21.1.1.2 Operating Materials and Supplies—Operating materials and supplies costs are greater than 10% of the operating cost. Operating materials and supplies include consumables such as ventilation curtain, cutting bits, drill steels, hydraulic and lube oils, water hoses, and ground support.

The ground support costs are estimated for both advance and retreat mining. During advance, the roof and updip rib of all entries will be bolted, strapped and meshed. The mains and sub-mains will have additional support in the form of 9.21-m resin cable bolts installed at the intersections of the travel way and the belt entries. On retreat, the roof and the updip rib of the entries splitting the pillars will be bolted and meshed. A 30% supplemental cost is added to the minimum total roof support cost/tonne for items such as extra bolts (spot bolting, shuttle car anchor bolts, timbers, cribs and wastage). This is an increase from the 20% supplemental cost used in the Preliminary Feasibility Study (PFS) (AAI et al. 2012a) because the new mine plan increased panel length is expected to require additional support due to extended panel entry life.

Table 21-5. Labor Cost by Classification (US 2012 $ thousands)

Category	Year -1	1	2	3	4	5	6	7	8	9	10
Hourly											
Underground											
Production	$153	$3,831	$7,355	$8,274	$8,274	$8,274	$8,274	$8,524	$8,524	$8,524	$8,274
Maintenance	$85	$1,181	$1,971	$2,601	$2,766	$2,891	$3,016	$3,141	$3,390	$3,390	$3,390
General Outby	$69	$1,423	$2,494	$2,704	$2,704	$2,704	$2,704	$2,704	$2,704	$2,704	$2,704
Total Hourly Underground	$308	$6,435	$11,820	$13,579	$13,745	$13,869	$13,994	$14,369	$14,618	$14,618	$14,369
Surface											
General	$59	$802	$1,184	$1,302	$1,302	$1,302	$1,302	$1,302	$1,302	$1,302	$1,302
Maintenance	$97	$712	$875	$907	$907	$907	$907	$907	$907	$907	$907
Total Hourly Surface	$156	$1,515	$2,058	$2,209	$2,209	$2,209	$2,209	$2,209	$2,209	$2,209	$2,209
Total Hourly	$464	$7,949	$13,878	$15,788	$15,954	$16,078	$16,203	$16,578	$16,827	$16,827	$16,578
Salary											
Management	$470	$940	$940	$940	$940	$940	$940	$940	$940	$940	$940
Operations	$142	$1,175	$1,600	$1,940	$2,020	$2,020	$2,020	$2,020	$2,020	$2,020	$2,020
Maintenance	$206	$1,198	$1,418	$1,485	$1,485	$1,485	$1,485	$1,485	$1,485	$1,485	$1,485
Engineering and Technical	$219	$1,275	$1,434	$1,483	$1,490	$1,490	$1,490	$1,490	$1,490	$1,490	$1,490
Safety	$70	$290	$300	$300	$300	$300	$300	$300	$300	$300	$300
Salary Total	$1,356	$5,776	$6,612	$7,068	$7,155	$7,155	$7,155	$7,155	$7,155	$7,155	$7,155
Total Labor	**$1,820**	**$13,726**	**$20,490**	**$22,855**	**$23,109**	**$23,233**	**$23,358**	**$23,733**	**$23,982**	**$23,982**	**$23,733**

Note: Does not include any current positions.

Table 21-5. Labor Cost by Classification (US 2012 $ thousands) *(concluded)*

Category	Year 11	12	13	14	15	16	17	18	19	20	21
Hourly											
Underground											
Production	$8,274	$8,274	$8,274	$8,274	$8,274	$8,274	$8,274	$7,355	$1,609		
Maintenance	$3,390	$3,390	$3,390	$3,390	$3,390	$3,390	$3,390	$2,710	$646		
General Outby	$2,704	$2,704	$2,704	$2,704	$2,704	$2,704	$2,704	$2,391	$715		
Total Hourly Underground	$14,369	$14,369	$14,369	$14,369	$14,369	$14,369	$14,369	$12,455	$2,970		
Surface											
General	$1,302	$1,302	$940	$940	$940	$940	$940	$940	$717		
Maintenance	$885	$801	$645	$645	$645	$645	$645	$645	$501		
Total Hourly Surface	$2,187	$2,104	$1,585	$1,585	$1,585	$1,585	$1,585	$1,585	$1,218		
Total Hourly	$16,555	$16,472	$15,954	$15,954	$15,954	$15,954	$15,954	$14,040	$4,188		
Salary											
Management	$940	$940	$940	$940	$940	$940	$940	$940	$787		
Operations	$2,020	$2,020	$2,020	$2,020	$2,020	$2,020	$2,020	$1,840	$832		
Maintenance	$1,485	$1,485	$1,485	$1,485	$1,485	$1,485	$1,485	$1,452	$830		
Engineering and Technical	$1,490	$1,490	$1,490	$1,490	$1,490	$1,490	$1,490	$1,448	$681	$202	$125
Safety	$300	$300	$300	$300	$300	$300	$300	$300	$190		
Salary Total	$7,155	$7,155	$7,155	$7,155	$7,155	$7,155	$7,155	$6,900	$3,932	$202	$125
Total Labor	**$23,710**	**$23,627**	**$23,109**	**$23,109**	**$23,109**	**$23,109**	**$23,109**	**$20,940**	**$8,120**	**$202**	**$125**

Note: Does not include any current positions.

Table 21-6. Personnel Cost at Maximum Mine Extent—Year 8

Category	Cost per Tonne
Hourly	
Underground	
Production	$12.20
Maintenance	$4.85
General outby	$3.88
Total Hourly Underground	$20.93
Surface	
General	$1.87
Maintenance	$1.30
Total Hourly Surface	$3.17
Hourly Total	**$24.10**
Salary	
Management	$1.23
Operations	$2.61
Maintenance	$1.92
Engineering and technical	$1.93
Administration	$0.63
Human Resources	$0.48
Safety and Training	$0.39
Salary Total	**$9.20**
Total	**$33.30**
Number of personnel	358
Tonnage	941,867
Average cost including burden	$87,602

Does not include corporate or current exploration personnel
7 production days/week:
Two 10-hour production shifts/day for 4 days/week
One 13-hour production shifts/day for 3 days/week
One additional 13-hour production shift on Fridays

The ground control estimate is included in Table 21-7. The balance of underground operating materials and supply costs are factored from a comparison of room-and-pillar mine operations using similar equipment and methods.

21.1.1.3 Underground Repair and Maintenance—Maintenance materials and supplies are directly reflected in the anticipated mining conditions. The anticipated conditions of muddy and steeply dipping working areas will result in higher maintenance costs than room-and-pillar mines with more favorable mining conditions. Maintenance materials and supplies include replacement trailing cables, parts, tires, and other materials necessary to maintain all the

Table 21-7. Ground Support Estimate

	Item Detail	Cost per Item ($)	Units per Meter	Cost per Meter ($)	Cost per Tonne ($)
DEVELOPMENT MINING					
Roof Support					
2.44-m bolts on 1.07-m spacing	2.44-m torque tension bolt	$12.00	3.74	$44.88	$1.72
	Roofbolt plate 150 mm x 150 mm	$1.99	3.74	$7.44	$0.29
	Resin (2 speed)	$1.86	9.20	$17.11	$0.66
	Metal strap	$3.41	0.94	$3.21	$0.12
	Wire mesh/meter (15-cm overlap by row)	$20.43	1.19	$24.37	$0.93
	Belt entry post at rib (1.5-m spacing)		0.10		
	Subtotal				$3.72
Rib Support (updip rib only)					
1.52-m bolts 2 per row on 1.5-m spacing	1.52-m torque tension bolt	$8.58	0.67	$5.72	$0.22
	Roofbolt plate 150 mm x 150 mm	$1.36	0.67	$0.91	$0.03
	Resin (2 speed)	$1.86	1.02	$1.89	$0.07
	Mesh	$20.43	0.19	$3.94	$0.15
	Rib plate	$4.27	0.67	$2.85	$0.11
	Corner straps	$13.93	0.33	$4.64	$0.18
	Subtotal				$0.76
Mains and Submains on Development					
2 out of every 7 intersections supported.	4.27-m cable bolts for intersections main travelway and belt entry	$19.78	0.15	$3.01	$0.12
4 sets each of 2 intersections every 30-m advance	Resin for cable bolts	$1.86	0.65	$1.21	$0.05
	Subtotal				$0.16
	Minimum total roof support cost/tonne of development				$4.64
	Estimated cost with 30% supplemental support (timbers, cribs, extra bolts) and wastage				**$6.04**
RETREAT MINING					
Roof Support					
6-ft bolts on 3.5-m spacing with mat and mesh	1.52-m torque tension	$9.00	3.74	$33.66	$1.29
	Roofbolt plate 150 mm x 150 mm	$1.99	3.74	$7.44	$0.29
	Resin (2 speed)	$1.86	5.68	$10.57	$0.41
	Metal strap	$3.41	0.94	$3.21	$0.12
	Wire mesh/meter (15-cm overlap by row)	$20.43	1.19	$24.37	$0.93
	Breaker Posts (8 per 30 m)		0.53		
	Subtotal				$3.04
Rib Support (updip rib only)					
5-ft bolts 2 per row on 1.5-m spacing	1.52-m torque tension	$7.50	0.67	$5.00	$0.19
	Round plate	$1.99	0.67	$1.33	$0.05
	Resin (2 speed)	$1.86	1.01	$1.88	$0.07
	Mesh	$20.43	0.19	$3.94	$0.15
	Rib plate	$4.27	0.67	$2.85	$0.11
	Corner straps	$13.93	0.33	$4.64	$0.18
	Subtotal				$0.75
	Minimum total roof support cost/tonne of pillaring				$3.79
	Estimated cost with 30% supplemental support (timbers, cribs, extra bolts) and wastage				**$4.93**

Notes: 26.1 tonnes per meter of development (average). Mining rate 900,000 tonnes per year (average)

equipment. The cable replacement costs are an engineered estimate. The balance of maintenance, materials and repair costs are factored from a comparison of room-and-pillar mine operations using similar equipment and methods.

21.1.1.4 Surface Mobile Equipment—The surface mobile equipment operation and maintenance costs reflect those expenses for fuel, hydraulic and lubricating oils, glycols, and other consumable fluids as well as for parts and components replaced during preventative and regular maintenance activities and during repair work. Also included hereunder are costs for tire replacement and for rebuilding heavy equipment.

21.1.1.5 Power and Fuel—The high horsepower equipment in the underground is operated using electric power. The electric power is estimated using the engineering design of the distribution system and estimated demand. The electric power accounts for an average 13% of the operating costs. Limited diesel operated equipment will be utilized underground due to diesel particular matter (DPM). Diesel-powered equipment will be used for personnel and supply transport, and for service equipment. The fuel cost for the underground diesel equipment is factored from similar mines. Propane used to heat the intake ventilation air is an additional operating cost during the winter months of the year. Average and peak demands for heating were based on the requirement to heat the intake air (using the average and record low temperatures) in the months from September to May to 4.4 degrees Celsius (°C). At peak demand, an 11.2-megawatt (MW) rated heater will be required. The heating system is thermostatically controlled to conserve propane use. Table 21-8 summarizes the propane operating cost estimate.

Table 21-8. Propane Estimate to Heat 212-cms Ventilation Air to 4.4°C

Month	Average Low Temperature (°C)	Record Low (°C)	Average Demand (liter/hour)	Peak Demand (liter/hour)
January	-14.4	-36.1	356	541
February	-13.0	-36.7	303	500
March	-8.8	-31.7	186	379
April	-2.9	-22.2		212
May	1.4	-10.6		87
June	5.1	-5.0		
July	8.5	-7.2		
August	7.2	-3.3		
September	2.3	-13.3		61
October	-2.3	-17.8		193
November	-7.5	-34.4	148	345
December	-12.0	-37.2	303	477
Heater size (MW)			7.00	11.20
Liters of propane consumed per hour during heating months			1,295	2,794
Millions of liters of propane consumed per year			5.670	22.025
Cost per year			$2,696,328	$10,473,106

Notes: Based on bulk price of propane of $0.48/liter. Heating of 212-cms quantity of ventilation air.

21.1.1.6 Receding Face—The cost of mine advance equipment is normally treated as capital expenditures and depreciated over the useful life. The receding face theory (US Treasury

Registry Section 1.612-2[a]) allows the deduction of capital expenditures (book basis) as operating costs if they are incurred solely because of the recession of the working face. For example, the extension of a conveyor belt to within the reach of the loading equipment at the working face does not increase the mine's production, decrease its operating cost, or otherwise enhance the mine value's at the loading point; therefore, the costs associated with the receding face qualify as an operating cost. For the FS economic analysis, these costs are expensed rather than capitalized.

Mine extension (receding face theory) infrastructure items fall into two main categories: permanent installations and recoverable items. Permanent infrastructure includes items consumed in the mining process, such as roof bolts used to anchor messenger wires for high voltage and communications cable installations. As the mine advances, the belt conveyor structure is advanced with the face. As the mine retreats, the structure can be recovered and installed at another location in the mine. The mine extension infrastructure typically includes all materials outby the section feeder-breaker, but does not include items on the surface at the mine portal. Tracking items associated with the mine extension in alignment with the mine production scheduling is critical to budgeting purchases to avoid production delays, and managing supply inventory. The costs by item and timing of installation associated with the receding face are shown in Table 21-9.

21.1.1.7 Mine Drainage Water System—MDW treatment costs are estimated by Sunrise for treating the water that contacts the mine opening. This volume is estimated to peak at approximately 63 liters per second (lps). The cost estimate includes pumping maintenance and reverse osmosis (RO) treatment of the mine water to the lowest applicable standard so that the water can be injected with the groundwater injection system. The cost estimate also includes recovery of solids from the water treatment plant and subsequent permanent waste disposal.

A water right must be purchased or leased to allow for use of water for the fire flow pond, mine discharge water, and other consumptive uses during mining operations. This has been accounted for in the operating cost section as an annual payment.

21.1.1.8 Administrative Cost—Administrative costs include such items as property taxes, insurance, telephone and postage, specialty consultants, legal services, office equipment leasing (copiers, etc.), office supplies, exploration lease fees, United States Mine Safety & Health Administration (MSHA) penalties, corporate overhead and sales costs. The administrative cost is based on comparison with room-and-pillar operations using similar mining methods.

21.1.1.9 User/Disposal Fee—The trash and sludge disposal costs as provided by quote from local vendors are included in this cost category. This category also includes the estimated Bloomington water use fees.

21.1.1.10 Contract Crushing—Crushing of the phosphate rock to minus 6.4 millimeter (mm) specification will be done by a contract operator. The budget quote includes labor, supplies, maintenance, and power costs for crushing up to 360 tonnes per hour (tph). The budget also includes a metal building in which to house the crusher and protect it from the weather.

Table 21-9. Receding Face Equipment (US$ millions)

Category	Year								
	1	2	3	4	5	6	7	8	9
Other Underground Equipment and Faciltities									
Fresh Water Pipe and Fittings (4 inch pvc)	$0.047	$0.047	$0.044	$0.038	$0.003	$0.025	$0.003	$0.003	
Mine Drainage Pipe and Fittings (8 inch pvc)	$0.060	$0.111	$0.104	$0.025	$0.029	$0.031			
Mine Drainage Pumps	$0.117	$0.117	$0.352	$0.117			$0.117		
Mine Drainage Pump Power Center & Starter	$0.150	$0.150	$0.450	$0.150			$0.150		
Mine Drainage Pipe and Fittings (6 inch pvc)	$0.027			$0.035					
48-inch Terminal Group	$8.395	$5.996	$7.195	$4.797		$1.199			
48-inch Structure	$0.344	$0.343	$0.318	$0.277	$0.022	$0.182	$0.022	$0.022	$0.022
48-inch Belting	$0.944	$0.941	$0.873	$0.761	$0.108	$0.499	$0.108	$0.108	$0.108
48-inch Power Unit (1000 hp)	$1.304	$0.913	$1.565	$0.783			$0.130		
48-inch Intermediate Loading Station	$0.160	$0.180	$0.160						
48-inch Belt Crossovers	$0.025	$0.025	$0.023	$0.020	$0.002	$0.013	$0.002	$0.002	
4/0 High Voltage Cable - Sections	$0.092	$0.092							
4/0 High Voltage Cable - Mains Belt Conveyors	$0.048			$0.062					
Control and Monitoring Cable Hangers	$0.001	$0.002	$0.002	$0.000	$0.000	$0.000			
Control and Monitoring UG Cable	$0.023	$0.023	$0.021	$0.019	$0.001	$0.012	$0.001	$0.001	$0.001
Dial/Pager Phones	$0.004	$0.003	$0.003	$0.002		$0.001	$0.064	$0.064	$0.064
Dial/Pager Phones UG Cables	$0.002	$0.002	$0.002	$0.002	$0.000	$0.001			
Personnel Tracking UG Cable Hangers	$0.002	$0.002	$0.002	$0.001	$0.000	$0.001	$0.000	$0.000	$0.000
Personnel Tracking UG Cables	$0.007	$0.007	$0.006	$0.006	$0.000	$0.004	$0.000	$0.000	$0.000
CO Detection System - Sensors and cables	$0.090	$0.090	$0.084	$0.073	$0.006	$0.048	$0.006	$0.006	$0.006
Outby Mine Atmospheric Monitoring Sensors	$0.030	$0.030	$0.028	$0.024	$0.002	$0.016	$0.002	$0.002	
Block Stoppings Mains (solid)	$0.014	$0.027	$0.025	$0.008	$0.010	$0.014	$0.002		
Block Stopping Panels (hollow)	$0.006	$0.007	$0.010	$0.018	$0.006	$0.014	$0.010	$0.018	$0.017
Mandoors	$0.002	$0.002	$0.002	$0.002		$0.001			
Overcasts - metal	$0.114	$0.057	$0.114	$0.057				$0.057	
Regulators	$0.004	$0.003	$0.004	$0.002		$0.001			
Total	$12.013	$9.168	$11.387	$7.279	$0.189	$2.061	$0.618	$0.282	$0.218

Table 21-9. Receding Face Equipment (US$ millions) *(concluded)*

Category	Year								
	10	11	12	13	14	15	16	17	18
Other Underground Equipment and Faciltities									
Fresh Water Pipe and Fittings (4 inch pvc)									
Mine Drainage Pipe and Fittings (8 inch pvc)									
Mine Drainage Pumps									
Mine Drainage Pump Power Center & Starter									
Mine Drainage Pipe and Fittings (6 inch pvc)									
48-inch Terminal Group									
48-inch Structure	$0.022	$0.022	$0.022	$0.022	$0.022	$0.022	$0.022	$0.022	
48-inch Belting	$0.108	$0.108	$0.108	$0.108	$0.108	$0.108	$0.108	$0.108	
48-inch Power Unit (1000 hp)	$0.130	$0.130		$0.130	$0.130	$0.130			
48-inch Intermediate Loading Station									
48-inch Belt Crossovers									
4/0 High Voltage Cable - Sections									
4/0 High Voltage Cable - Mains Belt Conveyors									
Control and Monitoring Cable Hangers									
Control and Monitoring UG Cable	$0.001	$0.001		$0.001					
Dial/Pager Phones									
Dial/Pager Phones UG Cables									
Personnel Tracking UG Cable Hangers									
Personnel Tracking UG Cables									
CO Detection System - Sensors and cables									
Outby Mine Atmospheric Monitoring Sensors									
Block Stoppings Mains (solid)									
Block Stopping Panels (hollow)	$0.011	$0.021	$0.015	$0.011	$0.017	$0.012	$0.014	$0.021	$0.020
Mandoors									
Overcasts - metal	$0.057	$0.057	$0.057	$0.057	$0.057	$0.114		$0.114	
Regulators									
Total	$0.329	$0.339	$0.201	$0.329	$0.333	$0.385	$0.144	$0.264	$0.020

21.1.1.11 Surface Facilities—The operating costs for the potable water system, mine water treatment, wastewater treatment, and other site operations buildings and facilities are included in the surface structures estimate by Sunrise with input from Bruno Engineering, P.C. (Bruno). This section also includes the surface building infrastructure maintenance and repair as estimated by Sunrise and Bruno. The facilities operating costs also includes the assay lab consumable costs of US$25,000 per year. Reclamation operating costs are estimated for maintenance of the permit boundary markers, post-mining surface water handling system maintenance, water monitoring, sampling, and reporting. This cost is included in the surface structures estimate.

21.1.1.12 Underground Rock Handling—Mine waste rock (non-ore) will be excavated during construction of ventilation overcasts, conveyor drive and transfer point installation, mining through faults, and grading the roadways. The handling cost to deliver the rock to the surface was estimated per tonne of rock based on the mine plan. The rock will be placed in a mine waste rock storage facility that will be capped and reclaimed at the end of mine life. The rock handling per tonne of rock was converted to a rate per tonne of ore using the proportion of rock to ore. These surface rock storage areas will be managed by personnel accounted for in the labor estimate. The rock mining will use operating supplies and maintenance materials at rates similar to those for ore mining. It is estimated that rock handling will consume power and fuel at 90% of mining rates.

21.1.2 Phosphate Rock Handling and Processing Cost

No further processing of the ore will take place following crushing to specification.

21.1.3 Transportation Cost

No transportation costs are included if the rail option is not used. The sales price is assumed freight on board (FOB) mine site. If the material is shipped via rail to the sales destination, transportation to the rail loadout is required. These costs were estimated by Sunrise and are presented in the rail option, Item 21.1.4.

21.1.4 Rail Option Operating Costs

The operating and maintenance costs for the rail loadout include labor to operate the rail facility and transportation of the crushed ore from the mine site to the rail loadout. Also included in this category are the costs for maintaining the access road from United States Highway 89 (US 89) to the rail loadout facilities. Table 21-10 shows these operating costs by year. The increase is predominantly due to the addition of the trucking of material from the mine site to the rail loadout facility to be located near Montpelier, Idaho. The trucking is based on quotes from local firms.

Table 21-10. Mine Life Operating Cost Weighted Average with Rail Loadout

Item	$/tonne
Labor	$32.68
Operating supplies	
Ground control	$5.40
Other operating supplies	$2.44
Underground repair and maintenance	
Section cables	$1.20
Other maintenance and repair	$2.99
Surface mobile equipment	$0.81
Power and fuel	
Electric power	$9.00
Diesel fuel/oil/lube underground	$0.66
Propane	$2.61
Receding face	$2.73
Mine drainage water system	$0.31
Administrative	$2.67
User/disposal fee	$0.05
Contract crushing	$5.13
Surface structures	$0.54
Underground rock handling	$0.57
Rail loadout*	$5.33
Operating Cost with Rail	**$75.13**

Note: Rail operating cost average based on tonnage Years 3 to 19

21.2 Capital Costs

21.2.1 General

Capital costs are developed from the list of equipment and infrastructure necessary to produce the ore at the rates designed in the current life-of-mine production plan. Estimated capital cost for the initial Paris Hills Phosphate Project (the Property or Project) Years of –2 through 2 is US$121 million. This capital investment includes all the infrastructure and equipment necessary to operate the mine at design capacity (1 million tonnes per annum [Mtpa]). The sustaining capital for Project Years 3–21 is estimated at US$134 million. The sum of the initial capital and sustaining capital, results in a total project capital investment of US$255 million. A summary of the capital costs by major category for the base case without the rail option is included in Table 21-11. This table summarizes the overall mine capital cost for the underground mine, surface facilities, and related infrastructure.

Table 21-11. Capital Cost Summary Without Rail ($ millions)

Category	Initial Project Capital Year -2	Initial Project Capital Year –1	Initial Project Capital Year 1	Initial Project Capital Year 2	Total Initial Project Capital Years –2 to 2	Sustaining Capital Years 3 to 21	Project Life Years –2 to 21
Underground Equipment and Facilities							
Production equipment		$28.721	$15.981	$3.013	$47.715	$32.402	$80.117
Outby mobile equipment		$3.244	$2.457	$1.067	$6.768	$5.570	$12.338
Other underground equipment and facilities		$0.584	$0.490	$0.487	$1.561	$3.693	$5.254
Ore handling equipment		$3.587	$0.050		$3.637		$3.637
Underground electrical, communications, and monitoring		$0.006	$0.020	$0.080	$0.106	$0.214	$0.320
Ventilation		$0.045			$0.045		$0.045
Total Underground Equipment and Facilities		$36.187	$18.998	$4.647	$59.832	$41.879	$101.711
Surface Facilities							
Mine portals		$0.450	$1.504	$0.872	$2.826	$0.001	$2.827
Surface electrical distribution system	$0.074	$0.392	$4.175	$0.439	$5.080	$0.260	$5.340
Other surface facilities		$0.672	$0.271	$0.326	$1.269		$1.269
Dewatering injection wells and mine drainage water treatment		$0.845	$5.566	$3.860	$10.271	$34.830	$45.101
Surface mobile equipment—mine		$1.795	$1.809	$1.145	$4.749	$2.585	$7.334
Surface infrastructure	$0.701	$12.279	$3.303	$6.626	$22.909		$22.908
Total Surface Facilities	$0.775	$16.433	$16.628	$13.268	$47.104	$37.676	$84.780
Capitalized major maintenance / rebuilds						$48.064	$48.064
Initial warehouse inventory / working capital	$0.450	$1.336	$1.554	$1.841	$5.181	-$5.181	
Final reclamation						$2.814	$2.814
Underground and Surface Capital	**$1.225**	**$53.956**	**$37.180**	**$19.755**	**$112.117**	**$125.252**	**$237.369**
Engineering design, procurement and construction management	$2.551	$0.829	$0.575	$0.384	$4.339	$0.279	$4.618
Cost contingency	$0.186	$1.656	$1.640	$1.106	$4.588	$8.490	$13.078
Total Underground and Surface Capital	**$3.962**	**$56.441**	**$39.395**	**$21.245**	**$121.044**	**$134.021**	**$255.065**
Cumulative Initial Project Capital	$3.962	$60.403	$99.799	$121.044			

Cost estimates are based on a range of sources. These sources are:

- Formal quotations
- Budgetary quotations Engineering estimates—preliminary, conceptually based, without detailed design
- Allowances—based on factored cost of similar equipment/systems recently quoted or constructed

The capital cost detail includes assumptions regarding initial equipment life, rebuild cost (if rebuild is an option), rebuild life, and then replacement cost. Rebuild and replacement life varies by equipment type and service duty. For example, a continuous miner is normally rebuilt once and then replaced. Rebuild and replacement for continuous miners are typically scheduled on a combination of time and tonnage.

21.2.2 Engineering Design, Procurement, and Construction Management

Engineering design, procurement, and project construction management (EPCM) costs are a part of all project cost estimates and are included in the economic analysis for a complete and accurate project cost representation. Certain items may be purchased with the engineering design cost included in the purchase price, for example, a highway vehicle or an individual electric motor. Other items that are components of a larger system which are unique to the project, for example, the surface electrical substation and distribution system require additional engineering and design. Some items, such as structural steel for conveyor supports, need detailed design to improve the cost estimate accuracy. While components within the system may have the design cost built into the item price, the overall system will be designed for the site-specific purpose. Engineering will also be required to develop purchase specifications. Therefore, the project capital has engineering design and construction cost included as a line item, as shown in Table 21-12.

Table 21-12. Engineering Design, Procurement, and Construction Management (US$ millions)

Category	Initial Project Capital Year				Project Capital	Sustaining Capital	Project Life
	–2	–1	1	2	Years –2 to 2	Years 3 to 21	Years –2 to 21
Engineering and Design, Other							
Mine-site engineering and design	2.256	0.423	0.141		2.820		2.820
Mine-site EPCM	0.060	0.406	0.434	0.384	1.284	0.279	1.563
Property control - main access roa(	0.210				0.210		0.210
Property control -power line	0.010				0.010		0.010
Property-injection well site	0.005				0.005		0.005
Property-injection pipeline ROW	0.010				0.010		0.010
Total	**2.551**	**0.829**	**0.575**	**0.384**	**4.339**	**0.279**	**4.618**

EPCM = Engineering Procurement and Construction Management, ROW = right-of-way

21.2.3 Dewatering in Advance of Mining and Mine Drainage Water Treatment

The hydrogeologic analysis of the mining area indicates that the mine plan area will need to be dewatered in advance of mining. This groundwater will be pumped from boreholes and injected out of the area of influence of the mine. Capital costs estimated include the necessary dewatering wells and appurtenant equipment, pipelines from the dewatering wells to the injection well locations, access roads, and power lines. Dewatering capital costs are outlined in Table 21-13.

Table 21-13. Dewatering Capital in Advance of Mining (US$ millions)

	Initial Project Capital Year				Total Initial Project Capital	Sustaining Capital	Project Life
Category	**–2**	**–1**	**1**	**2**	**Years –2 to 2**	**Years 3 to 21**	**Years –2 to 21**
Dewatering Injection Wells and Mine Drainage Water Treatment							
Treatment plant for 500-gpm mine drainage water (2 reverse osmosis units)		$0.520			$0.520	$0.521	$1.041
Dewater well pipelines to Hwy 89			$1.446	$0.437	$1.883	$1.456	$3.339
Booster pump station		$0.325			$0.325		$0.325
PW-1(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)			$0.942		$0.942	$0.000	$0.942
PW-2(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)			$1.346		$1.346	$0.000	$1.346
PW-3(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)				$1.364	$1.364	$0.000	$1.364
PW-4(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)				$1.196	$1.196	$0.000	$1.196
PW-5(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$1.625	$1.625
PW-6(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$1.912	$1.912
PW-7(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$1.986	$1.986
PW-8(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.086	$2.086
PW-9(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.348	$2.348
PW-10(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.166	$2.166
PW-11(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.101	$2.101
PW-12(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.130	$2.130
PW-13(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.061	$2.061
PW-14(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.596	$2.596
PW-15(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.668	$2.668
PW-16(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.501	$2.501
PW-17(Pmp/Mtr/Casing/CP/PA/drilling/Scrn/GP)						$2.482	$2.482
Dewatering wellhead electrical and controls			$0.123	$0.141	$0.264	$1.517	$1.781
Overhead power to wells			$0.286	$0.086	$0.372	$0.286	$0.658
Dewater well access roads			$0.023	$0.023	$0.046	$0.148	$0.194
Injection wells - drilling and casing (365 m deep 6 total)			$0.420	$0.420	$0.840	$1.680	$2.520
Injection wells - pipeline from US89 to injection wells			$0.980	$0.193	$1.173	$0.561	$1.733
Total		**$0.845**	**$5.566**	**$3.860**	**$10.271**	**$34.830**	**$45.101**

The groundwater that flows into the mine works becomes MDW. The portion of MDW removed during mining operations will need to be treated before it can be injected. A MDW sediment pond will be located on the surface to provide storage for the untreated water. The MDW will be pumped from the pond to the water treatment and pumping station where the water is cleaned via RO to the lowest applicable discharge standard. The RO treatment process will produce a waste stream from flushing operations. The waste stream will be conveyed to the head of the MDW pond for settling of suspended solids and eventual disposal. The capital cost for the MDW treatment system is included in Item 21.2.4 which includes the treatment plant, pumps, pipelines, access roads, and power.

21.2.4 Surface Infrastructure Including Buildings

The site preparation and construction of the surface infrastructure in support of the mine are estimated in Table 21-14. The site preparation capital costs include the mine site preparation, access roads, surface conveyors, operations buildings and structures. The infrastructure also includes the stormwater management structures, the potable water pump house and tank and the water treatment and pumping station which houses the package plant for wastewater treatment and the MDW treatment plant.

Table 21-14. Surface Infrastructure (US$ millions)

	Initial Project Capital Year				Total Initial Project Capital	Sustaining Capital	Project Life
Category	–2	–1	1	2	Years –2 to 2	Years 3 to 21	Years –2 to 21
Surface Infrastructure							
Mine site preparation	$0.274	$4.386	$0.548	$0.274	$5.483		$5.483
Access and haul roads	$0.148	$1.923	$0.740	$0.148	$2.959		$2.959
Buildings and structures		$2.622	$0.291		$2.913		$2.913
Process water piping and potable water tank	$0.230	$0.460	$0.230		$0.920		$0.920
Storm water management facilities	$0.049	$0.779	$0.097	$0.049	$0.974		$0.974
Wastewater package plant			$0.458		$0.458		$0.458
Conveyor—surface				$6.149	$6.149		$6.149
Power, control, and lighting		$1.614	$0.179		$1.793		$1.793
Generator (4,160 V, 2000 kW)			$0.650		$0.650		$0.650
Office furniture, lockers, baskets, etc.			$0.054	$0.006	$0.060		$0.060
Temporary mining setup*		$0.495	$0.055		$0.550		$0.550
Total	**$0.701**	**$12.279**	**$3.303**	**$6.626**	**$22.908**		**$22.908**

* The temporary mine setup is a temporary setup of facilities until the permanent facilities can be established.

21.2.5 Mine Portal Facilities

Mine portal facilities will include the protective portal canopies (concrete and steel construction), intake air heaters for the intake air/travelway portal and the ventilation fan and starter. A small number of storage and maintenance trailers are included at the mine portal area. A mine portal office trailer with first and second responder Emergency Medical Technician (EMT) kits will also be included with the mine portal support facilities. The portal area will be gravel-surfaced and protected with a fenced enclosure. The area will also house a bulk propane storage tank used to supply the intake air heaters. See Table 21-15 for the cost summary.

21.2.6 Surface Electrical and Communications Systems

The surface electrical and communications system capital is listed in Table 21-16. The surface electrical category will include the incoming power line, main substations and the associated distribution system. The power is delivered to the underground via the portals. In addition to the electrical infrastructure, this category includes the control station and trunk lines for mine communications and monitoring.

Table 21-15. Mine Portal Facilities (US$ millions)

Category	Initial Project Capital Year				Total Initial Project Capital	Sustaining Capital	Project Life
	–2	–1	1	2	Years –2 to 2	Years 3 to 21	Years –2 to 21
Mine Portals							
Portal canopies (fan, conveyor, travel way, exhaust)		$0.171			$0.171		$0.171
Intake air heaters including buildings and propane tank area installation			$0.398		$0.398		$0.398
Air lock doors			$0.060		$0.060		$0.060
Portal office / EMT trailer		$0.019			$0.019		$0.019
Maintenance trailer (1)		$0.014			$0.014		$0.014
Storage trailer (3)		$0.034			$0.034		$0.034
Mine fan, starter, and starter building			$0.872	$0.872	$1.745		$1.745
Mine ventilation fan electricrical distribution		$0.174	$0.174		$0.348		$0.347
Gravel surfacing, sign, barriers		$0.039			$0.039		$0.039
Total		**$0.451**	**$1.504**	**$0.872**	**$2.827**		**$2.827**

Table 21-16. Surface Electrical Distribution (US$ millions)

Category	Initial Project Capital Year				Total Initial Project Capital	Sustaining Capital	Project Life
	–2	–1	1	2	Years –2 to 2	Years 3 to 21	Years –2 to 21
Surface Electrical and Communications Systems							
Electrical design (69 kV to 12.47 kV)			$0.250		$0.250		$0.250
Electrical design (12.47 to facilities)		$0.293	$0.033		$0.326		$0.325
Electrical EPCM		$0.011	$0.073	$0.066	$0.150	$0.157	$0.307
69-kV incoming power line and branch protection			$1.389		$1.389		$1.389
Main substation			$1.622		$1.622		$1.622
Mine ventilation fan electrical distribution and control system			$0.347		$0.347		$0.347
Surface distribution (buried conduits, overhead lines)	0.074	$0.074	$0.074	$0.074	$0.296		$0.295
Mine shop power center			$0.270	$0.270	$0.540		$0.540
Mine monitoring and control station			$0.100		$0.100	$0.100	$0.200
Monitoring surface trunk cables		$0.003	$0.003	$0.005	$0.011		$0.010
Communications surface trunk cables		$0.003	$0.003	$0.005	$0.011		$0.010
Personnel tracking surface trunk cables		$0.003	$0.003		$0.006		$0.005
Surface mine dial/page phones		$0.005	$0.010	$0.015	$0.030		$0.030
Cap lamp chargers		$0.003		$0.005	$0.008	$0.002	$0.010
Total	**0.074**	**$0.395**	**$4.177**	**$0.440**	**$5.086**	**$0.259**	**$5.340**

21.2.7 Other Surface Facilities and Equipment

In addition to the major surface facilities listed in Item 21.2.4 an assay laboratory, maintenance shop equipment, a fuel and fluids material storage area for materials waiting for use at the mine or transport to a disposal facility and an office trailer for the bench yard/crusher and maintenance shop will be constructed. The equipment required for the information technology, engineering, assay laboratory and maintenance shops are included in this category. The other surface facilities and equipment are listed in Table 21-17.

Table 21-17. Other Surface Facilities and Equipment (US$ millions)

Category	Initial Project Capital Year				Total Initial Project Capital	Sustaining Capital	Project Life
	–2	–1	1	2	Years –2 to 2	Years 3 to 21	Years –2 to 21
Other Surface Faciltities							
Computer servers and equipment			0.100		0.100		0.100
Assay Laboratory (includes equipment)		0.371	0.124		0.494		0.494
Underground shop equipment		0.090		0.210	0.300		0.300
Warehouse and shop equipment			0.029	0.116	0.145		0.145
Heavy equipment and hazardous storage garage		0.211			0.211		0.211
Bench yard/crusher/maintenance office trailer			0.019		0.019		0.019
Total		**0.672**	**0.271**	**0.326**	**1.269**		**1.269**

21.2.8 Surface Mobile Equipment at the Mine Site

Surface mobile equipment is listed in Table 21-18. This listing includes the equipment required to support the roads, stockpiles, and maintain the stormwater routing. Forklifts and a flatbed truck are included in support of the warehouse and supply yard. The category also includes the warehouse, assigned vehicles for management staff, and the pool vehicles.

Table 21-18. Surface Mobile Equipment at Mine Site (US$ millions)

Category	Initial Project Capital Year				Total Initial Project Capital	Sustaining Capital	Project Life
	–2	–1	1	2	Years –2 to 2	Years 3 to 21	Years –2 to 21
Surface Mobile Equipment—Mine Site							
Crawler tractor—D9				1.105	1.105	1.105	2.210
Front end loader			1.110		1.110	0.555	1.665
Industrial backhoe			0.124		0.124		0.124
Supply yard forklift (IT 38)			0.125		0.125		0.125
Warehouse forklift				0.040	0.040		0.040
Mine manager's vehicle (Expedition)		0.030			0.030	0.060	0.090
Mine superintendent's vehicle (F150CC)		0.030			0.030	0.060	0.090
Maintenance superintendent's vehicle (F150CC)		0.030			0.030	0.060	0.090
Yard/surface vehicle		0.030			0.030	0.060	0.090
Engineering vehicle (F150CC)		0.030			0.030	0.060	0.090
Maintenance vehicle (F150CC)		0.030			0.030	0.060	0.090
Flat bed (5.5 m)		0.150			0.150	0.300	0.450
Road grader with snow blade			0.450		0.450		0.450
Dump truck / snow plow / spreader		0.190			0.190	0.190	0.380
Volvo A40 articulated haul trucks		1.200			1.200		1.200
Bobcat (skidsteer)		0.055			0.055	0.055	0.110
Portable welder		0.020			0.020	0.020	0.040
Total		**1.795**	**1.809**	**1.145**	**4.749**	**2.585**	**7.334**

21.2.9 Underground Production Equipment

The underground mining production equipment capital costs are based on the direct needs of the active mining sections. The mining cut cycle advances the mine followed in sequence by placement of roof support. The mining sections will use a supersection layout. With this layout, two miners, two roof bolters, one power center, and three shuttle cars will be required for each supersection. When one miner is tramming to a new face, the other will be mining. This allows them to share the shuttle cars. Once a panel is fully developed, the pillars will be partially extracted on retreat. During this phase, the supersection layout is used for pillar splitting. A single section is used for pillaring. The underground production equipment will include all section mining equipment and section support equipment. Table 21-19 lists the capital for the underground production equipment.

Table 21-19. Underground Production Equipment (US$ millions)

	Initial Project Capital Year				Project Capital	Sustaining Capital	Project Life
Category	**–2**	**–1**	**1**	**2**	**Years –2 to 2**	**Years 3 to 21**	**Years –2 to 21**
Section Production Equipment							
Continuous miner		13.273	6.637		19.910	19.910	39.820
Shuttle car		5.177	2.588		7.765	1.726	9.491
Dual-boom roof bolter		2.839	1.419		4.258	2.129	6.387
Feeder/breaker		1.309	0.655		1.964	0.655	2.618
Section scoop (diesel)		1.053	0.527		1.580		1.580
Section forklift (diesel)		0.487	0.243		0.730	0.243	0.974
Section power center		0.520	0.260		0.780		0.780
Section switchhouse		0.190	0.095		0.285		0.285
Shuttle car distribution box		0.061	0.031		0.092		0.092
Section monitoring sensors		0.008	0.004		0.011	0.080	0.091
Roofbolt/timber sled		0.008	0.008		0.016		0.016
Section trailing cables (initial allotment)		0.234	0.117		0.351		0.351
Section maintenance / parts trailer		0.050	0.025		0.076	0.050	0.126
Section supply trailer		0.134	0.067		0.202	0.101	0.302
Section firefighting / EMT sled		0.044	0.022		0.066	0.044	0.110
Section high voltage cable sled		0.018	0.018		0.036	0.054	0.089
Section kitchen sled		0.022	0.011		0.033	0.022	0.055
Section refuge chamber			0.175	0.175	0.350	0.875	1.225
Section portable toilet		0.011	0.005		0.016	0.005	0.021
Permissible drainage pumps (13 hp)		0.153	0.077		0.230	0.690	0.920
Section welder / cutting torches		0.017	0.008		0.025	0.017	0.042
Section dial / page phone		0.002	0.001		0.003	0.005	0.008
Section portable radios—intrinsically safe		0.019	0.009		0.028	0.014	0.042
Initial allotment—face ventilation, water hose, etc.		0.063	0.032		0.095		0.095
Initial allotment—section spare parts		0.084	0.042		0.126		0.126
Continuous miner retriever with cable			0.068		0.068		0.068
Mobile roof supports with cable		2.816	2.816	2.816	8.448	5.632	14.080
Mechanics tool set / specialty tools (initial allotment)		0.129	0.022	0.022	0.172	0.151	0.323
Total		**28.721**	**15.981**	**3.013**	**47.715**	**32.402**	**80.117**

21.2.10 Outby Mobile Equipment

The outby mobile equipment capital is listed in Table 21-20. This equipment will be in direct support of the face and includes the construction equipment, underground vehicles, materials trailers, and a portable generator used for moving electrical equipment when power is not readily available.

Table 21-20. Outby Underground Mobile Equipment (US$ millions)

	Initial Project Capital Year				Total Initial Project Capital	Sustaining Capital	Project Life
Category	**–2**	**–1**	**1**	**2**	**Years –2 to 3**	**Years 3 to 21**	**Years –2 to 21**
Outby Mobile Equipment							
Supply tractor (5th wheel / pintel hook)		0.5191		0.5191	1.038	0.5191	1.5574
Supply tractor attachments			0.0858		0.086	0.0858	0.1716
Lubrication trailer		0.0210	0.0210	0.0210	0.063	0.0210	0.0840
Pipe trailer		0.0221	0.0221	0.0221	0.066	0.0662	0.1323
Belt move trailer		0.0819	0.0410	0.0205	0.143	0.0410	0.1843
Mobile belt winder with trailer—48-inch							
Water trailer (roadways)			0.0275		0.028	0.0275	0.0550
Block stopping trailer		0.0207	0.0207	0.0207	0.062	0.0414	0.1034
Outby scoops		0.4640	0.4640	0.4640	1.392	0.4640	1.8561
Petito mule		1.0079			1.008		1.0079
Construction roof bolter (dual boom)			0.6620		0.662		0.6620
Can manipulator and beam setter		0.6187			0.619		0.6187
Belt move crew personnel vehicle			0.0587		0.059	0.1762	0.2349
Construction move crew vehicle			0.0587		0.059	0.1762	0.2349
Mine superintendent's vehicle		0.0559			0.056	0.1678	0.2237
Mine foreman's personnel vehicle		0.0559			0.056	0.1678	0.2237
Section personnel vehicle (man trips)		0.1264	0.3160		0.442	1.3273	1.7697
Shift foreman's personnel vehicle			0.0587		0.059	0.1762	0.2349
Maintenance superintendent's vehicle			0.0587		0.059	0.1762	0.2349
Maintenance shift foreman's vehicle			0.0587		0.059	0.1762	0.2349
Outby Vehicle (roving)			0.5034		0.503	1.5101	2.0134
Underground portable generator (equipment moving)		0.2500			0.250	0.2500	0.5000
Total		**3.244**	**2.457**	**1.067**	**6.768**	**5.570**	**12.338**

21.2.11 Underground Receding Face Equipment

The mine extension materials are expensed in this FS. The receding face equipment was listed previously in the operating expenses in Table 21-9.

21.2.12 Other Underground Equipment

Stationary underground equipment in support of the underground sections is included in Table 21-21. This category includes safety equipment and specialized construction tools.

Table 21-21. Other Underground Equipment and Facilities (US$ millions)

Category	Initial Project Capital Year				Total Initial Project Capital	Sustaining Capital	Project Life
	–2	–1	1	2	Years –2 to 2	Years 3 to 21	Years –2 to 21
Other Underground Equipment / Facilities							
Portable handheld drills (air and hydraulic)		0.0150	0.0300		0.045	0.0450	0.0900
Portable personnel radios—intrinsically safe (outby personnel)			0.0155	0.0062	0.022	0.0279	0.0496
Pressure washer			0.0016	0.0016	0.003	0.0015	0.0047
Other specialty construction tools		0.0158			0.016	0.0157	0.0315
Portable toilets		0.0026	0.0053	0.0026	0.011	0.0184	0.0289
Underground powder and cap magazine (day box)		0.0026			0.003	0.0027	0.0053
Gunite machine		0.0554			0.055	0.0554	0.1108
Concrete mixer / pump			0.0055		0.006	0.0055	0.0110
Gravel trailer			0.0312	0.0312	0.062	0.0623	0.1247
Portable welder			0.0057	0.0057	0.011	0.0115	0.0229
Construction power center				0.1600	0.160		0.1600
Miners' cap lamps		0.0192	0.0295	0.0221	0.071	0.0177	0.0885
Dosimeters (noise)		0.0097	0.0097		0.019	0.5795	0.5989
Sound level meter		0.0026			0.003		0.0026
Automated external defibrillator		0.0061	0.0091	0.0030	0.018		0.0182
Fire extinguishers		0.0008	0.0017	0.0017	0.004	0.1829	0.1871
Firefighting—hoses, nozzles, fittings		0.0015	0.0075	0.0075	0.017	0.0075	0.0240
First aid supplies		0.0020	0.0020	0.0020	0.006	0.0020	0.0080
Foam generator		0.0154	0.0154		0.031		0.0308
Hearing protectors		0.0158	0.0158	0.0158	0.047	-0.0001	0.0473
Knee/shin protectors		0.0053	0.0053	0.0053	0.016	0.0001	0.0160
Multi-gas detectors		0.0026	0.0156	0.0039	0.022	0.2756	0.2977
Personnel dust sampler			0.0105	0.0105	0.021	0.0105	0.0315
Area dust sampler			0.0042	0.0042	0.008	0.0084	0.0168
Self-contained self-rescuers		0.0415	0.1410	0.0830	0.266	0.3317	0.5972
Respirators		0.0005	0.0005	0.0005	0.002	0.0020	0.0035
Ventilation instruments			0.0075		0.008		0.0075
Training equipment		0.0500			0.050	0.0500	0.1000
Training equipment—panel boards		0.2000			0.200		0.2000
Fresh water pipe and fittings (4 inch steel)							
15-cm mine drainage pipe and fittings (plastic panels)							
20-cm mine drainage pipe and fittings (mains plastic)							
Mine drainage pumps			0.1200	0.1200	0.240	0.6000	0.8400
Mine drainage borehole pumps/starters/power centers/power lines						1.3785	1.3785
Mine rescue equipment		0.1200			0.120		0.1200
Total		**0.584**	**0.490**	**0.487**	**1.561**	**3.692**	**5.254**

21.2.13 Underground Ore Handling Equipment

The underground ore will be transported from the face to the surface via belt conveyors. Each terminal group will include a remote drive, remote discharge frame, winch takeup, tail pulley (loading type), belt splice station, dribble conveyor, fire suppression sprinkler system, power center with cable, safeties, lighting, 50 meters (m) of structure, two cross-unders and 170 m of conveyor belting. The conveyor terminal groups, structure and belting are included in the receding face Table 21-9, except for the initial investment which is shown in Table 21-22.

Table 21-22. Underground Ore Handling Equipment (US$ millions)

Category	Initial Project Capital Year –2	–1	1	2	Total Initial Project Capital Years –2 to 2	Sustaining Capital Years 3 to 21	Project Life Years –2 to 21
Underground Ore Handling Equipment							
Belt tools		0.0500	0.0500		0.100		0.1000
48-inch terminal group		2.3980			2.398		2.3980
48-inch structure (includes bolt to hang)		0.1510			0.151		0.1510
48-inch belting includes splices		0.4130			0.413		0.4130
48-inch oower unit (1,000 hp)		0.5220			0.522		0.5220
48-inch intermediate loading station		0.0400			0.040		0.0400
48-inch belt crossovers		0.0050			0.005		0.0050
48-inch belt scale-portal conveyor		0.0090			0.009		0.0090
Total		**3.587**	**0.050**		**3.637**		**3.637**

21.2.14 Underground Electrical, Communications and Monitoring Equipment

With the exception of two capacitor banks at US$68,900 each, the underground electrical cables, communication phones, personnel tracking, and mine atmospheric monitoring equipment will be included with the receding face as shown in Table 21-9.

21.2.15 Ventilation

Except for the ventilation items needed for initial setup of the mine, the ventilation control items of block stoppings (with and without access doors), overcasts, and regulators will be included in the receding face items, as listed in Table 21-9.

21.2.16 Initial Warehouse Inventory and Working Capital

The initial warehouse inventory and working capital is shown in Table 21-23. Initial warehouse inventory will be the initial inventory of spare parts and mine supplies. Working capital as used in the FS represents funds to provide liquidity to cover short-term debts and operating expenses during project construction and startup.

The warehouse and supply yard will initially be equipped with critical spare parts and consumable supplies. After the initial capital purchase, these items are included as operating costs in the categories of maintenance materials and repairs category; and in operation supplies. Capitalized spares are also included in this category.

21.2.17 Major Capital Maintenance and Rebuilds

The major pieces of capital equipment will undergo scheduled maintenance and rebuilds at approximately halfway through their life. The continuous miners, shuttle car and feeder-breakers are rebuilt at approximately years 5 and 15 and purchased new at 10 years. The cost for the major capital maintenance and rebuilds are listed in sustaining capital in Table 21-24.

Table 21-23. Initial Warehouse Inventory and Working Capital (US$ millions)

Category	Initial Project Capital Year –2	–1	1	2	Project Capital Years –2 to 2	Sustaining Capital Years 3 to 21	Project Life Years –2 to 21
Initial Warehouse Inventory / Working Capital							
Initial working capital	0.450	0.900	0.900	0.750	3.000	-3.000	
Initial warehouse and supply yard inventory		0.436	0.654	1.091	2.181	-2.181	
Total	**0.450**	**1.336**	**1.554**	**1.841**	**5.181**	**-5.181**	

Table 21-24. Major Capital Maintenance and Rebuilds (US$ millions)

Category	Initial Project Capital Year –2	–1	1	2	Total Initial Project Capital Years –2 to 2	Sustaining Capital Years 3 to 21	Project Life Years –2 to 21
Capitalized Major Maintenance / Rebuilds							
Continuous miner (rebuild with new frame)						18.815	18.815
Shuttle car (rebuil dwith new frame)						19.801	19.801
Dual-boom roof bolter							
Feeder-breaker						2.945	2.945
Section scoop						1.580	1.580
Section forklift						0.511	0.511
Supply tractor (5th wheel / pintel hook)						1.038	1.038
Outby scoops						2.107	2.107
Petito mule						0.454	0.454
Construction roof bolter (dual-boom pricing)							
Can manipulator and beam setter						0.371	0.371
Crawler tractor—D9						0.442	0.442
Total						**48.064**	**48.064**

21.2.18 Capitalized Initial Mine Development

This cash flow analysis does not include the capitalization of the cost of exploration or mine development costs prior to Year –2 with the exception of lease payments in advance of royalties.

21.2.19 Sustaining Capital

Sustaining capital refers to the capital required after the initial investment that brings the mine up to full capacity. Capital will be required to replace and rebuild equipment for both the underground and surface. The sustaining capital also expands the dewatering and surface electrical infrastructure as the mine advances. Mine advancement equipment is expensed as discussed above.

21.2.20 Cost Contingency

For the FS, the contingency basis for certain budgeted items, such as discreet equipment that can be purchased complete and ready to operate on a standalone basis, may be reduced with creditable quotations. Other cost items, such as earthwork, buildings, foundations, conveyors, water systems, etc., which have to have detailed design completed before solid cost estimates can be produced. Therefore, a line-by-line capital item contingency factor, ranging from 5% to 20% to determine a weighted average contingency for the FS capital cost estimate, was assigned. This factor was determined on the basis of quotations (actual and budgetary), engineering estimates, and/or allowances estimated for the various capital items. Some budgetary quotations stated a contingency basis (i.e., $ ±15%).

21.2.21 Optional Rail Loadout

Table 21-25 lists the capital items and equipment required if the rail loadout option is selected. A 6.05% overall contingency has been added to the facility cost. This contingency covers the facilities, conveyor, switch gear, highway intersection, and access roads.

Table 21-25. Project Capital Including Rail Loadout (US$ millions)

	Initial Project Capital Year				Total Initial Project Capital	Sustaining Capital	Project Life
Category	**-2**	**-1**	**1**	**2**	**Years -2 to 2**	**Years 3 to 21**	**Years –2 to 21**
Rail Loadout (6.05% contingency included)							
Rail loadout facilities (contingency added to this item)			4.313	4.313	8.627		8.627
Rail conveyor			1.539	1.539	3.077		3.077
US89 intersection			0.130	0.130	0.260		0.260
Access road to rail loadout			0.302	0.302	0.604		0.604
Box culvert			0.028	0.028	0.056		0.056
Switch gear			0.500	0.500	1.000		1.000
Engineering design-rail			0.700	0.700	1.400		1.400
EPCM			0.550	0.550	1.100		1.100
Surface mobile equipment - rail loadout							
D9 dozer				1.105	1.105		1.105
Portable pump				0.015	0.015		0.015
Total Rail Capital			8.062	9.182	17.244		17.244
Total Project Capital	3.962	56.4413	47.457	30.427	138.288	134.021	272.309
Total Cumulative Initial Project Capital	3.962	60.40	107.861	138.288			

22.0 ECONOMIC ANALYSIS

The overall project evaluation is completed in the form of a Net Present Value (NPV) analysis of the revenues less the costs as they apply to the mine production schedule. The NPV calculations have been completed using an 8 percent (%) discount rate as a base case. NPV's have been calculated on a pre-tax and after-tax basis. The Internal Rate of Return (IRR) was also calculated on a pre-tax and after-tax basis.

22.1 Taxes, Royalties, and Base Assumptions

The base assumptions in the cash flow analysis are summarized in Table 22-1. The assumptions are typical for mines operating with a United States of America (USA or US) tax structure. Items requiring further explanation include the Idaho mine license tax and the domestic production deduction. Idaho Mine license tax is a 1% tax on the net income from mining property less the deletion expense from the federal return (Idaho Form 47, Idaho Mine License Tax Return). The domestic production deduction is a US-based business activity for qualified products that are manufactured, produced, grown or extracted within the US. In 2010, the domestic production deduction rate is 9% of income (Internal Revenue Code 199).

Table 22-1. Cash Flow Model Assumptions

Sales price FOB shipping point	\$165/tonne
Fourth quarter 2012 US dollars	
Tonnage sold in year produced	
Exploration costs not included	
Corporate overhead not included	
Discount rate	8%
Federal income tax rate	35%
Idaho income tax rate	7.6%
Idaho mine license tax	1%
Alternative minimum tax not considered	
Modified acccelerated cost recovery system (MACRS) depreciation	
Percentage depletion—phosphate rock per Code of Federal Regulations (CFR) Title 26 Part 613	14%
Domestic production deduction per Internal Revenue Code 199	9%
Royalty rates (gross production)	
Private mineral rights	5%
Federal (United States Bureau of Land Management [BLM])	on P_2O_5 units
Federal (BLM) unit value per mineral management service	1.6883
RMP Resources Corp. (RMP) (Earth Sciences, Inc. [ESI])	3%
State	on P_2O_5 units
State unit value (follows BLM unit value)	1.6883
Private mineral rights	4–5%
P_2O_5 = phosphorus pentoxide	

22.2 Project Economics Without Rail Loadout

The cash flow is estimated on a pre-tax and after-tax basis. The complete cash flow is presented in Table 22-2.[10] The analysis spans 21 years. This includes two years (Project Years –2 and –1) of site construction and equipment acquisition prior to the startup of ore production in Project Year 1. Ore production ramps up in Project Years 1 to 2 and continues through Project Year 19. Project Years 20 and 21 are reclamation. Revenues for Project Years 1 to 19 are based on the tonnage and grade from the mine plan. Royalties are deducted from the gross sales. The revenue after royalty payments is further reduced by the cost of producing the ore.

Table 22-2. Cash Flow Analysis Without Rail

		-2	-1	1	2	3	4	5	6	7
Annual ore tonnes	(000's of tonnes)			318.872	740.097	885.428	916.260	986.810	902.858	999.153
Ore grade	(%P_2O_5)			31.84	30.76	29.96	28.46	28.62	29.34	29.68
Sales	($ millions)			52.614	122.116	146.096	151.183	162.824	148.972	164.860
Royalties (–) (and leases)	($ millions)	0.322	0.322	1.161	2.359	3.329	4.942	4.050	2.722	4.366
Revenue after royalty	($ millions)	(0.322)	(0.322)	51.453	119.757	142.767	146.241	158.773	146.250	160.494
Cost of goods sold and expenses	($/tonne)			127.99	80.69	80.46	75.22	64.02	72.51	65.98
Cost of goods sold and expenses	($ millions)	1.069	2.996	40.813	59.715	71.243	68.924	63.176	65.464	65.924
Loss carryforward or carryback	($ millions)				18.853	0.133				
Domestic production deduction	($ millions)			0.958	5.404	6.437	6.959	8.604	7.271	8.511
Depreciation	($ millions)	0.193	7.135	16.633	19.019	17.691	18.006	18.769	18.577	18.050
Depletion	($ millions)				16.766	19.987	20.474	22.228	20.475	22.469
Costs	($ millions)	1.262	10.131	58.403	119.757	115.491	114.362	112.777	111.787	114.955
Income before taxes	($ millions)	(1.584)	(10.453)	(6.950)		27.276	31.879	45.996	34.463	45.539
Income tax expense	($ millions)									
Federal income tax	($ millions)					8.726	10.198	14.714	11.025	14.568
State income tax	($ millions)					2.073	2.423	3.496	2.619	3.461
State mine license tax	($ millions)					0.273	0.319	0.460	0.345	0.455
Domestic production addback	($ millions)			0.958	5.404	6.437	6.959	8.604	7.271	8.511
Depreciation addback	($ millions)	0.193	7.135	16.633	19.019	17.691	18.006	18.769	18.577	18.050
Depletion addback	($ millions)				16.766	19.987	20.474	22.228	20.475	22.469
Cash basis net income (loss)	($ millions)	(1.391)	(3.318)	10.641	41.189	60.320	64.378	76.927	66.797	76.085
Reclamation	($ millions)									
Capital expenditures without rail	($ millions)	3.776	54.787	37.756	20.140	9.204	20.723	7.993	13.322	14.420
Cost contingency	($ millions)	0.186	1.656	1.640	1.106	0.612	1.534	0.806	1.166	0.610
Capital plus contingency	($ millions)	3.962	56.443	39.396	21.246	9.816	22.257	8.799	14.488	15.030
Net cash flow—after tax	($ millions)	(5.352)	(59.760)	(28.755)	38.797	50.637	42.121	68.127	52.310	61.055
Cumulative cash flow—after tax	($ millions)	(5.352)	(65.112)	(93.867)	(55.071)	(4.434)	37.687	105.814	158.124	219.179
Net cash flow—pre-tax	($ millions)	(5.352)	(59.760)	(28.755)	38.797	61.435	54.742	86.337	65.953	79.084
Cumulative cash flow—pre-tax	($ millions)	(5.352)	(65.112)	(93.867)	(55.071)	6.365	61.106	147.444	213.397	292.481

[10] The cash flow model is not intended to be used for book or tax accounting purposes.

Table 22-2. Cash Flow Analysis Without Rail *(concluded)*

		8	9	10	11	12	13	14	15	16
Annual ore tonnes	(000's of tonnes)	941.867	970.639	1019.776	926.500	1005.129	975.220	941.188	991.810	1008.273
Ore grade	(%P_2O_5)	29.58	29.40	29.73	29.70	29.64	29.35	28.57	28.26	28.91
Sales	($ millions)	155.408	160.155	168.263	152.872	165.846	160.911	155.296	163.649	166.365
Royalties (–) (and leases)	($ millions)	4.670	6.556	6.721	5.917	8.155	8.001	5.649	4.841	2.772
Revenue after royalty	($ millions)	150.738	153.599	161.542	146.956	157.691	152.911	149.647	158.808	163.593
Cost of goods sold and expenses	($/tonne)	68.37	67.63	64.80	69.80	66.04	66.26	67.55	64.96	64.03
Cost of goods sold and expenses	($ millions)	64.395	65.646	66.086	64.669	66.376	64.615	63.580	95.698	64.563
Loss carryforward or carryback	($ millions)									
Domestic production deduction	($ millions)	7.771	7.916	8.591	7.406	8.218	7.947	7.746	5.680	8.913
Depreciation	($ millions)	15.939	15.146	14.996	13.906	13.196	12.570	10.852	8.386	5.890
Depletion	($ millions)	21.103	21.504	22.616	20.574	22.077	21.407	20.951	22.233	22.903
Costs	($ millions)	109.208	110.211	112.289	106.555	109.868	106.539	103.129	131.997	102.269
Income before taxes	($ millions)	41.531	43.388	49.253	40.401	47.823	46.372	46.518	26.811	61.325
Income tax expense	($ millions)									
Federal income tax	($ millions)	13.286	13.880	15.756	12.924	15.299	14.834	14.881	8.577	19.618
State income tax	($ millions)	3.156	3.297	3.743	3.070	3.635	3.524	3.535	2.038	4.661
State mine license tax	($ millions)	0.415	0.434	0.493	0.404	0.478	0.464	0.465	0.268	0.613
Domestic production addback	($ millions)	7.771	7.916	8.591	7.406	8.218	7.947	7.746		
Depreciation addback	($ millions)	15.939	15.146	14.996	13.906	13.196	12.570	10.852	8.386	5.890
Depletion addback	($ millions)	21.103	21.504	22.616	20.574	22.077	21.407	20.951	22.233	22.903
Cash basis net income (loss)	($ millions)	69.486	70.342	75.464	65.888	71.903	69.473	67.185	52.227	65.226
Reclamation	($ millions)									
Capital expenditures without rail	($ millions)	12.001	15.389	7.403	7.693	9.175	5.268	3.007	0.739	1.505
Cost contingency	($ millions)	0.394	0.656	0.374	0.617	0.781	0.525	0.299	0.071	0.148
Capital plus contingency	($ millions)	12.395	16.045	7.777	8.310	9.956	5.793	3.306	0.810	1.653
Net cash flow—after tax	($ millions)	57.092	54.297	67.687	57.578	61.948	63.680	63.879	51.417	72.484
Cumulative cash flow—after tax	($ millions)	276.271	330.568	398.255	455.834	517.781	581.462	645.341	696.758	769.242
Net cash flow—pre-tax	($ millions)	73.534	71.474	87.187	73.573	80.881	82.039	82.296	62.031	96.763
Cumulative cash flow—pre-tax	($ millions)	366.015	437.489	524.676	598.249	679.130	761.169	843.465	905.496	1,002.259

		17	18	19	20	21
Annual ore tonnes	(000's of tonnes)	1,010.616	960.763	202.441		
Ore grade	(%P2O5)	30.04	30.95	31.89		
Sales	($ millions)	166.752	158.526	33.403		
Royalties (–) (and leases)	($ millions)	3.634	3.878	1.073		
Revenue after royalty	($ millions)	163.117	154.648	32.330		
Cost of goods sold and expenses	($/tonne)	63.03	60.56	94.93		
Cost of goods sold and expenses	($ millions)	63.698	58.181	19.217	0.274	0.159
Loss carryforward or carryback	($ millions)					
Domestic production deduction	($ millions)	8.948	8.682	1.180		
Depreciation	($ millions)	3.752	2.387	1.084		
Depletion	($ millions)	22.836	21.651	4.526		
Costs	($ millions)	99.235	90.901	26.007		
Income before taxes	($ millions)	63.883	63.747	6.323		
Income tax expense	($ millions)					
Federal income tax	($ millions)	20.436	20.393	2.023		
State income tax	($ millions)	4.855	4.845	0.481		
State mine license tax	($ millions)	0.639	0.637	0.063		
Domestic production addback	($ millions)					
Depreciation addback	($ millions)	3.752	2.387	1.084		
Depletion addback	($ millions)	22.836	21.651	4.526		
Cash basis net income (loss)	($ millions)	64.542	61.910	9.366		
Raclamation*	($ millions)				1.407	1.407
Capital expenditures without rail	($ millions)	0.052		(2.181)		
Cost contingency	($ millions)	0.003		(0.668)	0.281	0.281
Capital plus contingency	($ millions)	0.056		(2.849)	0.281	0.281
Net cash flow—after tax	($ millions)	73.434	70.592	16.396	(1.962)	(1.847)
Cumulative cash flow—after tax	($ millions)	842.676	913.268	926.664	924.702	922.855
Net cash flow—pre-tax	($ millions)	98.725	95.830	15.899	(1.962)	(1.847)
Cumulative cash flow—pre-tax	($ millions)	1,100.984	1,196.813	1,212.712	1,210.750	1,208.903

*Cost of goods sold for years 20 and 21 is oversight labor

For the pre-tax cash flow, this revenue is reduced by capital expenditures, including the cost contingency and the State of Idaho mine license tax (fee), to obtain the net cash flow pre-tax.

For the after-tax cash flow, the domestic production deduction, depreciation and depletion further reduce the revenue to obtain the income before taxes. Federal and state taxes are paid on this income. The deduction for domestic production, depreciation, and depletion are added back in to establish the cash basis net income.

The capital investment, revenue, and after tax cash flow are shown by year in Figure 22-1. The cash flow turns positive in the fifth year of the project. The cumulative capital investment and cash flow after-tax is plotted in Figure 22-2. The graph shows payback midway between Project Years 3 and 4 or after 5 years (without interest expense included).

The Project has two years of cash outflow for construction prior to the start of production (revenue stream). The total Initial Project Capital (IPC) expenditures extend over a 4-year period.

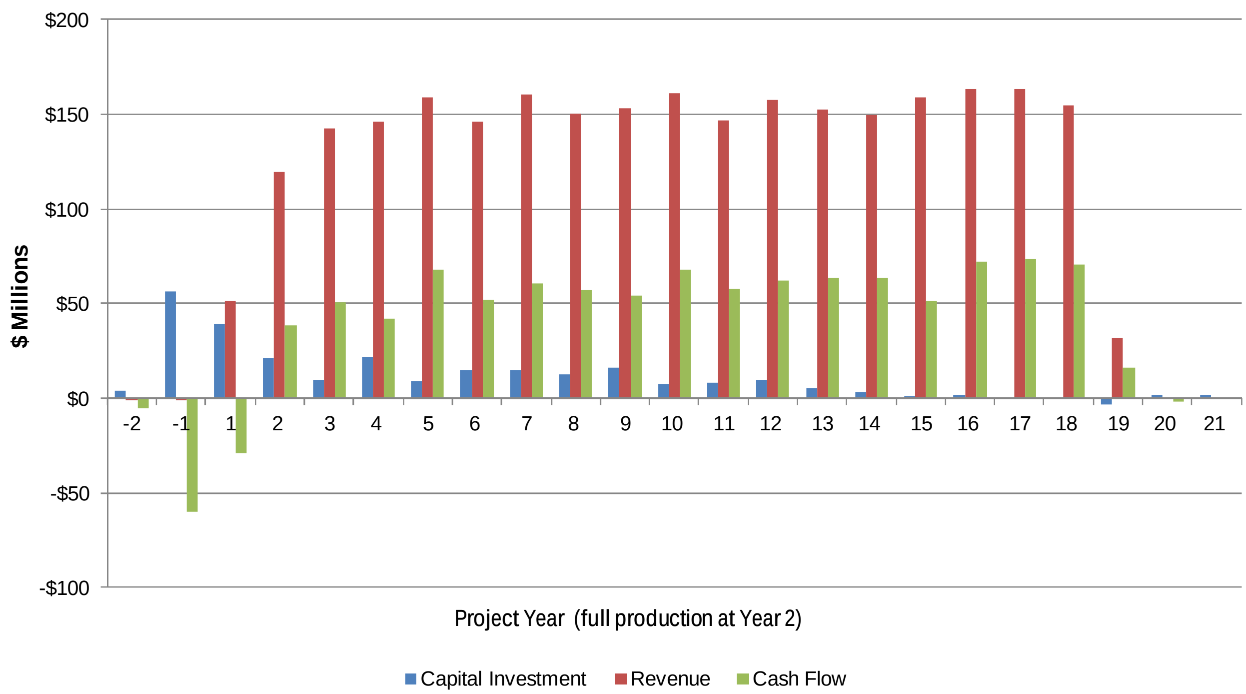


Figure 22-1. **Capital, Revenue, and Cash Flow** (after-tax) **by Project Year** (IPC = Project Years –2 through 2)

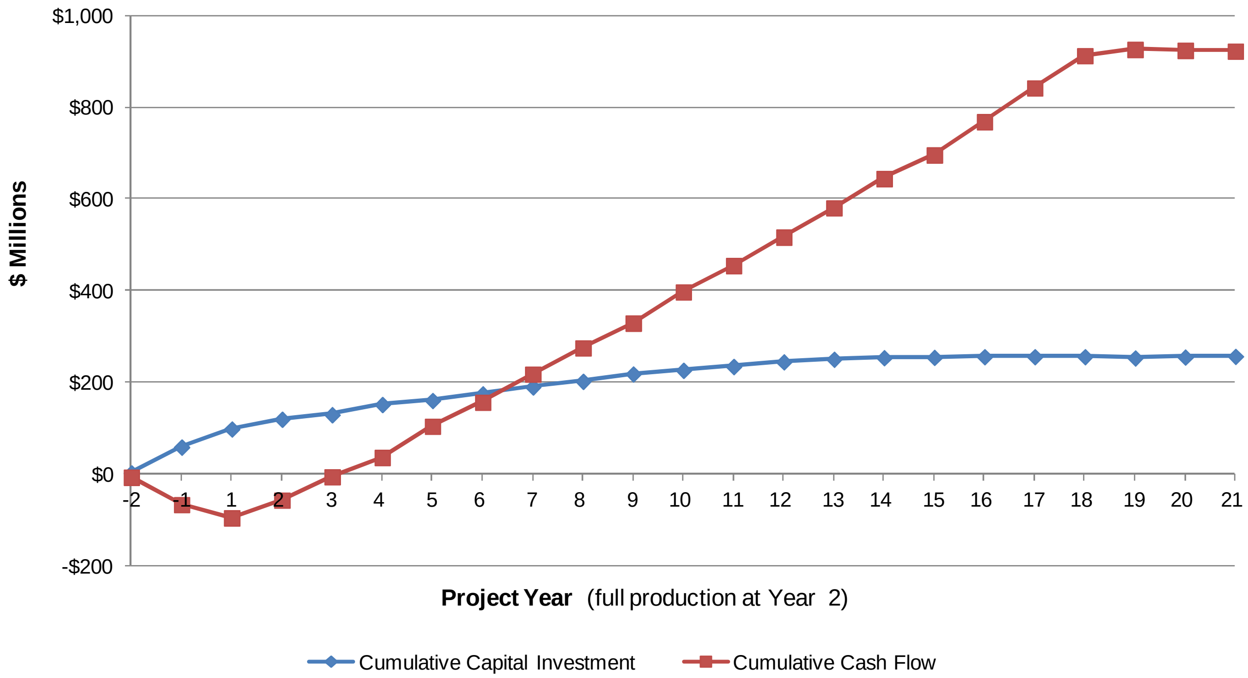


Figure 22-2. Cumulative Capital Investment and After-Tax Cash Flow

The IPC[11] cost is US$121.0 million. During the IPC period, the maximum negative cumulative cash flow is US$93.9 million, occurring in Project Year 2. Revenues generated during the IPC period total US$174.7 million. The life-of-project capital is estimated at US$255.1 million. The NPV of this cash flow before tax is US$477.5 million and after-tax is $360.1 million, indicating an economically viable project. The pre-tax IRR is 45.9% and the after-tax IRR is 40.2%.

The payback period is expressed as the start of production (Project Year 1) as the first year of the payback period. The payback period is 3.1 years (after-tax basis) after start of production.

The NPV, IRR, and payback period of the cash flows pre- and after-tax are listed in Table 22-3.

A sensitivity analysis was completed using 10% positive and negative change in the variants of phosphate price, capital costs, operating costs, and annual tonnage produced. The after-tax NPV using a discount rate of 8% was determined by changing the variants one at a time. The results are shown in Table 22-4 and graphically in Figure 22-3. In all cases, the NPV indicates an economically viable project. The sensitivity analysis indicates that the project is most sensitive to sales price and least sensitive to capital cost.

[11] IPC is the capital from start of construction until the last scheduled production unit is installed. The IPC is from Project Year –2 to Project Year 2, a 4-year period.

Table 22-3. Net Present Value, Internal Rate of Return, and Payback Without Rail—Base Case

Discount rate	8%
NPV pre-tax	US$477.5 million
NPV after-tax	US$360.1 million
IRR pre-tax	45.9%
IRR after-tax	40.2%
Payback pre-tax from start of construction	4.9 years
Payback after-tax from start of construction	5.1 years
Payback pre-tax from start of production	2.9 years
Payback after-tax from start of production	3.1 years

Notes:
Start of construction begins in Project Year –2
Start of production begins in Project Year 1

Table 22-4. Sensitivity Analysis of After-Tax Net Present Value (US$ millions) **at Discount Rate of 8%**

Variant Parameter	Increase 10%	Decrease 10%
Capital cost	342.3	378.0
Operating cost	332.0	385.9
Sales price	448.1	269.0
Production tonnage	415.2	303.6

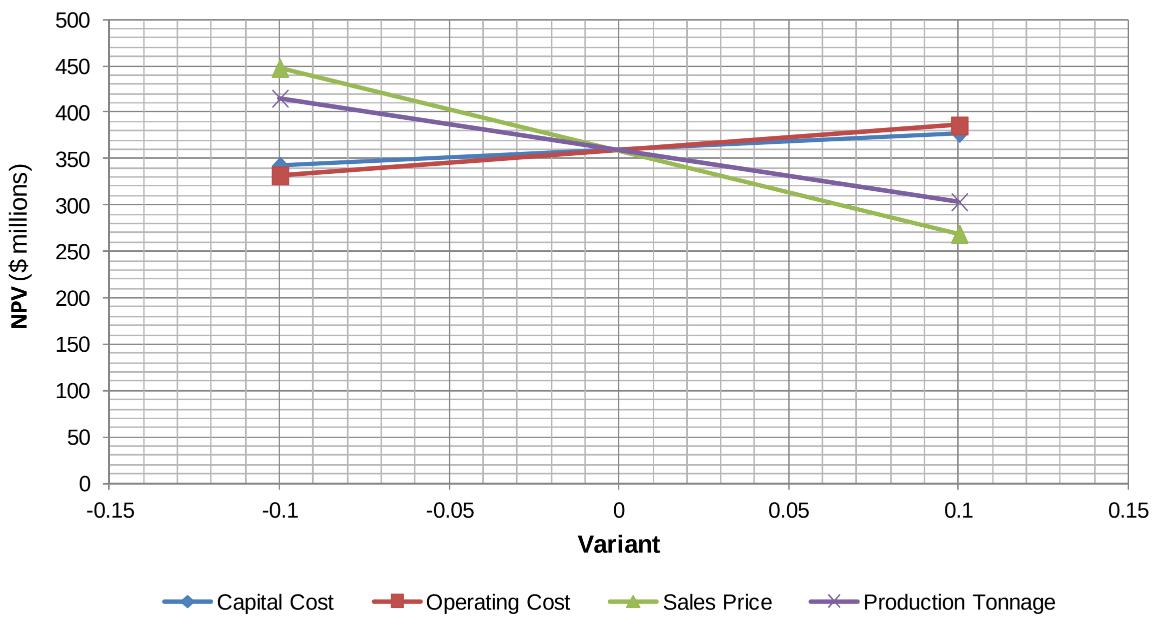


Figure 22-3. Sensitivity Analysis Results

To estimate the worst-case scenario, the annual tonnage and price variants were set to 10% lower and the operating cost and capital variants were set at 10% higher. The worst-case NPV is $176 million.

22.3 Project Economics with Rail Loadout

The NPV, when the optional rail loadout is included, is US$425 million pre-tax and US$326 million after-tax (refer to Table 22-5 below).

Table 22-5. Net Present Value, Internal Rate of Return, and Payback—Rail Option

Discount rate	8%
NPV pre-tax	US$425.3 million
NPV after-tax	US$325.5 million
IRR pre-tax	40.5%
IRR after-tax	35.8%
Payback pre-tax from start of construction	5.3 years
Payback after-tax from start of construction	5.6 years
Payback pre-tax from start of production	3.3 years
Payback after-tax from start of production	3.6 years

Notes:
Start of construction begins in Project Year –2
Start of production begins in Project Year 1

23.0 ADJACENT PROPERTIES

There are no adjacent properties that are at the equivalent stage of development as the Paris Hills Phosphate Project (the Property). The historic Bear Lake Mine is located approximately 1.6 kilometers (km) north in Sleight Canyon and is described in Item 6.2.4 of this report. Other minor historical mining adjacent to the Property is described in Item 6.2.5 of this report. The Qualified Persons (QPs) have not verified this information and have relied upon cited reports in the public domain for the data presented.

24.0 Other Relevant Data and Information

24.1 Hydrogeology

Groundwater data for the Paris Hills Phosphate Project (the Property) are available from regional and site-specific studies. The hydrogeologic setting of the Southeast Idaho Phosphate District is described in numerous reports, most notably Ralston et al. (1977, 1980, and 1983), Winter (1980), and Whetstone (2003 and 2009). Site-specific data are available from a preliminary hydrogeologic investigation completed in 2011 and a baseline groundwater characterization program that is currently in progress (Whetstone 2012a).

24.1.1 Regional Hydrogeologic Framework

Groundwater in southeast Idaho occurs in local-, intermediate-, and regional-scale flow systems, depending on topography, geology, and stratigraphic continuity. Intermediate- to regional-scale groundwater flow systems occur in all bedrock units at the Project with the exception of the Wasatch Formation, Thaynes Limestone, and Meade Peak Member. The Wasatch Formation and Thaynes Limestone have limited areal extent and thickness at Paris Hills, and do not have the potential to host significant groundwater systems. The Meade Peak Member is an aquitard, and except where faulted or fractured, separates regional groundwater flow in the Wells Formation[12] from intermediate-scale groundwater systems in the overlying units.

Studies by Ralston and others (1977 and 1983) and Winter (1980) indicate that the Wells Formation is a regional-scale aquifer that participates in inter-basin transfers of groundwater. The Wells Formation is confined over a large area of southeast Idaho where it is capped by the Meade Peak Member. It may be unconfined near surface outcrops. The Rex Chert and Dinwoody Formation generally host groundwater flow systems with short- to intermediate-length flow paths. The Dinwoody Formation is shaley and typically has low to moderate permeability except where fractured. The Rex Chert may have moderate high permeability over a widespread area (Whetstone 2003 and 2009). Groundwater elevations in the Rex Chert at Paris Hills reflect the regional base level, and the unit may have significant hydrologic interconnection with the Wells Formation along fractures.

24.1.2 Hydrogeologic Characteristics of Project Area

24.1.2.1 Site-Specific Data—Site-specific hydrogeologic data for the Project includes results from packer permeability tests in four exploration boreholes, groundwater levels from eight pairs of twinned vibrating wire piezometers (VWPs), and water level, water quality, and permeability data from six monitoring wells. The locations of packer test boreholes, VWPs, and monitoring wells are shown in Figure 24-1.

[12] Includes the Grandeur Member of the Park City Formation. Because of lithologic and hydrologic similarities, the Grandeur Tongue is not broken out as a separate unit from the Wells Formation for the hydrogeologic description.

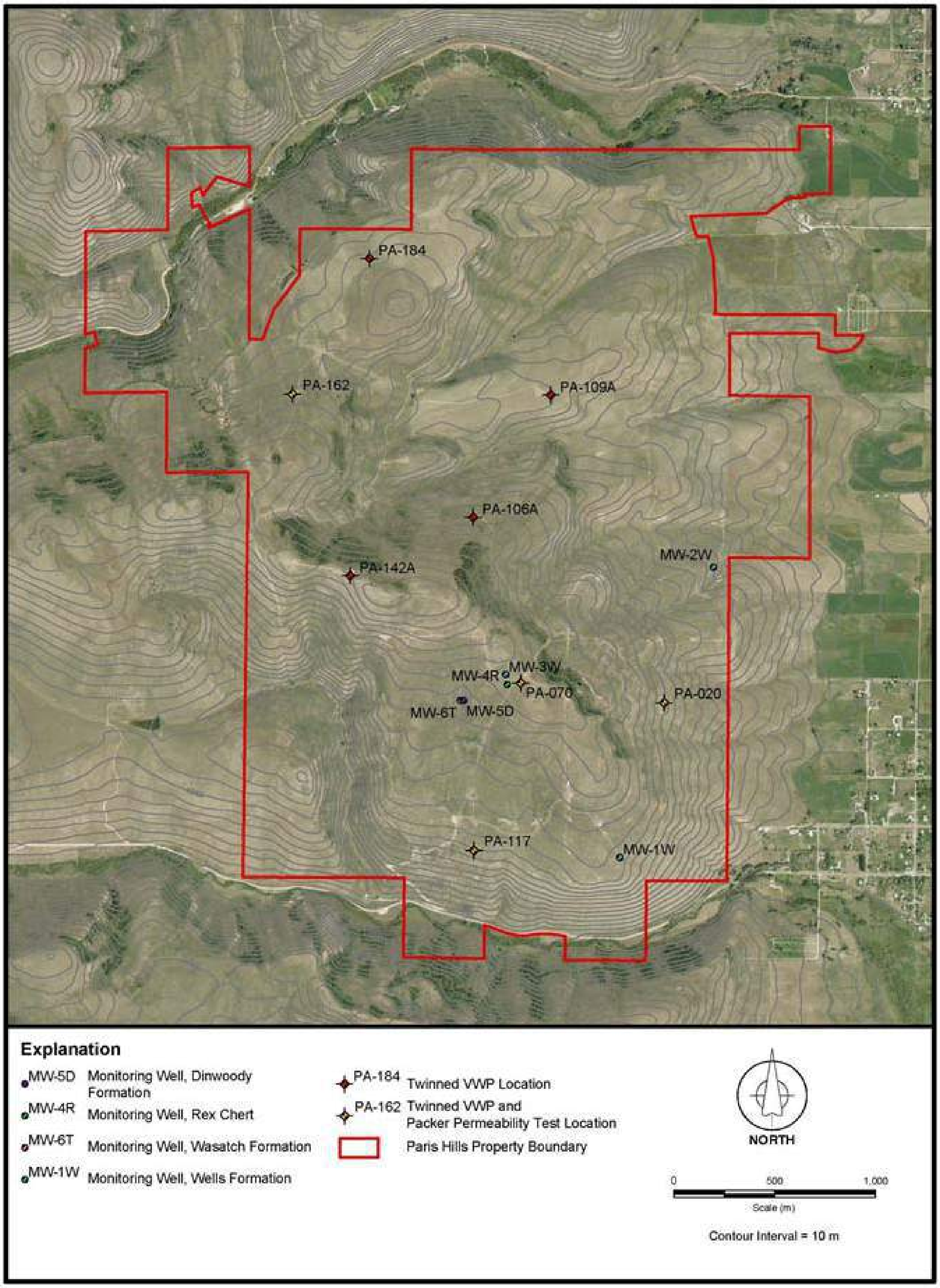


Figure 24-1. Packer Test, Vibrating Wire Piezometer, and Monitoring Well Locations

A total of 21 packer tests were performed in four exploration boreholes to develop permeability data for bedrock. The tested boreholes included PA-020, PA-070, PA-117 and PA-162. A typical test was performed by isolating a section of the borehole with an inflatable packer and injecting water into the section at several pressure steps while recording the flow. Results from the packer permeability tests are summarized in Table 24-1.

Table 24-1. Packer Test Results Summarized by Lithology

Unit	Borehole	Test Interval (m bgs)	Hydraulic Conductivity (cm/s)	Average Value (cm/s)	Median Value (cm/s)	Geometric Mean (cm/s)
Rex Chert	PA-020	172.0–202.7	1.2×10^{-6}	3.0×10^{-5}	1.2×10^{-6}	2.5×10^{-6}
	PA-020	208.5–216.5	4.4×10^{-7}			
	PA-070	326.5–339.0	3.2×10^{-8}			
	PA-070	336.6–342.4	7.8×10^{-7}			
	PA-117	25.0–44.2	4.8×10^{-5}			
	PA-117	61.6–80.8	1.5×10^{-4}			
	PA-162	785.1–804.1	5.9×10^{-6}			
Meade Peak Upper Waste and UPZ	PA-020	218.0–227.4	1.4×10^{-5}	2.4×10^{-5}	2.2×10^{-5}	1.2×10^{-5}
	PA-020	223.5–227.4	3.0×10^{-5}			
	PA-070	351.2–361.3	5.2×10^{-5}			
	PA-162	866.9–874.1	1.1×10^{-6}			
Meade Peak Center Waste	PA-020	232.9–247.0	8.4×10^{-7}	6.9×10^{-6}	5.2×10^{-6}	2.9×10^{-6}
	PA-070	362.8–409.8	1.8×10^{-5}			
	PA-070	403.7–409.8	2.5×10^{-7}			
	PA-117	80.5–114.3	5.2×10^{-6}			
	PA-117	100.3–114.3	9.7×10^{-6}			
Meade Peak LPZ and Lower Waste	PA-070	409.1–412.2	6.6×10^{-7}	4.5×10^{-6}	4.5×10^{-6}	2.4×10^{-6}
	PA-117	127.7–133.5	8.3×10^{-6}			
Grandeur Tongue/ Wells Formation	PA-020	257.3–265.2	5.4×10^{-5}	2.2×10^{-5}	1.3×10^{-5}	8.2×10^{-6}
	PA-070	415.2–423.8	1.3×10^{-5}			
	PA-117	132.3–141.8	8.2×10^{-7}			

Notes: bgs = below ground surface; UPZ = Upper Phosphate Zone; LPZ = Lower Phosphate Zone

Sixteen VWPs were installed in eight boreholes to monitor groundwater water levels in bedrock. The upper VWP in each borehole was installed in the Rex Chert above the contact with the Meade Peak Member. The lower VWP was installed in the Wells Formation immediately below the Meade Peak contact. Installation details and water level readings are summarized in Table 24-2.

Six monitoring wells were installed to monitor water levels and water quality in bedrock. Installation details and completion water levels are summarized in Table 24-3. The monitoring wells were also used for pneumatic slug tests to develop permeability data for the screened formations. Pneumatic slug tests are single well tests that use compressed air to depress the water level to a point below the starting static water level (SWL). Upon release of the air-slug, the water level recovery is monitored and can be used to calculate the hydraulic conductivity of the formation. Pneumatic slug test results are summarized in Table 24-4.

Table 24-2. Summary of Vibrating Wire Piezometer Installation Details and Water Level Readings

Borehole	Formation	Casing Elevation (m amsl)	Installation Depth (m btoc)	Depth to Water (m btoc)	Water Elevation (m amsl)	Vertical Gradient	Temperature (C°)
PA-020	Rex Chert	1,952.03	193.62	47.93	1,904.10	-1.11	13.9
	Wells Formation		260.31	121.97	1,830.06		15.9
PA-070	Rex Chert	2,035.76	343.97	217.86	1,817.90	-0.03	13.7
	Wells Formation		417.33	220.38	1,815.38		15.2
PA-106A	Rex Chert	2,014.27	548.14	176.47	1,837.80	-0.29	19.2
	Wells Formation		632.06	200.48	1,813.79		18.9
PA-109A	Rex Chert	2,013.48	631.39	202.41	1,811.07	0.003	17.8
	Wells Formation		715.08	202.14	1,811.34		20.4
PA-117	Rex Chert	1,939.09	71.66	68.66	1,870.43	-0.76	10.8
	Wells Formation		139.08	119.74	1,819.35		12.5
PA-142A	Rex Chert	2,075.73	571.78	261.40	1,814.33	-0.08	16.1
	Wells Formation		649.47	267.73	1,808.00		17.7
PA-162	Rex Chert	2,031.96	830.13	219.92	1,812.04	-0.11	13.6
	Wells Formation		903.89	227.75	1,804.21		15.4
PA-184	Rex Chert	1,961.48	849.01	147.32	1,814.16	0.17	16.5
	Wells Formation		934.94	132.52	1,828.96		19.3

Notes:
Depth to water and temperature readings from 18 September 2012.
Data from PA-184 are considered to have low accuracy. The associated water level measurements are interpreted to be approximate.
Negative vertical gradients are downward. Positive vertical gradients are upward.
m = meters, amsl = above mean sea level, btoc = below top of casing, °C = degrees Celsius

Table 24-3. Summary of Monitoring Well Data

Well ID	Formation	Installation Depth (m btoc)	Depth to Water (m btoc)	Water Elevation (m amsl)	pH	SC (μS/cm)	Temperature (C˚)
MW-1W	Wells Formation	172.05	153.62	1,819.70	7.51	203	9.5
MW- 2W	Wells Formation	TBD	TBD	TBD	TBD	TBD	TBD
MW- 3W	Wells Formation	450.77	214.18	1,819.92	7.85	311	16.2
MW-4R	Rex Chert	336.15	211.50	1,820.70	7.89	324	12.3
MM-5D	Dinwoody Formation	80.31	46.31	1,968.12	8.15	245	9.6
MW-6T	Wasatch Formation	TBD	TBD	TBD	TBD	TBD	TBD

Notes:
m = meters, amsl = above mean sea level, btoc = below top of casing, pH = potential hydrogen, SC = specific conductance, TBD=to be determined, C = degrees Celsius

Table 24-4. Summary of Pneumatic Slug Testing Results

Well ID	Tested Formation	Analysis Assumptions	Hydraulic Conductivity (cm/s)
MW-1W	Wells Formation—water table	Unconfined, partially penetrating well	2.7×10^{-2}
MW-2W	Wells Formation—West Bear Lake Fault Zone	Confined, partially penetrating well	TBD
MW-3W	Wells Formation—Consolidated Fault Zone	Confined, partially penetrating well	8.2×10^{-3}
MW-4R	Rex Chert—Consolidated Fault Zone	Confined, partially penetrating well	2.8×10^{-3}
MW-5D	Dinwoody Formation—water table	Unconfined, partially penetrating well	TBD
MW-6T	Wasatch Formation—perched groundwater flow system	Unconfined	TBD

cm/s = centimeters per second, TBD = to be determined

Water quality sampling of the wells is in progress with the first complete round of results expected to be available in the first quarter of 2013.

24.1.2.2 Hydrogeologic Conceptual Site Model—The depth to groundwater at the site ranges from near surface for perched local-scale flow systems in the Wasatch Formation to more than 250 meters (m) for the regional flow system in the Wells Formation. VWP data indicate a northwesterly flow direction with an approximate gradient of 0.02 to 0.06 meters per meter (m/m) in the Rex Chert and 0.003 to 0.005 m/m in the Wells Formation. The potentiometric surfaces for both units are deflected near the Consolidated Fault Zone, suggesting that the structure is a preferential conduit for groundwater flow (Figures 24-2 and 24-3). This conclusion is supported by slug test data from monitoring wells MW-3W and MW-4R which indicate relatively high hydraulic conductivities of 8.2×10^{-3} and 2.8×10^{-3} centimeters per second (cm/s) respectively for fractured Wells Formation and Rex Chert near the fault zone. Increased permeability is likely to be associated with other faults and geologic structures at the site including the West Bear Lake Fault Zone, Sage Hills Fault Zone, and Spring Wash Faults. Increased fracturing along the axis of the syncline is believed to exert controlling influence over the general groundwater flow direction in the Project area with water flowing northwest into the hinge.

Groundwater at the site occurs in upper and lower flow systems separated by a leaky aquitard. The upper flow system occurs in the Rex Chert and overlying strata. It flows northwest and may be semi-confined to confined depending on location. The lower flow system is part of a regional-scale aquifer in the Wells Formation. The lower flow system is confined and flows northwest roughly parallel to the plunge of the syncline. The upper and lower flow systems are separated by the Meade Peak Member which acts as a leaky aquitard.

The submergence of the Lower Phosphate Zone (LPZ) below the regional groundwater level increases to the northwest (Figure 24-4). The planned elevation of the portal is 30 to 50 meters (m) above the water table. The northwestern extent of the underground workings will be submerged by more than 700 m.

The Paris Thrust Fault is a large displacement fault located west of the Project area. It places lower Cambrian-age rocks over younger Paleozoic sedimentary strata and is conceptualized to have extensive gouge zones that act as a barrier to groundwater flow.

Data from VWPs indicates the water table in bedrock is 15 to 60 m lower than surface water in Paris and Bloomington Creeks. The streams are conceptualized to be perched systems not directly connected to the water table near the Property.

Preliminary analyses for MW-1W indicate that groundwater in the Wells Formation meets state and federal standards with the exception of manganese. Manganese has a secondary standard of 0.05 milligrams per liter (mg/l) in drinking water (federal) and groundwater (state). Measured concentrations were 0.0855 mg/l (dissolved) and 0.0797 mg/l (total). Secondary standards are based on aesthetics rather than adverse impacts to human health. The federal manganese standard is a recommended guideline. The state manganese standard is enforceable,

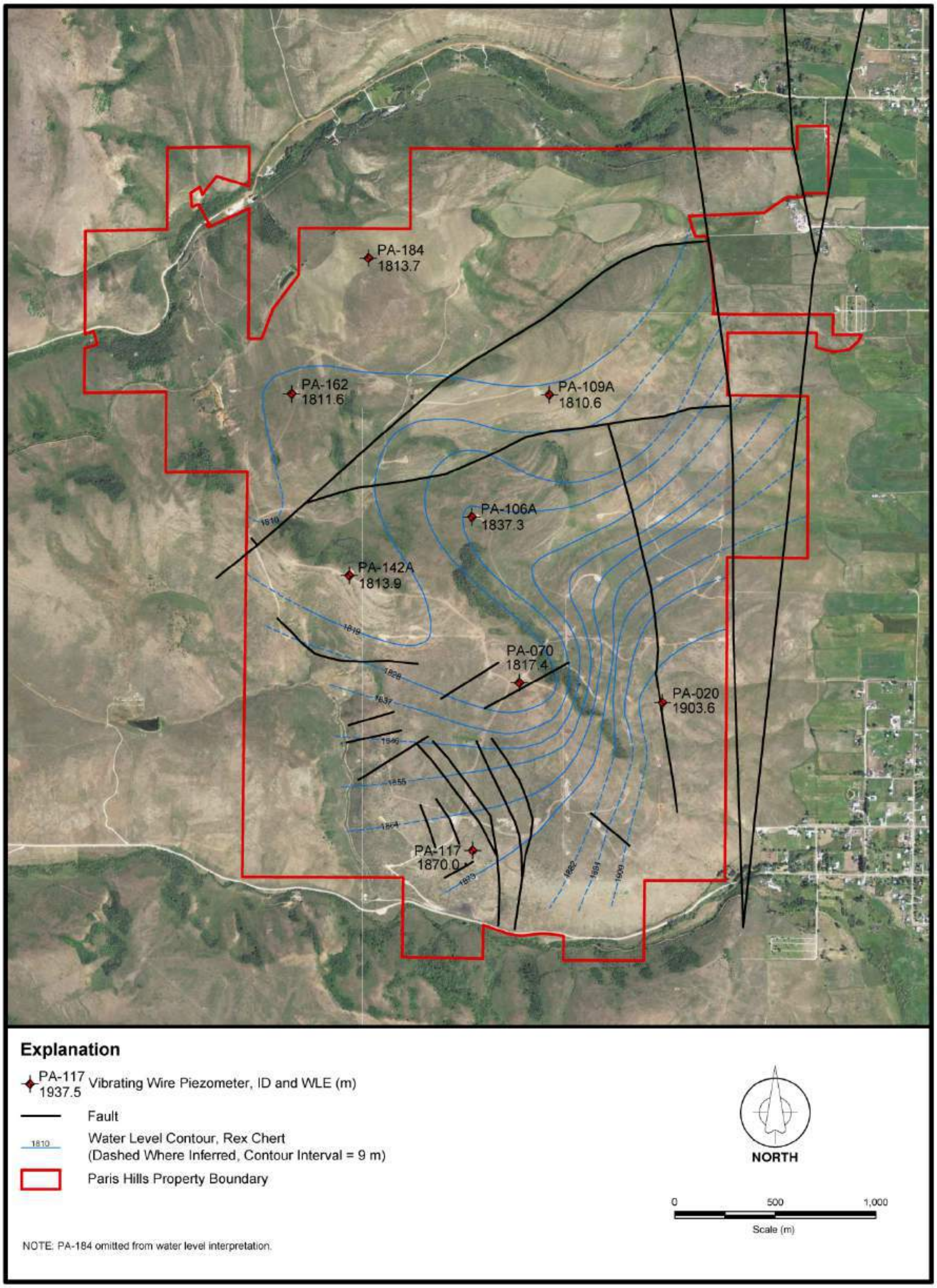


Figure 24-2. Potentiometric Surface in the Rex Chert (September 2012)

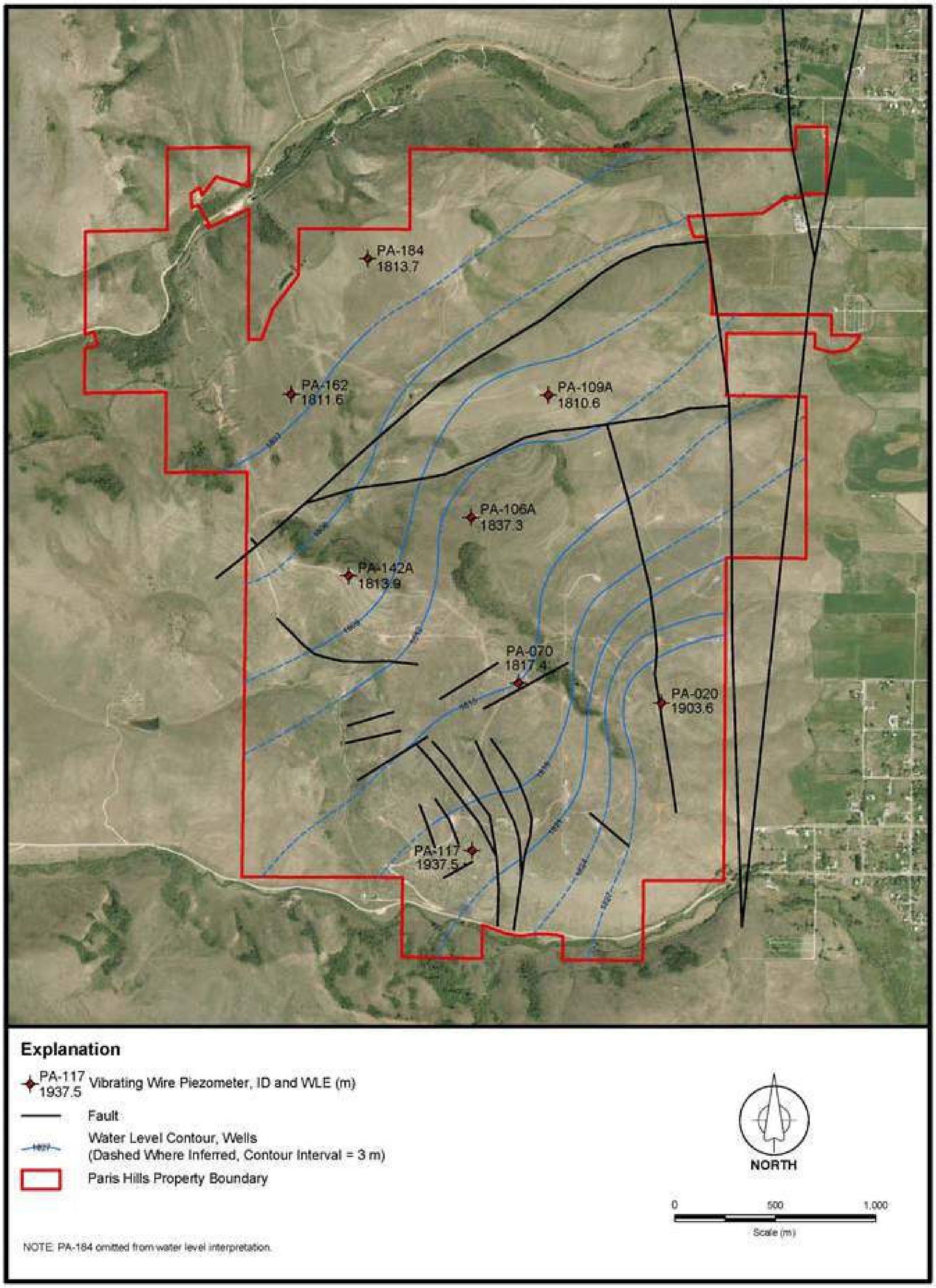


Figure 24-3. Potentiometric Surface in the Wells Formation (September 2012)

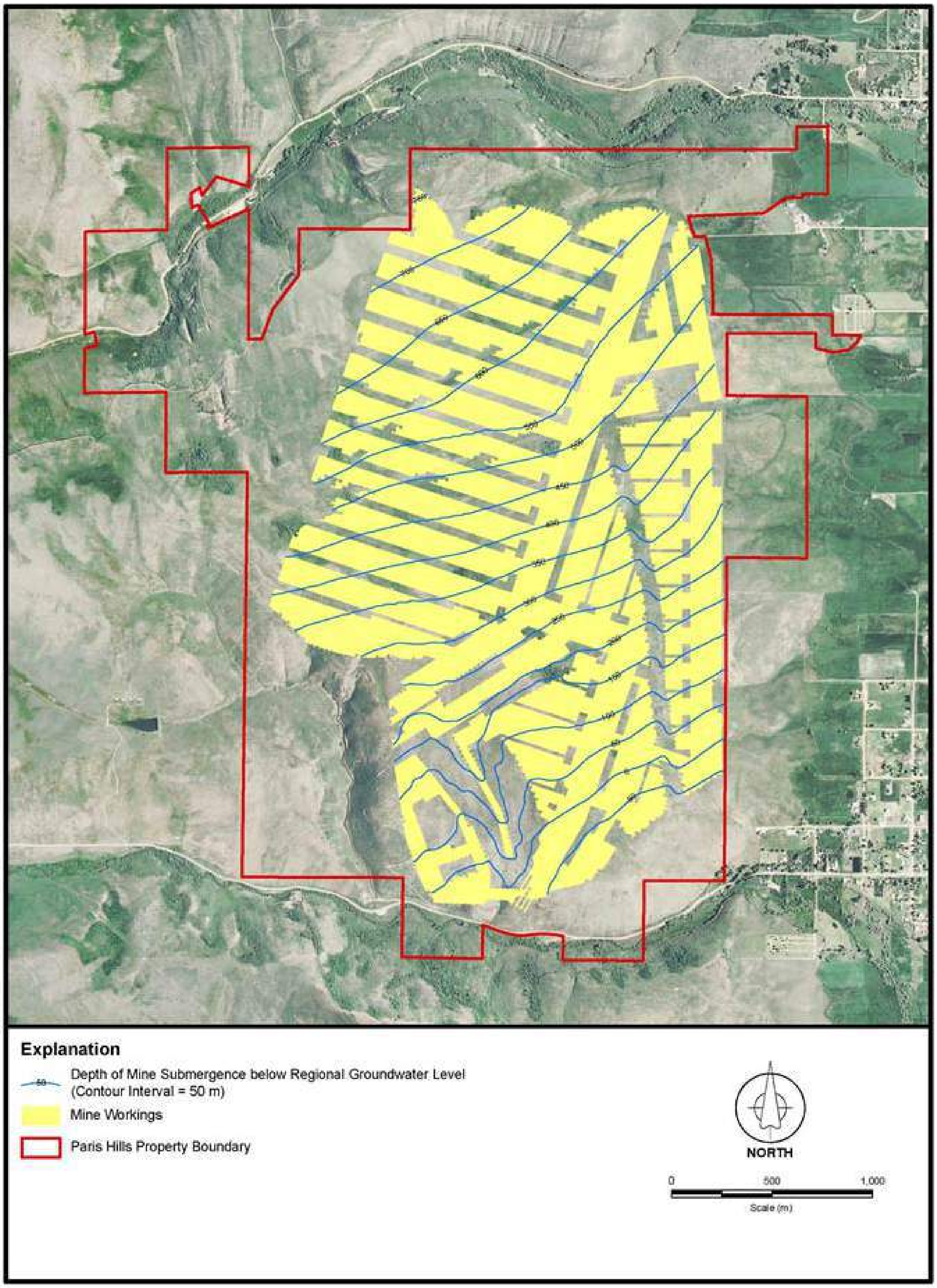


Figure 24-4. Submergence of Underground Workings below Regional Groundwater Level

but sites with elevated background concentrations may develop site-specific standards above 0.05 mg/l under the Idaho Groundwater Quality Rule (Idaho Administrative Procedures Act [IDAPA] 58.01.11).

24.1.3 Numerical Modeling of Mine Dewatering

A three-dimensional numerical groundwater flow model was prepared to evaluate dewatering requirements for the planned underground workings in the horizontal limb of the syncline. The model was developed using MODFLOW-SURFACT version 3.0 (HydroGeologic 2001). Complete documentation of the groundwater model is presented in the "Updated Preliminary Hydrogeological Study for the Paris Hills Project" (Whetstone 2012b). The model setup and results are summarized in the following sections.

The groundwater model was prepared in two parts: (1) an initial steady-state model to simulate the pre-mining groundwater flow system and (2) a transient model to simulate time-dependent dewatering requirements as a function of mine development. The groundwater model includes 12 layers that simulate stratigraphy extending downward from the water table to the bottom of the Wells Formation. Layer elevations are variable and are draped to follow geologic structure (Figure 24-5). The model includes representations of major structural features that are likely to be hydraulically active. These features include the Paris Thrust Fault, hinge of the syncline, Consolidated Fault Zone, West Bear Lake Fault Zone, Sage Hills Fault Zone, North and South Spring Wash Faults, and other smaller faults.

Groundwater levels for the steady-state model were calibrated using water level data from VWPs. The average difference between the calibrated model and the target water levels was about 2 percent (%) of the maximum drawdown needed to dewater the mine. The dewatering simulation considers a 19-year mine life and calculates the average inflow to the mine on an annual basis. The underground workings are simulated to start near the portal and expand north as the mine is developed. Retreat mining is modeled to start in Year 3 and result in subsidence of the overlying strata. Subsidence effects are simulated by increasing the modeled hydraulic conductivity of the affected rock masses. Hydrologic changes in the continuous zone are not expected to influence inflow to the mine and are not simulated in the model.

Results of the dewatering simulation indicate that pumping from up to 17 wells will be required to adequately depressurize the system for mining (Figure 24-6). The predicted dewatering discharge is shown in Figure 24-7.

Predicted mine inflow increases with increasing depth of submergence as mining moves downdip to the north. The peak predicted pumping rate is about 1,043 liters per second (lps) during mining Year 12. As modeled, pumping from extraction wells is sufficient to effectively dewater the mine, and the peak simulated discharge from the underground working is projected to be about 10 lps. This low pumping rate from the workings is probably unrealistic and it is recommended that planning for mine discharge consider a discharge rate of about 30 to 60 lps starting in mining Year 3.

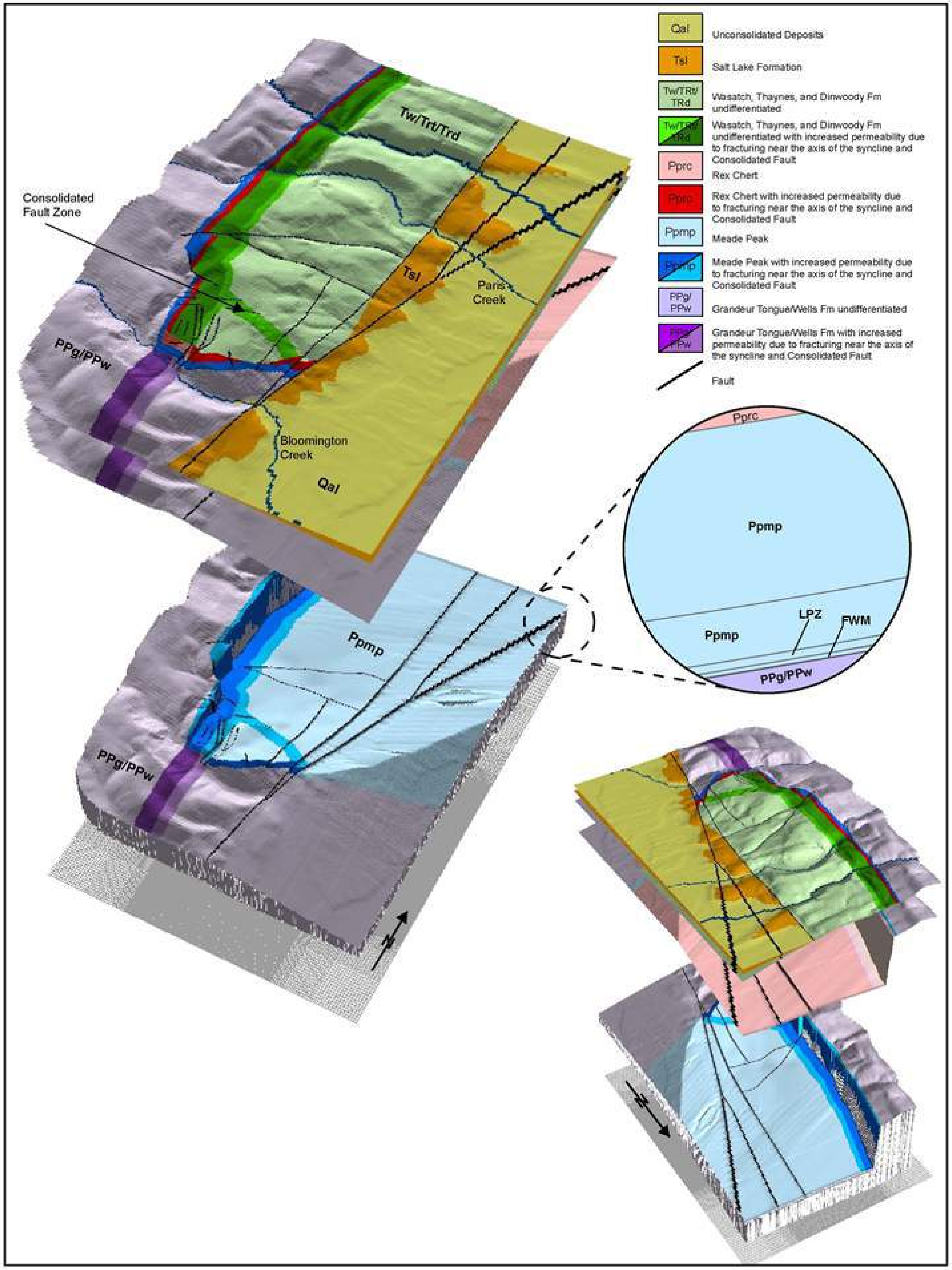


Figure 24-5. Three-Dimensional Block Diagrams of Groundwater Model Setup

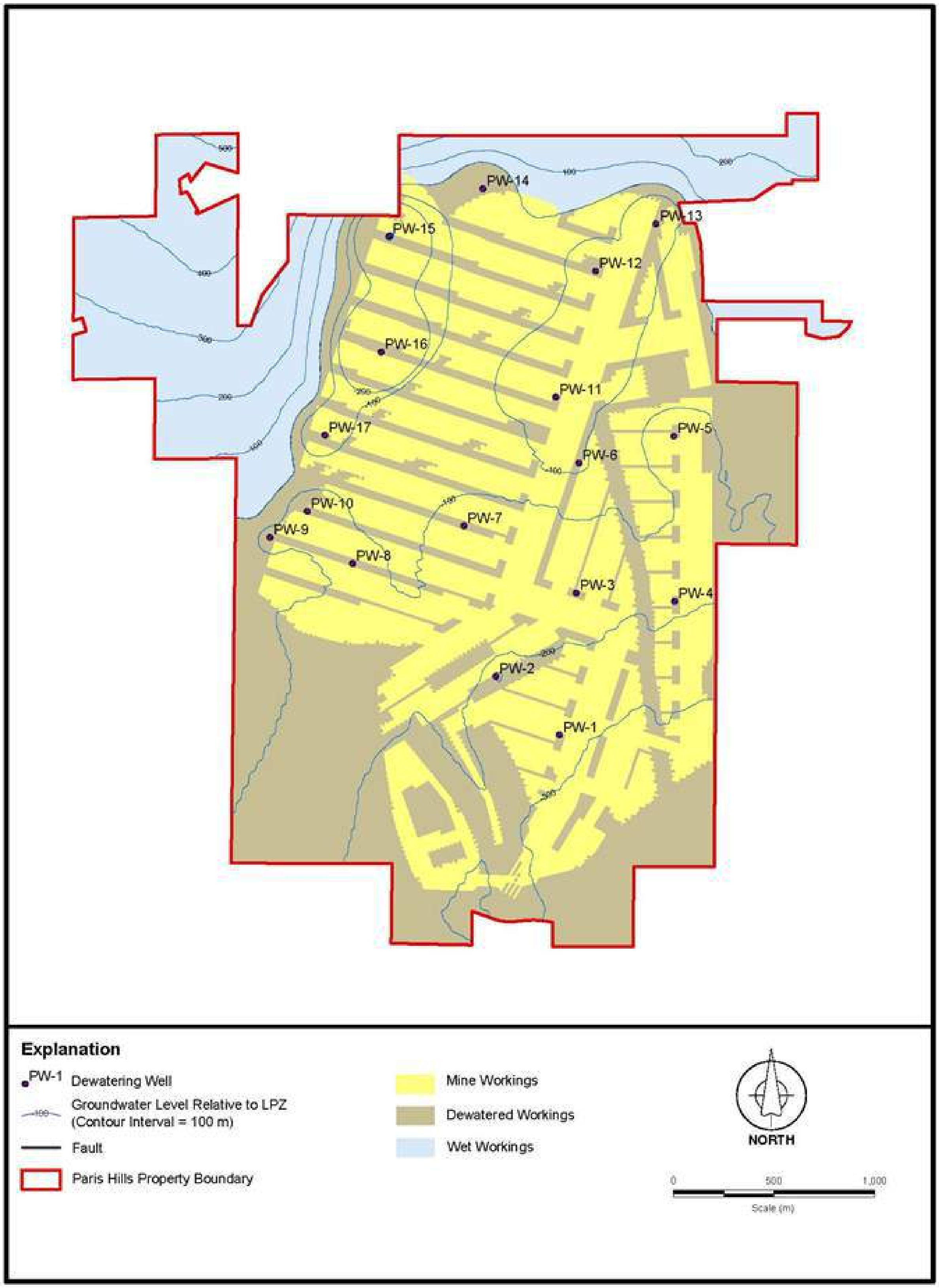


Figure 24-6. Locations of Simulated Dewatering Wells and Contoured Maximum Drawdown

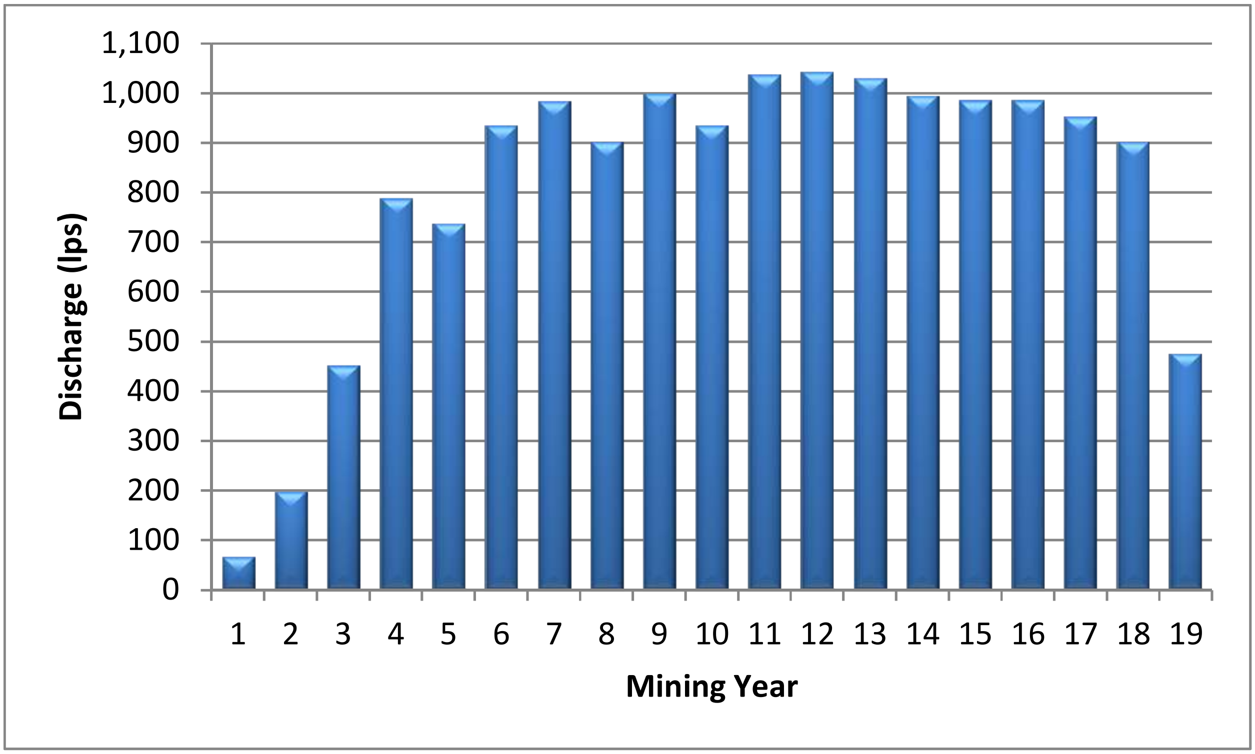


Figure 24-7. Simulated Average Mine Dewatering Discharge Rates

Uncertainty in the model predictions is associated with the assumptions used for the input parameters, geologic model, and conceptual hydrologic model. Assumptions with the greatest impact on predicted dewatering requirements include the driving head on the system, the assigned hydraulic conductivity for geologic units, and the conceptual model which assumes that groundwater is connected to an extensive system that is essentially inexhaustible. The modeled head assumptions are well constrained by data from VWPs and monitoring wells, and are believed to accurately reflect the system. Assumptions for hydraulic conductivity have more uncertainty. The modeled values are based on professional judgment and calibration of the steady-state groundwater model. They reflect the lower middle range of the observed regional and site-specific packer testing values. Recent slug testing results in faulted areas suggest that highly fractured areas may have higher hydraulic conductivities than modeled. If true, dewatering requirements could be higher than predicted.

The assumption of an inexhaustible groundwater system is very conservative and drives the modeled sustained high inflows. Any compartmentalization of the aquifer system will reduce the overall dewatering requirement. It is believed that the hydraulic conductivity and water availability assumptions balance each other and that the modeled dewatering requirements are the best engineering estimate based on the current understanding of the groundwater system.

24.1.4 Ongoing Hydrogeologic Characterization Work

Additional hydro-geologic characterization work is planned for the Property in 2013. The work includes continuation of groundwater monitoring and water quality sampling, performance of a large-scale aquifer test near the Consolidated Fault Zone, and characterization of the injection area for disposal of dewatering discharge.

Monitoring wells listed in Table 24-4 will be sampled every other month to develop baseline data to support permitting activities. The wells are installed with data-logging pressure transducers to provide information about seasonal variation of groundwater levels. The VWPs will continue to be monitored on a monthly basis.

An aquifer test with observation wells is planned near the Consolidated Fault Zone during the summer field season in 2013. The test will be situated near monitoring wells MW-3W and MW-4R and will require installation of a large-diameter pumping well (30- to 36-centimeter (cm) casing). The aquifer test would include an 8- to 10-hour step-drawdown test to determine the maximum sustainable pumping rate for the well and a 72-hour constant-rate discharge test to determine aquifer properties. Data from the tests will be used to improve confidence in the hydraulic conductivity assumptions for the dewatering analysis and evaluate potential compartmentalization of the aquifer.

Hydrogeologic characterization of the injection site for dewatering discharge is planned to begin in January 2013. The planned disposal site is situated in Bear Valley about 2.4 kilometers (km) east of the Property area. The targeted injection horizon is the Salt Lake Formation at a depth of between 180 to 450 m. Based on the available geophysical data, the Salt Lake Formation is overlain by about 180 m of low-permeable unconsolidated sediments. The hydrogeologic characterization program will include coring and packer permeability testing of the targeted injection horizon in two boreholes, and installation and sampling of two monitoring wells to develop baseline water quality data. The program is intended to provide information that can be used to support the design of the injection well field and permitting activities.

24.2 Geochemistry

Geochemical data for the Property are available from regional sources and site-specific studies. Site-specific information includes whole rock geochemical data from the mineral exploration drilling program and acid base accounting (ABA), synthetic precipitation leaching procedure (SPLP), and whole rock analyses from the Paris Hills Baseline Geochemistry Study, currently in progress (Whetstone 2012c).

24.2.1 Regional Setting and Geochemical Issues in the Southeast Idaho Phosphate District

The Phosphoria Formation has been the subject of study by the United States Geological Survey (USGS) throughout much of the last century. In 1997, the United States Bureau of Land Management (BLM) and United States Forest Service (USFS) requested that the USGS initiate a series of geologic, geoenvironmental, and resource studies to support land management decisions by federal agencies (Hein 2004). This program followed three earlier USGS investigations and consisted of multidisciplinary research with emphasis centered on baseline geological and geochemical characterization of the Phosphoria Formation. Additional geochemical investigations have been prepared to support permitting of other mines in the region (Maxim 2000, 2002, 2005, 2006; Whetstone 2010). These studies provide information about the characterization methods that are required to support mine permitting.

Studies by the USGS and others indicate that selenium and other constituents of potential concern (COPCs) have elevated concentrations in phosphate mine waste rock (Perkins and Foster 2004; Hein, Perkins, and McIntyre 2004; Grauch et al. 2004; Herring and Grauch 2004; Maxim 2000, 2002, 2005; Whetstone 2010). The Meade Peak Member is identified as the primary geologic host of selenium and has been implicated in livestock deaths and deformities in aquatic birds at several mining sites in the district (Piper et al. 2000; Presser et al. 2004; Hamilton, Buhl, and Lamothe 2004). Cadmium, antimony, iron, manganese, nickel, sulfate and zinc are also identified as being mobile in seepage from Meade Peak waste rock (Maxim 2000, 2002, 2005, 2006; Whetstone 2010).

The framework mineral assemblage of the Meade Peak Member is dominated by quartz, potassium feldspar, and plagioclase, with subordinate amounts of detrital phosphate, carbonate, and oxide minerals (Grauch et al. 2004; DePangher 2007). Matrix minerals are a combination of detrital and authigenic clays (Grauch et al. 2004; DePangher 2007). Carbonate fluorapatite (CFA) is the primary phosphate mineral.

Fine-grained pyrite is widely distributed in the Meade Peak Member. Vaesite (nickel sulfide) is common in solid-solution with pyrite (Grauch et al. 2004). Sphalerite (zinc sulfide) is also widely distributed and generally occurs as inclusions in CFA or disseminated in the matrix (Grauch et al. 2004). Sphalerite is commonly associated with sulvanite (copper vanadium sulfide) and cadmium sulfide (Grauch et al. 2004).

Fine-grained pyrite is widely distributed in the Meade Peak Member. Vaesite (nickel sulfide) occurs in solid-solution with pyrite (Grauch et al. 2004). Sphalerite (zinc sulfide) is associated with sulvanite (copper vanadium sulfide) and cadmium sulfide (Grauch et al. 2004). The Meade Peak Member also contains native selenium as fracture fillings. Buddingtonite (ammonium feldspar) occurs as overgrowths on detrital orthoclase (Knudsen and Gunter 2004). Roscoelite (vanadium illite) has been observed as coatings on bedding planes and as void fillings (Grauch et al. 2004). Carbonate cement (calcite and dolomite) and overgrowths on detrital grains are also common.

A variety of other minerals are also known to be present in the Meade Peak Member. Uraninite occurs as inclusions in CFA (Zielinski et al. 2004). Fluorite and barite occur in veinlets with quartz and calcite (Grauch et al. 2004). Bitumen is disseminated throughout the matrix and occurs in veins (Grauch et al. 2004).

Geochemical data for the Property are available from whole rock analyses, ABA, SPLP, and whole rock testing that were completed as part of the Baseline Geochemical Characterization Study (Whetstone 2012c). The study is in progress and includes the following components:

- Analysis of the mineralogical composition of waste rock and ore by thin-section microscopy and scanning electron microscopy (SEM)
- Analysis of the elemental content of waste rock and ore by inductively coupled plasma-atomic emission spectrometry (ICP-AES) and mass spectrometry (ICP-MS)
- Analysis of sulfur content and speciation, total organic carbon content, and acid generating potential of waste rock and ore by ABA

- Analysis of the leaching characteristics of waste rock and ore by SPLP and column leaching tests
- Analysis of metal attenuation from solution by adsorption onto soil and rock using batch adsorption tests

Samples for the study were obtained from 39 boreholes (Figure 24-8) and include 738 sections of crushed core from strata in and adjacent to the LPZ. The samples were combined in two steps to form A Composites representing the mine roof, floor, and LPZ in each borehole (117 total) and B Composites representing the roof, floor, and LPZ across the entire deposit (3 total). A diagram showing the design of the testing program is presented in Figure 24-9. Analytical work for whole rock geochemistry, ABA, and SPLP tests has been completed. Column testing and thin-section microscopy is in progress and is scheduled to be completed in March 2013. Batch adsorption tests will be performed if the results of the column tests indicate a need for an attenuation study.

Preliminary results of the whole rock testing indicate that ore and waste rock from the LPZ contain antimony, arsenic, cadmium, chromium, copper, molybdenum, nickel, phosphorous, rhenium, selenium, strontium, sulfur, tungsten, uranium, vanadium, and zinc in concentrations that exceed world shale averages. Selenium is concentrated in wall rocks from the floor compared to the roof and LPZ. Cadmium is concentrated in the LPZ compared to the roof and floor.

Preliminary results for ABA testing indicate that mined waste rock and ore are not expected to generate acidic drainage. This is consistent with historical experience at other phosphate mine sites in the district. ARD has not been observed to be associated with phosphate mine waste rock.

Preliminary results from SPLP tests indicate that sulfate, antimony, cadmium, iron, manganese, and selenium are likely to be mobile in seepage from waste rock at concentrations that exceed their potentially applicable groundwater standards. Molybdenum and nickel were also mobile in leachates for some samples, but do not have associated groundwater standards.

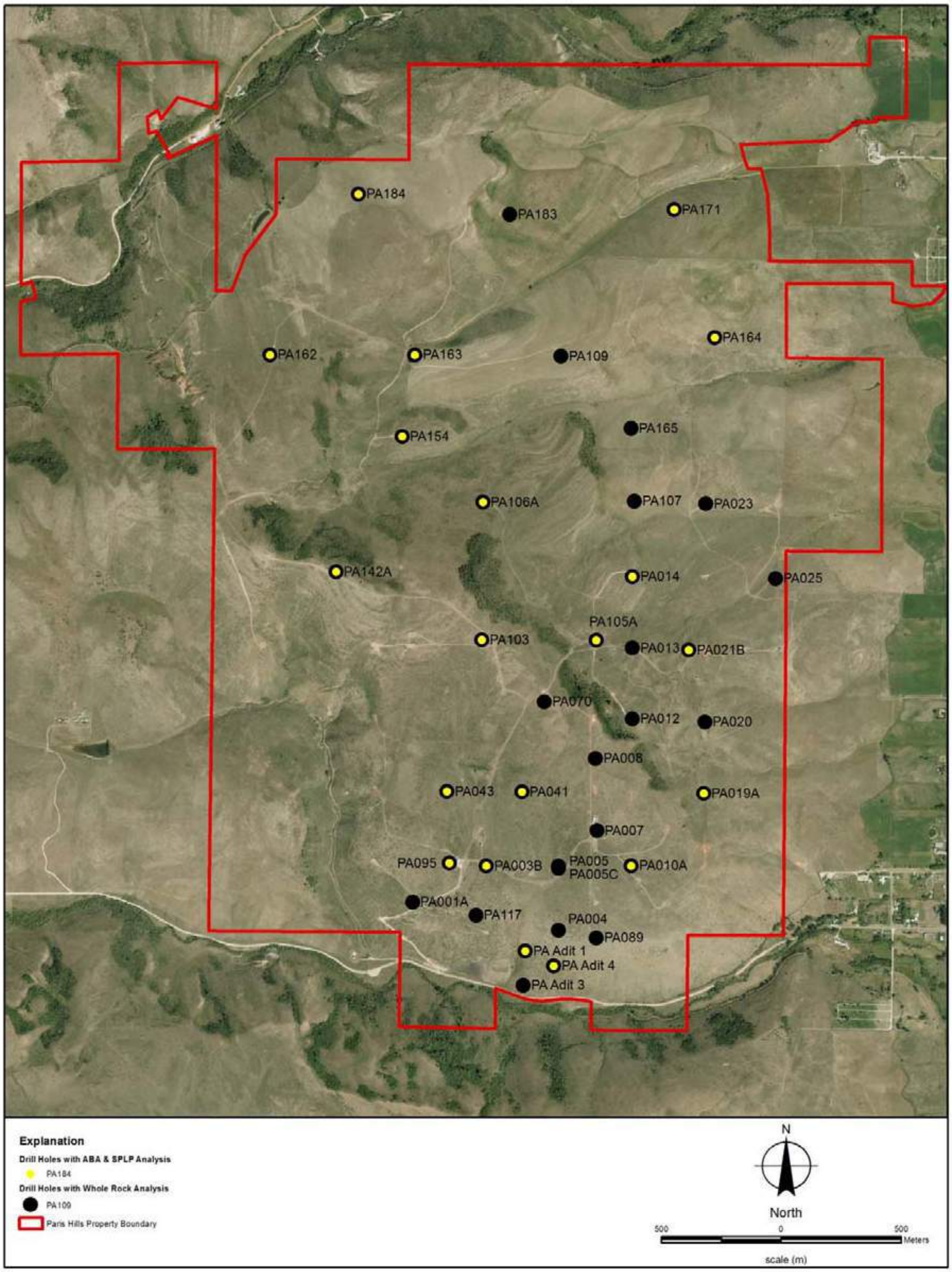


Figure 24-8. Location of Boreholes Used for the Baseline Geochemical Study

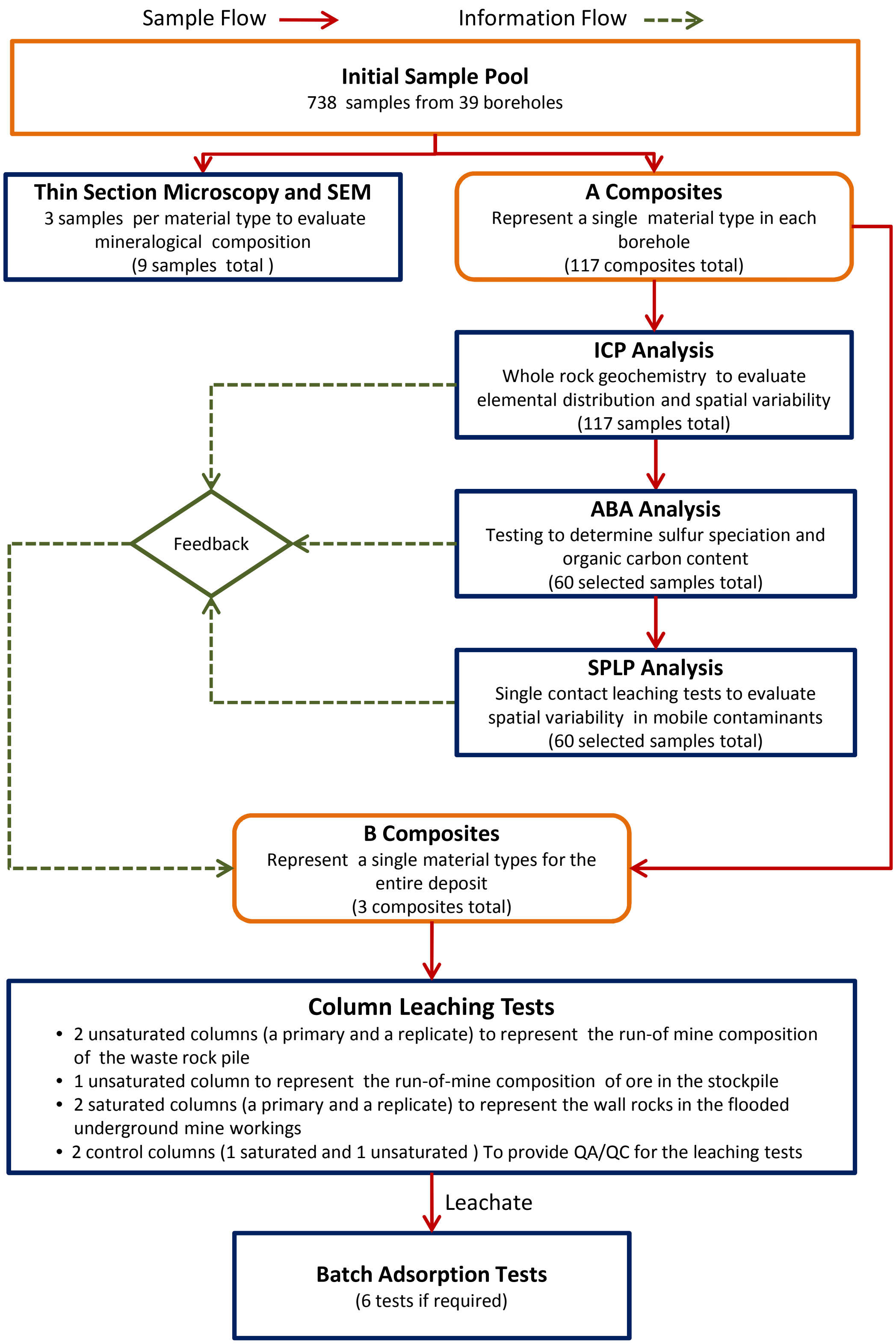


Figure 24-9. Structure of the Baseline Geochemical Testing Program

25.0 INTERPRETATION AND CONCLUSIONS

The Paris Hills Phosphate Project (the Property) contains significant phosphate mineralization in sufficient quantities and of sufficient grade to be attractive for mining under current market conditions, notwithstanding the risk inherent to proving and developing any mining property. The Lower Phosphate Zone (LPZ) represents the principal mining target. The Upper Phosphate Zone (UPZ) represents a secondary mining target. Vanadium represents upside mining potential.

Mineral Resources are stated for the flat-lying limb of the LPZ and UPZ. Mineral Reserves are stated for the LPZ based on a Feasibility Study (FS) for underground room-and-pillar mining completed in December 2012. The FS concludes that the LPZ room-and-pillar Project is economical and that the crushed run-of-mine (ROM) phosphate rock concentrate product will be marketable. The FS determines that steady-state annual production rates of 900,000 tonnes (t) to 1.0 million tonnes (Mt) with an average life-of-project annual ore grade of 29.5 percent (%) phosphorus pentoxide (P_2O_5) should be achievable given the mining assumptions used in the FS. Annual ore grade ranges between 28.5% and 31.9% P_2O_5. Other ore grade parameters are within acceptable limits for phosphate rock concentrate markets.

There is sufficient data from the 2010–2012 exploration program to support the geologic interpretations of the mineral deposit on the Paris Hills Agricom Inc. (PHA) Property that were used in the FS. Determinations of Mineral Resources and Mineral Reserves were based on a geological model developed using Carlson Software's Geologic Module (Carlson 2011) and the mine projections, scheduling, and production tonnes and ore grade were based on Carlson's Underground Mining Module (Carlson 2011). Carlson is commonly used mine planning software for bedded (tabular) deposits. Exploration Targets were identified in addition to the Mineral Resources and Mineral Reserves for future consideration.

Adequate design, permitting requirements, hydrogeologic, and marketing analyses were conducted to support establishing mining methods, mining equipment, and infrastructure requirements at the FS level. Estimates of capital and operating costs were obtained to determine that the LPZ is an economically viable project, given the assumptions identified in the FS. Sensitivity analyses were done for phosphate rock price, capital and operating costs, and production rate. The sensitivity analyses concluded that the Project is economically robust with all scenarios generating positive Net Present Values (NPV).

Several geologic factors, including steeply dipping areas and faults, make the mining operation technically challenging. Permitting is key to Project scheduling.

A two-dimensional risk assessment was developed to identify areas of potentially significant project risks. Groundwater flows and pressures were the most significant technical mining risk, followed by ground control and ore grade dilution. Mitigation measures were incorporated into the FS that should have a reasonable probability of reducing these and other significant risks to acceptable levels.

Additional drilling is recommended to expand the reserves on the Property. Further analysis and research is necessary for hydrogeologic and Project permitting decisions and meeting regulatory requirements.

26.0 RECOMMENDATIONS

Paris Hills Agricom Inc. (PHA) should continue with permitting activities, marketing of the phosphate ore, and detailed engineering design for the Paris Hills Phosphate Project (the Property). The following recommendations are mutually independent activities aimed at advancing the Project to development and production. The total estimated cost of the recommended tasks ranges from US$6 million to US$14 million. The recommendations are not phased.

26.1 Geology/Exploration

Infill and step-out drilling should be completed to elevate remaining areas of the Lower Phosphate Zone (LPZ) horizontal limb to the status of a Measured & Indicated (M&I) Resource. Step-out drilling is necessary to define the western limits of the horizontal limb. Definition drilling is recommended to evaluate or confirm anomalous results from past exploration drilling, primarily related to LPZ thickness.

Definition drilling ahead of mining is recommended to define the geometry and location of faults.

Long-term drilling plans should include angled drilling through the upturned limb to define resource potential. The Upper Phosphate Zone (UPZ) and Vanadium Zone (VZ) should be sampled and evaluated for upside production potential in conjunction with principal mining in the LPZ.

The phosphate resource remains open to the north at potentially mineable depths. Future exploration to the north is warranted.

Additional mapping and analysis should be conducted to improve characterization of major fault and fracture zones.

The estimated cost is US$500,000 to US$1.5 million.

26.2 Seismic Surveying (structural geology)

Two- or three-dimensional high-resolution seismic surveying is recommended for identifying faulting and other structural features of significance to mining in the LPZ. The tradeoff between two- and three-dimensional costs and technical value requires evaluation. Even though the resolution is similar, three-dimensional seismic surveying is preferred from a technical perspective for enhanced structural understanding, which is critical for final mine planning for this Project. The seismic survey program is recommended prior to final mine planning and development.

The estimated cost is US$1.5 million to US$2.0 million.

26.3 Mining Management, Design, and Equipment

Based on geologic knowledge and drilling experience gained to date, PHA should reevaluate Sigra oriented horizontal stress testing in zones of higher quality rock. Stress levels were assumed for the geotechnical feasibility design. Measurements are useful for design validation and improving detailed mine design. The estimated cost is US$80,000 to US$150,000.

26.4 Processing

Additional metallurgical testing is recommended to test variability of key quality parameters throughout the deposit. Testing samples should include material to represent roof/floor dilution and identify characteristics of weathering. Key parameters for testing include phosphorus pentoxide (P_2O_5), minor element ratio (MER) constituents (aluminum oxide [Al_2O_3], iron/ferric oxide [Fe_2O_3], magnesium oxide [MgO]), and organic carbon.

A particle size distribution analysis is recommended for the LPZ ore to identify particle size versus key quality parameters (primarily P_2O_5 grade). The evaluation should be conducted on both run-of-mine (ROM) and crushed ore material. This analysis would be most valuable with a bulk sample from initial mining.

The estimated cost is up to US$275,000.

26.5 Project Permitting and Regulatory Agencies

Proceed with environmental and other regulatory requirements per the following activities:

- Continue and expand environmental baseline studies.
- Review the National Environmental Policy Act (NEPA) requirements based on the specific Project elements.
- Continue consultation with key agencies on the development of a study plan for collecting hydrological and hydrogeological data.
- Continue with task group meetings comprised of representatives from each of the key agencies to review the baseline data program and groundwater/geochemical modeling exercises.

PHA should continue Project review meetings with all potentially involved regulatory agencies to ensure that permitting and plan requirements are understood. These include applicable federal, state, and local agencies. Areas of continued discussion include:

- United States Mine Safety & Health Administration (MSHA) mine plan and approval requirements, including dams and sediment pond designs
- Clean Water Act (CWA) 401, 402, and 404 permits
- County conditional use permits
- Sanitary sewage treatment plant permits
- Idaho Department of Environmental Quality (IDEQ) requirements
- United States Environmental Protection Agency (EPA) requirements

- Idaho Department of Water Resources (IDWR) requirements
- Idaho Transportation Department (ITD) requirements
- Other local agencies

The estimated cost is US$1.5 million to US$3.0 million.

26.6 Hydrogeologic/Groundwater Analysis (geochemistry)

Continue the hydrogeologic characterization program and groundwater monitoring with the following activities:

- Continue semi-monthly (every other month) monitoring of groundwater levels and water quality in the six project area monitoring wells.
- Continue monthly monitoring of water levels for the eight pairs of nested vibrating wire piezometers (VWPs).
- Conduct a 72-hour constant-discharge pumping test in the Consolidated Fault Zone near MW-3W and MW–4R.
- Continue hydrogeologic characterization of the potential injection site for mine dewatering discharge of groundwater. The hydrogeologic characterization program will include coring and packer permeability testing of the targeted injection horizon in two boreholes, and installation and sampling of two monitoring wells to develop baseline water quality data.
- Continue to refine the hydrogeologic model for determination of mine dewatering estimates and optimal placement of dewatering wells.
- Complete column tests for the geochemical characterization program.
- Continue to refine the numerical groundwater model of contaminant fate and transport.

The estimated cost is US$2 million to US$3 million.

26.7 Marketing

Continue marketing development via negotiations with potential PHA phosphate consumers to define and pinpoint phosphate rock marketing and sales alternatives.

Determine the preferred transportation method and required infrastructure. If rail transport is required, update the rail loadout option to align with the Union Pacific Railroad's (UP's) engineering design requirements and commence negotiations if necessary.

The estimated cost is US$50,000 to US$100,000.

26.8 Community Relations

Continue to foster stakeholder support for development of the Paris Hills Project. Specifically continue with community meetings to inform the public at local and state levels of project development and plans.

26.9 Upper Phosphate Zone Preliminary Economic Assessment

Prepare a National Instrument (NI) 43-101 compliant Technical Report (TR) Preliminary Economic Assessment of the UPZ, including an analysis of beneficiation options.

Conduct a second phase of beneficiation testing and fertilizer testing (variability testing) for the UPZ.

The estimated cost is US$200,000 to US$400,000.

26.10 Upturned Limb Phosphate Resource Estimate

Conduct an exploration drilling program on the upturned limb and generate an NI 43-101 compliant TR resource estimate of the upturned limb.

The estimated cost is US$1.0 million.

26.11 Land

Continue to acquire control of key properties that are needed for the surface facilities and infrastructure.

The estimated cost is up to US$3 million.

26.12 Other Work

Additional recommendations for exploration and development are identified below. These tasks are forward-looking and remain independent of the LPZ FS:

- **Vanadium Zone—**Analyze the VZ to evaluate the upside potential of vanadium pentoxide (V_2O_5) coproduction with phosphate mining.

- **Northern Exploration—**The phosphate resource remains open to the north at potentially mineable depths. Future exploration to the north off the Property is warranted. Numerical modeling is recommended for evaluating mining potential under deep cover exceeding 1,000 meters (m).

27.0 REFERENCES

AAI (2011), "NI 43-101 Technical Report, Paris Hills Phosphate Project, Bloomington, Idaho, USA," prepared for Stonegate Agricom Ltd., effective date November 17.

AAI (2012a), "NI 43-101 Technical Report, Paris Hills Phosphate Project, Bloomington, Idaho, USA," prepared for Stonegate Agricom Ltd., effective date March 26.

AAI (2012b), "NI 43-101 Technical Report, Paris Hills Phosphate Project, Bloomington, Idaho, USA," prepared for Stonegate Agricom Ltd., effective date August 15.

AAI (2013), "NI 43-101 Technical Report, Paris Hills Phosphate Project, Bloomington, Idaho, USA," prepared for Stonegate Agricom Ltd., effective date January 18.

AAI, Stonegate Agricom Limited, Brown and Caldwell, DcR Engineering Services, Inc., Whetstone Associates, and Bruno Engineering, P.C. (2012a), "Preliminary Feasibility Study Paris Hills Phosphate Rock Underground Mine Project," prepared for Stonegate Agricom Ltd., effective date March 26.

AAI, Stonegate Agricom Limited, Brown and Caldwell, Sunrise Engineering, Inc., Whetstone Associates, and Bruno Engineering, P.C. (2012b), "Feasibility Study Paris Hills Phosphate Rock Underground Mine Project," prepared for Stonegate Agricom Ltd., effective date December 21.

AMEC (2010), "NI 43-101 Technical Report, Paris Hills Phosphate Project, Idaho, USA," prepared for Stonegate Agricom Ltd. by Edward J. C. Orbock III, Douglas Reid, and John Rust, effective date February 1.

Armstrong, Frank C. and Earle C. Cressman (1963), "The Bannock Thrust Zone Southeastern Idaho," USGS Professional Paper 374-J.

Armstrong, F. C. and S. S. Oriel (1965), "Tectonic Development of the Idaho-Wyoming Thrust Belt," *American Association of Petroleum Geologists Bulletin*, 49:1847–1866.

Canadian Institute of Mining, Metallurgy and Petroleum (CIM) (2003), "Estimation of Mineral Resources and Mineral Reserves, Best Practice Guidelines: Canadian Institute of Mining, Metallurgy and Petroleum," November 23, <http://www. cim.org/ committees/-estimation2003.pdf>.

Canadian Institute of Mining, Metallurgy and Petroleum (CIM) (2010), "CIM Definition Standards - For Mineral Resources and Mineral Reserves: Canadian Institute of Mining, Metallurgy and Petroleum," 2010, <http://www.cim. org/UserFiles/File/CIM_DEFINITON_STANDARDS_Nov_2010.pdf >.

Carlson Mining 2011 Software© (2011), website <http://www.carlsonsw.com>.

Carlson Mining 2013 Software© (2013), website <http://www.carlsonsw.com>.

Code of Federal Regulations (2010), "Mineral Resources," Title 30, Parts 1 to 199, July 1, 782 pp.

Code of Federal Regulations (2011), "Public Lands," Title 43, Part 3595 Protection Against Mining Hazards.

Coleman, S. M. (2006), "Acoustic Stratigraphy of Bear Lake, Utah-Idaho-Late Quaternary Sedimentation Patterns in a Simple Half-Graben," *Sedimentary Geology*, 185:113–125.

CRU Strategies (CRU) (2012), "Paris Hills Phosphate Rock Marketing Study," a report prepared for PHA, January.

DePangher, M. (2007), "Blackfoot Bridge Project Petrographic Report #UEG," a consultant report prepared for Whetstone Associates, 10 pp.

De Voto, R. H. (1977), "Geology and Vanadium Resource Paris-Bloomington Area, Idaho," Earth Science. Inc., Golden, Colorado.

Diamond, R. B. (1979), "Views on Marketing of Phosphate Rock for Direct Application," International Fertilizer Development Center (IFDC) SP-1.

Driggs, B. W. (1970), *History of Teton Valley, Idaho*, eds. Clements, L. J. and H. S. Forbush, Eastern Idaho Publishing Company, Rexburg, Idaho.

ESI (1976), "Geology and Phosphate Resource Paris-Bloomington Area, Idaho," Golden, Colorado.

Federal Highway Administration (FHWA) (2009), "Manual on Uniform Traffic Control Devices for Streets and Highways" <http://mutcd.fhwa.dot.gov/> "Federal Mine Safety & Health Act of 1977," (P.L. 95-164), 88 pp., amended in 2006 by the Mine Improvement and New Emergency Response Act.

Grauch, R. I., G. A. Desborough, G. P. Meeker, A. L. Foster, R. G. Tysdal, J. R. Herring, H. A. Lowers, B. A. Ball, R. A. Zielinski, and E. A. Johnson (2004), "Petrogenesis and Mineralogic Residence of Selected Elements in the Meade Peak Phosphatic Shale Member of the Permian Phosphoria Formation, Southeast Idaho," *Life Cycle of the Phosphoria Formation: From Deposition to Post-Mining Environment*, Hein, James R., ed. pp. 189–226.

Guldbrandsen, R. A. (1967) Some Compositional Features of Phosphorites of the Phosphoria Formation," *Anatomy of the Western Phosphate Field; a Guide to the Geologic Occurrence, Exploration Methods, Mining Engineering, Recovery Technology*, organized and edited by Lyle A. Hale, Intermountain Association of Geologists, 15th Annual Field Conference.

Hale, L. A., ed. (1967), "Anatomy of the Western Phosphate Field: A guide to the Geologic Occurrence, Exploration Methods, Mining Engineering, Recovery Technology," Intermountain Association of Geologists 15th Annual Field Conference, 285 pp.

Hamilton, S., K. Buhl and P. Lamothe (2004), "Selenium and other Trace Elements in Water, Sediment, Aquatic Plants, Aquatic Vertebrates, and Fish from stream in SE Idaho near Phosphate Mining," *Life Cycle of the Phosphoria Formation: From Deposition to Post-Mining Environment*, Hein, James R., ed. pp. 483–525.

Hein, J. R. (2004), "Life Cycle of the Phosphoria Formation: From Deposition to the Post-Mining Environment," *Handbook of Exploration and Environmental Geochemistry*, Elsevier, vol. 8, 635 pp.

Hein, J., R. Perkins, B. McIntyre (2004), "Evolution of Thought Concerning the Origin of the Phosphoria Formation, Western U.S. Phosphate Field," *Life Cycle of the Phosphoria Formation: From Deposition to Post-Mining Environment*, Hein, James R., ed. pp. 399–435.

Herring, J. and R. Grauch (2004), "Lithogeochemistry of the Meade Peak Phosphatic Shale Member of the Phosphoria Formation, Southeast Idaho," *Life Cycle of the Phosphoria Formation: From Deposition to Post-Mining Environment*, Hein, James R., ed. pp. 321–366.

HydroGeoLogic (2001), MODFLOW-SURFACT Software Version 3.0, Code Documentation Report.

Idaho Administrative Procedures Act (IDAPA) (2010), "Water Quality Standards," 58.01.02.

Idaho Department of Environmental Quality (IDEQ) (2011), "Idaho's 2010 Integrated Report, Final," 776 pp., available at <http://www.deq.idaho.gov/media/725927-2010-integrated-report.pdf>.

Idaho Department of Fish and Game (IDFG) (2011), Idaho Fish and Wildlife Information System (IFWIS) database search results for the proposed action, GIS data received from IFWIS on January 31, 2011.

Idaho Department of Labor (2011), "Labor Force Data, Preliminary County Data September 2011," located at <http://labor.idaho.gov/dnn/Portals/48/histrates. pdf>, accessed on November 10, 2011.

Idaho Department of Labor (1992), "Best Management Practices for Mining in Idaho," accessed December 2012, <http://www.idl.idaho.gov/bureau/minerals/bmp_manual1992/bmp_index.htm>.

Idaho Department of Lands (IDL) (1992), "Best Management Practices for Mining in Idaho," available at <http://www. idl.idaho.gov/bureau/minerals/bmp_manual1992/bmp_index.htm>.

Idaho Transportation Department (ITD) (2000), "State of Idaho Rural Highways Access Control Guide," available at <http://www.itd.idaho.gov/highways/gis/StateMaps/2000AccessControl.pdf>.

Idaho Transportation Department (ITD) (2009), "Administrative Policy A-01-09 Authority of Sign agreements. Administrative Policy," available at <http://itd.idaho.gov/search results.htm?cx=008095621238038291248%3Aqfihudqqhgi&cof=FORID%3A11&q=A-01-09>.

Jacobs Engineering S.A. (2011a), "Beneficiation Status Report—Paris Hills Phosphate Project, Lakeland, Florida," prepared for PHA, September.

Jacobs Engineering S.A. (2011b), "Evaluation of Stonegate Paris Hills Phosphate Ore for Fertilizer Production from Jacobs Pilot Plant Testing Lakeland, Florida," prepared for PHA, September.

Jacobs Engineering S.A. (2011c), "Acidulation of Paris Hills Concentrate by Dihydrate Process from Jacobs Pilot Plant Testing, Lakeland, Florida," September.

Jacobs Engineering S.A. (2012a), "Beneficiation Status Report 2—Paris Hills Phosphate Project, Lakeland, Florida," prepared for PHA, February.

Jacobs Engineering S.A. (2012b), "Organic Carbon Procedural Modification Letter with Reference to Report Titled Acidulation of Paris Hills Concentrate by Dihydrate Process, Lakeland, Florida," November.

Kendorski, F. (1993), "Effect of High Extraction Coal Mining on Surface and Ground Waters," *Proceedings of 12th International Conference on Ground Control in Mining*, Peng, S.S. ed., pp. 412–425.

Knudsen, A. and M. Gunter (2004), "The Effects of Weathering on the Mineralogy of the Phosphoria Formation, Southeast Idaho," *Life Cycle of the Phosphoria Formation: From Deposition to Post-Mining Environment*, Hein, James R., ed. pp. 169–188.

Lee, William H. (2000), "A History of Phosphate Mining in Southeastern Idaho," USGS Open-File Report 00-425.

Manning, A. and S. Deaver (1992), "Ethnohistoric (Aboriginal) Resources," *American Falls Reservoir Class I Inventory*, vol.1 (draft), eds. J. S. Bruder, S. E. Burke, and D. L. Douglas, Research Paper no. 1, Dames and Moore Intermountain Cultural Resource Services, Boise, Idaho, pp. 4-1 – 4-32.

Maxim Technologies, Inc. (2000), "Overburden Environmental Geochemistry Report for FMC Dry Valley Mine Extension EIS, Caribou County, Idaho," Technical Report prepared for Bureau of Land Management, U.S. Forest Service, and FMC Corporation.

Maxim Technologies, Inc. (2002), "North Rasmussen Ridge Mine Expansion Final Environmental Geochemistry Study," prepared for Agrium Conda Phosphate Operations.

Maxim Technologies, Inc. (2005), "Final Baseline Technical Report on Environmental Geochemistry for Manning and Deer Creek Phosphate Lease Areas (Panels F and G) at

Smoky Canyon Mine," prepared by Maxim Technologies for J.R. Simplot Company, March.

Maxim Technologies, Inc. (2006), "Agrium Dry Valley Mine Operational Geochemistry Baseline Validation Study," prepared for Agrium Conda Phosphate Operations.

McCalpin, J. P. (2003), "Neotectonics of Bear Lake Valley, Utah and Idaho: A Preliminary Assessment," Utah Geological Survey, Miscellaneous Publication 03-4, Salt Lake City, Utah, 43 pp.

McKelvey, V. E. and L. D. Carswell (1956), "Uranium in the Phosphoria Formation," in Page, L. R., Stocking, H. E., and Smith, H. B., compilers, *Contributions to the Geology of Uranium and Thorium*, by the United States Geological Survey and Atomic Energy Commission for the United Nations International Conference on Peaceful Uses of Atomic Energy, Geneva, Switzerland, 1955, USGS Professional Paper 300, pp. 483–487.

McKelvey, V. E. and J. D. Strobell, Jr. (1955), "Preliminary Geologic Map of the Paris-Bloomington Vanadium Area, Bear Lake County, Idaho," USGS Map, MF 41.

McKelvey, V. E., R. W. Swanson, D. H. Van Sickle, Ellis Leon Yochelson, Earle Rupert Cressman, and Richard Porter Sheldon (1959), "Geology of Permian Rocks in the Western Phosphate Field," USGS Professional Paper 313-A.

McKelvey, V. E., Williams, James Steele, R. P. Sheldon, E. R. Cressman, T. M. Cheney, and R. W. Swanson (1967), "The Phosphoria, Park City and Shedhorn Formations in Western Phosphate Field," International Association of Geologists, Fifteenth Annual Field Conference, Anatomy of the Western Phosphate Field, pp. 15–33.

Murphy, R. F. and Y. Murphy (1986), "Northern Shoshone and Bannock," *Handbook of Native American Indians: Great Basin*, eds. W. D'Azevedo and W. C. Sturtevant, Smithsonian Institute, Washington, DC, pp. 284–307.

Oriel, S. S., and L. B. Platt (1980), "Geologic Map of the Preston 1° x 2° Quadrangle, Southeastern Idaho and Western Wyoming," U. S. Geological Survey Miscellaneous Investigations Map I 1127, scale 1:250,000.

Perkins, R. and Foster, A. (2004), "Mineral Affinities and Distribution of Selenium and other Trace Elements in Black Shale and Phosphorite of the Phosphoria Formation," *Life Cycle of the Phosphoria Formation: From Deposition to Post-Mining Environment*, Hein, James R., ed. pp. 251–295.

Piper, D., J. Skorupa, T. Presser, M. Hardy, S. Hamilton, M. Huebner, and R. Gulbrandsen (2000), "The Phosphoria Formation at the Hot Springs Mine – A Source of Selenium and other Trace Elements to Ground Water, Surface Water, Vegetation, and Biota," United States Geological Survey Open File Report 00-050, 75 pp.

Presser, T., D. Piper, K. Bird, J. Skorupa, S. Hamilton, S. Detwiler, and M. Huebner (2004), "The Phosphoria Formation: A Model for Forecasting Global Selenium Sources to the Environment," *Life Cycle of the Phosphoria Formation: From Deposition to Post-Mining Environment*, Hein, James R., ed. pp. 299–319.

Ralston, D., O. Mohammad, M. Robinette and T. Edwards (1977) "Solutions to Water Resource Problems Associated With Open Pit Mining in the Phosphate Area of Southeastern Idaho," report prepared for U.S. Forest Service, Groundwater Study Contract No. 50-897.

Ralston, D., T. Brooks, M. Cannon, T. Corbet, H. Singh, W. Winter and C. Wai (1980), "Interactions of Mining and Water Resource Systems in the Southeastern Idaho Phosphate Field," Research Technical Completion Report Project C-7651, Idaho Water Research Institute, Moscow, Idaho.

Ralston, D., A. Mayo, J. Arrigo, J. Baglio, L. Coleman, J. Hubbell and K. Souder (1983), "Thermal Groundwater Flow Systems in the Thrust Zone in Southeastern Idaho," Idaho Water and Energy Resources Research Institute, University of Idaho, Moscow, 336 pp.

Richards, R. W. and G. R. Mansfield (1912), "The Bannock Overthrust, A Major Fault in the Southeastern Idaho and North-Central Utah," *Journal of Geology*, 20:681–709.

RPS Boyd PetroSearch (Boyd) (2011), "2011 Paris Hills 2D Seismic Interpretation," Calgary, Alberta, Canada, October 14.

Service, A. L. (1966), "An Evaluation of the Western Phosphate Industry and Its Resources; Part 3," Idaho, USBM Report of Investigations 6801, pp. 1–201.

Sheldon, R. P. (1989), "Phosphorite Deposits of the Phosphoria Formation, Western United States," *Phosphate Deposits of the World*, Notholt, A. J. G., R. P. Sheldon, and D. F. Davidson, eds., Vol. 2: Phosphate Rock Resources, pp. 54–61.

Sheldon, R. P., E. K. Maughan and E. R. Cressman (1967), "Sedimentation of Rocks of Leonard (Permian) Age in Wyoming and Adjacent States," International Association Geologists, Fifteenth Annual Field Conference, Anatomy of the Western Phosphate Field, pp. 1–13.

State of Idaho Legislature (2011), "Idaho Surface Mining Act, Title 47, Chapter 15," available at < http://www.legislature.idaho.gov/idstat/Title47/T47CH15.htm>.

Stone, M. (2010), "Paris Hills Exploration Drilling Plan 2011 Federal Land," a report from Stonegate Agricom Ltd. submitted to the BLM, 33 pp.

United States Department of the Interior (USDOI) (1997), Solid Minerals Payor Handbook—Royalty Management Program, Release 1.0, February 20, 171 pp.

United States Department of the Interior Bureau of Land Management (BLM) (2007), "Mineral Leasing Act of 1920 as Amended," re-transcribed August 9th, 145 pp., available at <http://www.blm.gov/pgdata/etc/medialib/blm/ut/vernal_fo/lands_minerals.Par.6287.File.dat/MineralLeasingAct1920.pdf>.

United States Department of the Interior Bureau of Land Management (BLM) (2010), "National Landscape and Conservation System Wilderness Areas and Wilderness Study Areas," last updated 8 September 2010, located at <http://www.blm.gov/pgdata/etc/medialib/blm/wo/Law_Enforcement/nlcs/online_electronic/maps.Par.96225.File.dat/nlcs_ae_07-2010_6_letter_wsa-wa.jpg>, accessed 9 November 2010.

United States Department of the Interior Bureau of Land Management (BLM) (2011), Environmental Assessment EA number: DOI-BLM-1020-2011-0018-EA, Paris Hills Prospecting and Exploration Drilling Program.

United States Environmental Protection Agency (EPA) (1994), "Technical Document, Acid Mine Drainage Prediction," EPA/530/R/94/036, December.

United States Fish and Wildlife Service (USFWS) (2010), "Idaho's Endangered, Threatened, Proposed and Candidate Species With Associated Proposed and Critical Habitats," December 13.

United States Fish and Wildlife Service (USFWS) (2011), "Wildlife and Habitat Description for the Bear Lake National Wildlife Refuge," accessed 14 February 2011, available at <http://www.fws.gov/bearlake/wildlife.html>.

USGS (1982), "Sedimentary Phosphate Resource Classification System Classification of the U.S. Bureau of Mines and U.S. Geological Survey," Circular 882.

Walker, H. A. (1944), "Report of Paris – Bloomington Vanadium Project," Investigation by Wyodak Agency #AA-198.

Whetstone Associates, Inc. (2003) "Water Resources Technical Report for the Proposed North Rasmussen Ridge Mine Expansion" report, prepared for USDOI BLM, Upper Snake River District, Pocatello Field Office, April 8.

Whetstone Associates, Inc. (2009), "Final Water Resources Baseline Characterization Report, Blackfoot Bridge Mine EIS," report prepared for USDOI BLM, Idaho Falls District, Pocatello Field Office.

Whetstone Associates, Inc. (2010), "Revised Final Baseline Geochemical Study, Blackfoot Bridge Mine EIS," prepared for BLM, Pocatello Field Office, March.

Whetstone Associates, Inc. (2012a), "Draft Baseline Groundwater Study Plan for the Paris Hills Project," prepared for Paris Hills Agricom.

Whetstone Associates, Inc. (2012b), "Updated Preliminary Hydrogeologic Study for The Paris Hills Underground Phosphate Mine Project," prepared for Paris Hills Agricom.

Whetstone Associates, Inc. (2012c), "Draft Baseline Geochemistry Study for The Paris Hills Underground Phosphate Mine Project," prepared for Paris Hills Agricom.

Witkind, I. J. (1975) "Preliminary Map Showing Known and Suspected Active Faults in Idaho," U.S. Geological Survey Open File Report 75-278, single sheet, scale 1:500,000.

Winter, G. (1980), "Groundwater Flow Systems in the Phosphate Sequence, Caribou County, Idaho," University of Idaho, M.S. thesis.

Wyodak Coal Manufacturing Company (1944), "Report of Paris-Bloomington Vanadium Investigations," report No. AA 170, USGS Field Records Library, January 6, 100 pp.

Zielinski, R. A., J. R. Budahn, R. I. Grauch, J. B. Paces, and K. R. Simmons (2004), "Weathering of the Meade Peak Phosphatic Shale Member, Phosphoria Formation: Observations based on Uranium and its Decay Products," *Life Cycle of the Phosphoria Formation: From Deposition to Post-Mining Environment*, Hein, James R., ed. pp. 227–246.

APPENDIX A

CERTIFICATES OF QUALIFIED PERSONS

A.1 Statement of Certification by Principal Author

Leo J. Gilbride, P.E.
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CERTIFICATE OF QUALIFIED PERSON

I, Leo J. Gilbride, P.E., do hereby certify that:

1. I am a Senior Consultant with:

   Agapito Associates, Inc
   715 Horizon Drive, Suite 340
   Grand Junction, Colorado, 81506
   USA

2. I graduated with a degree in Civil Engineering *summa cum laude* from California Polytechnic State University, San Luis Obispo, California, USA, in 1992, and a Master of Science in Mining Engineering at the Mackay School of Mines, University of Nevada, Reno, USA, in 1995.

3. I am licensed as a professional engineer in the State of Colorado (Number 33329).

4. I am a member of the Society of Mining, Metallurgy and Exploration, Inc. (Member Number 4028449) and the American Society of Civil Engineers (Member Number 271529).

5. I have practiced as a consulting mining engineer for 18 years since graduation from the Mackay School of Mines, University of Nevada, Reno, in 1995.

6. As a consulting engineer, I have completed mineral resource and mineral reserve estimations, and scoping, prefeasibility, and feasibility studies in industrial minerals, metals and coal, including trona, potash, nahcolite, phosphate, uranium, vanadium, molybdenum, cobalt and nickel. Extraction methods with which I have experience include room-and-pillar, longwall, drift-and-fill, open stoping, block caving, open pit, and solution mining.

7. I have consulted on projects for more than one dozen underground mines located in the western US in the last 5 years.

8. I have read the definition of "Qualified Person" as defined in National Instrument (NI) 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101), and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

9. I am responsible for preparation of the following items of the Technical Report titled *Amended and Restated NI 43-101 Technical Report—Paris Hills Phosphate Project, Bloomington Idaho, USA,* effective date 18 January 2013, restated 08 July 2013: Items 2.0 through 5.0, 13.0, 14.0, 19.0, 20.0, 23.0, and 24.0. I co-wrote Items 1.0, 6.0, and 25.0 through 27.0.

10. I have no financial involvement with Stonegate Agricom Ltd., Paris Hills Agricom Inc., or their affiliates.

11. I am independent of the issuer according to the criteria stated in Section 1.5 of NI 43-101.

12. I undertook site visits to the property on 06–07 January 2011 and 23–25 May 2011.

13. I served as a Qualified Person in the preparation of three Technical Reports on the Property addressed to Stonegate Agricom Ltd. dated 17 November 2011, 26 March 2012, and 15 August 2012. Prior to that, I had no direct involvement with the Property that is the subject of this Technical Report.

14. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

15. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

16. Opinions and geological interpretations expressed herein are based on the information provided and the general experience and expertise possessed by the consultant. These opinions are offered up as further information for the consideration of the general public and are subject to change as new data are acquired and understood.

Dated this 08th day of July 2013.

"SIGNED AND SEALED"

Signature of Qualified Person *PROFESSIONAL SEAL*

Leo J. Gilbride, P.E.
Print name of Qualified Person

A.2 Statement of Certification by Principal Author

Vanessa Santos, P.G.
Agapito Associates, Inc.
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USA

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Email: vsantos@agapito.com

CERTIFICATE OF QUALIFIED PERSON

I, Vanessa Santos, P.G., do hereby certify that:

1. I am Chief Geologist with:

   Agapito Associates, Inc
   715 Horizon Drive, Suite 340
   Grand Junction, Colorado, 81506
   USA

2. I graduated with a Bachelors of Science degree in Geology in 1981 and a Masters of Science degree in Geology in 1983 from the University of Kentucky, Lexington, Kentucky, USA.

3. I am licensed as a professional geologist in the state of South Carolina (2403) and Georgia (1664).

4. I am a registered member of the Society of Mining, Metallurgy and Exploration, Inc. (Member Number 405-8318).

5. I have practiced as a geologist for 28 years since graduation from the University of Kentucky and have 15 years of experience as a geologist and 13 years as a consulting geologist with industrial minerals, coal, and aggregate mining and exploration companies.

6. As a geologist, I have worked in all facets of mining and exploration: evaluation, geologic reconnaissance, field mapping, drilling/coring, ore zone definition, geologic modeling and reserve estimation, QA/QC in minerals and commodities including potash, phosphate, trona, lithium, mica, feldspar, high purity quartz, and phlogopite, industrial sand, talc, limestone, dolomite, crushed stone, kaolin, ball and specialty clays and alluvial diamonds.

7. I have worked on multiple industrial minerals projects, including phosphate and potash, in North America, South America, and Africa in the last 5 years.

8. I have read the definition of "Qualified Person" as defined in National Instrument (NI) 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101), and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

9. I am responsible for preparation of the following items of the Technical Report titled *Amended and Restated NI 43-101 Technical Report—Paris Hills Phosphate Project, Bloomington Idaho, USA*, effective date 18 January 2013, restated 08 July 2013: Items 7.0 through 12.0. I co-wrote Items 1.0, 6.0, and 25.0 through 27.0.

10. I have no financial involvement with Stonegate Agricom Ltd., Paris Hills Agricom Inc., or their affiliates.

11. I am independent of the issuer according to the criteria stated in Section 1.5 of NI 43-101.

12. I undertook site visits to the property on 23–27 May, 5–8 July, 29–30 August 2011, and 20–22 July 2012.

13. I served as a Qualified Person in the preparation of three Technical Reports on the Property addressed to Stonegate Agricom Ltd. dated 17 November 2011, 26 March 2012, and 15 August 2012. Prior to that, I had no direct involvement with the Property that is the subject of this Technical Report.

14. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

15. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

16. Opinions and geological interpretations expressed herein are based on the information provided and the general experience and expertise possessed by the consultant. These opinions are offered up as further information for the consideration of the general public and are subject to change as new data are acquired and understood.

Dated this 08th day of July 2013.

"SIGNED AND SEALED"

Signature of Qualified Person *PROFESSIONAL SEAL*

Vanessa Santos, P.G.
Print name of Qualified Person

A.3 Statement of Certification by Principal Author

Gary L. Skaggs, P.E., P.Eng.
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CERTIFICATE OF QUALIFIED PERSON

I, Gary L. Skaggs, P.E., P.Eng. do hereby certify that:

1. I am a Vice President/Principal with:

   Agapito Associates, Inc
   715 Horizon Drive, Suite 340
   Grand Junction, Colorado, 81506
   USA

2. I graduated with a degree in Mining Engineering from Virginia Polytechnic Institute (Virginia Tech), Blacksburg, Virginia USA, in 1969, and a Master of Business Administration degree, Executive Program, from the University of Denver, Denver, Colorado, USA, in 1986.

3. I am a licensed professional engineer in the states of Alabama, Colorado (Number 24551), Illinois, Kentucky, Missouri, Montana, Nevada, New Mexico, Ohio, Utah, Virginia, West Virginia, Wyoming, and the Provinces of Alberta and Saskatchewan, Canada.

4. I am a Registered Member (No. 2974570) of the Society of Mining, Metallurgy and Exploration, Inc.

5. I have worked as a mining engineer for 43 years since graduation from Virginia Polytechnic Institute, with 26 years' experience with mining companies in engineering and management, and 17 years consulting practice.

6. As a consulting engineer, I have completed mineral resource and mineral reserve estimations, mine planning, scoping, prefeasibility, and feasibility studies, and infrastructure design for industrial minerals, metals, coal (USA and Canada), trona, and potash (USA and Canada). Extraction methods with which I have experience include room-and-pillar, longwall, drift-and-fill, stoping, augering, and open pit.

7. I have more than 5 years' senior technical and general managerial responsibility entailing the exercise of independent judgment in mining operations and in consulting.

8. I have read the definition of "Qualified Person" as defined in National Instrument (NI) 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101), and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

9. I am responsible for co-writing of the following items of the Technical Report titled *Amended and Restated NI 43-101 Technical Report—Paris Hills Phosphate Project, Bloomington Idaho, USA*, effective date 18 January 2013, restated 08 July 2013: Items 1.0, 15.0 through 17.0, 21.0, 22.0, and 25.0 through 27.0.

10. I have no financial involvement with Stonegate Agricom Ltd., Paris Hills Agricom Inc., or their affiliates.

11. I am independent of the issuer according to the criteria stated in Section 1.5 of NI 43-101.

12. I undertook site visits to the property on 06–07 January 2011, 23–25 May 2011, 05–07 July 2011, 06–08 September, 5 October, 2011, and 12 June 2012.

13. I served as a Qualified Person in the preparation of two Technical Reports on the Property addressed to Stonegate Agricom Ltd. dated 26 March 2012 and 15 August 2012. Prior to that, I had no direct involvement with the Property that is the subject of this Technical Report.

14. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

15. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

16. Opinions and geological interpretations expressed herein are based on the information provided and the general experience and expertise possessed by the consultant. These opinions are offered up as further information for the consideration of the general public and are subject to change as new data are acquired and understood.

Dated this 08th day of July 2013.

"SIGNED AND SEALED"

Signature of Qualified Person

Gary L. Skaggs, P.E., P.Eng.

Print name of Qualified Person *PROFESSIONAL SEAL*

A.4 Statement of Certification by Author

Susan B. Patton, Ph.D., P.E.
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CERTIFICATE OF QUALIFIED PERSON

I, Susan B. Patton, Ph.D., P.E. do hereby certify that:

1. I am a Senior Associate with:

   Agapito Associates, Inc
   715 Horizon Drive, Suite 340
   Grand Junction, Colorado, 81506
   USA

2. I graduated with a Bachelor's degree in Mining Engineering from New Mexico Tech, Socorro, New Mexico, USA in 1983; and a Masters of Mineral Engineering degree from the University of Alabama, Tuscaloosa, Alabama, USA in 1989; and an Interdisciplinary Doctor of Philosophy degree in Mining and Environmental Engineering from the University of Alabama, Tuscaloosa, Alabama, USA in 1993.

3. I am a licensed professional engineer in the states of Alabama (19875), Colorado (30176), and Montana (14542).

4. I am a Member (2482200) of the Society of Mining, Metallurgy and Exploration, Inc.

5. I have worked as a mining engineer for 29 years since graduation from New Mexico Tech. Positions include academic and research faculty, academic administration, mine site engineering, and consulting.

6. As a consulting engineer, I have completed mineral resource and mineral reserve evaluations, mine planning, prefeasibility and feasibility studies, and ventilation design for metal, non-metal and coal. Extraction methods with which I have mine site experience include room-and-pillar and open cast.

7. I have more than 5 years' senior technical responsibility entailing the exercise of independent judgment.

8. I have read the definition of a "Qualified Person" as defined in National Instrument (NI) 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101), and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

9. I am responsible for co-writing the following items of the Technical Report titled *Amended and Restated NI 43-101 Technical Report—Paris Hills Phosphate Project, Bloomington Idaho, USA*, effective date 18 January 2013, restated 08 July 2013: Items 1.0, 15.0, 16.0, 21.0, 22.0, and 25.0 through 27.0.

10. I have no financial involvement with Stonegate Agricom Ltd., Paris Hills Agricom Inc., or their affiliates.

11. I am independent of the issuer according to the criteria stated in Section 1.5 of NI 43-101.

12. I participated, not as a Qualified Person, in the preparation of two Technical Reports on the Property addressed to Stonegate Agricom Ltd. dated 26 March 2012 and 15 August 2012. Prior to that, I had no direct involvement with the Property that is the subject of this Technical Report.

13. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

14. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

15. Opinions and geological interpretations expressed herein are based on the information provided and the general experience and expertise possessed by the consultant. These opinions are offered up as further information for the consideration of the general public and are subject to change as new data are acquired and understood.

Dated this 08th day of July 2013.

"SIGNED AND SEALED"

Signature of Qualified Person

Susan B. Patton, Ph.D., P.E.
Print name of Qualified Person

PROFESSIONAL SEAL

A.5 Statement of Certification by Author

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CERTIFICATE OF QUALIFIED PERSON

I, Eric Dursteler, P.E., C.F.M. do hereby certify that:

1. I am a Service Center Manager/Project Engineer with:

   Sunrise Engineering, Inc
   26 South Main Street
   Smithfield, Utah, 84335
   USA

2. I graduated with a degree in Civil and Environmental Engineering from Utah State University (USU), Logan, Utah USA, in 1996.

3. I am a licensed professional engineer in the states of Utah and Idaho.

4. I am a Registered Member (No. 4176563) of the Society of Mining, Metallurgy and Exploration, Inc.

5. I have worked as a civil engineer for 16 years since graduation from Utah State University with 6 years' experience with mining companies in civil engineering and project management.

6. As a consulting engineer, I have completed studies, planning and surface infrastructure design for industrial minerals and metals, and conducted quality control and quality assurance inspections (USA).

7. I have read the definition of "Qualified Person" as defined in National Instrument (NI) 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101), and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

8. I am responsible for preparation of the following items of the Technical Report titled *Amended and Restated NI 43-101 Technical Report—Paris Hills Phosphate Project*,

Bloomington Idaho, USA, effective date 18 January 2013, restated 08 July 2013: Items 17.0, 18.0, and 21.0. I co-wrote Items 1.0 and 25.0 through 27.0.

9. I have no financial involvement with Stonegate Agricom Ltd., Paris Hills Agricom Inc., or their affiliates.

10. I am independent of the issuer according to the criteria stated in Section 1.5 of NI 43-101.

11. I undertook site visits to the property on 17 August 2012, 21 August 2012, 06 September 2012, 26 September 2012, 11 October 2012, 02 November 2012, and 07 November 2012.

12. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

13. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

14. Opinions and geological interpretations expressed herein are based on the information provided and the general experience and expertise possessed by the consultant. These opinions are offered up as further information for the consideration of the general public and are subject to change as new data are acquired and understood.

Dated this 08th day of July 2013.

"SIGNED AND SEALED"
____
Signature of Qualified Person

Eric Dursteler, P.E., C.F.M.
Print name of Qualified Person

PROFESSIONAL SEAL