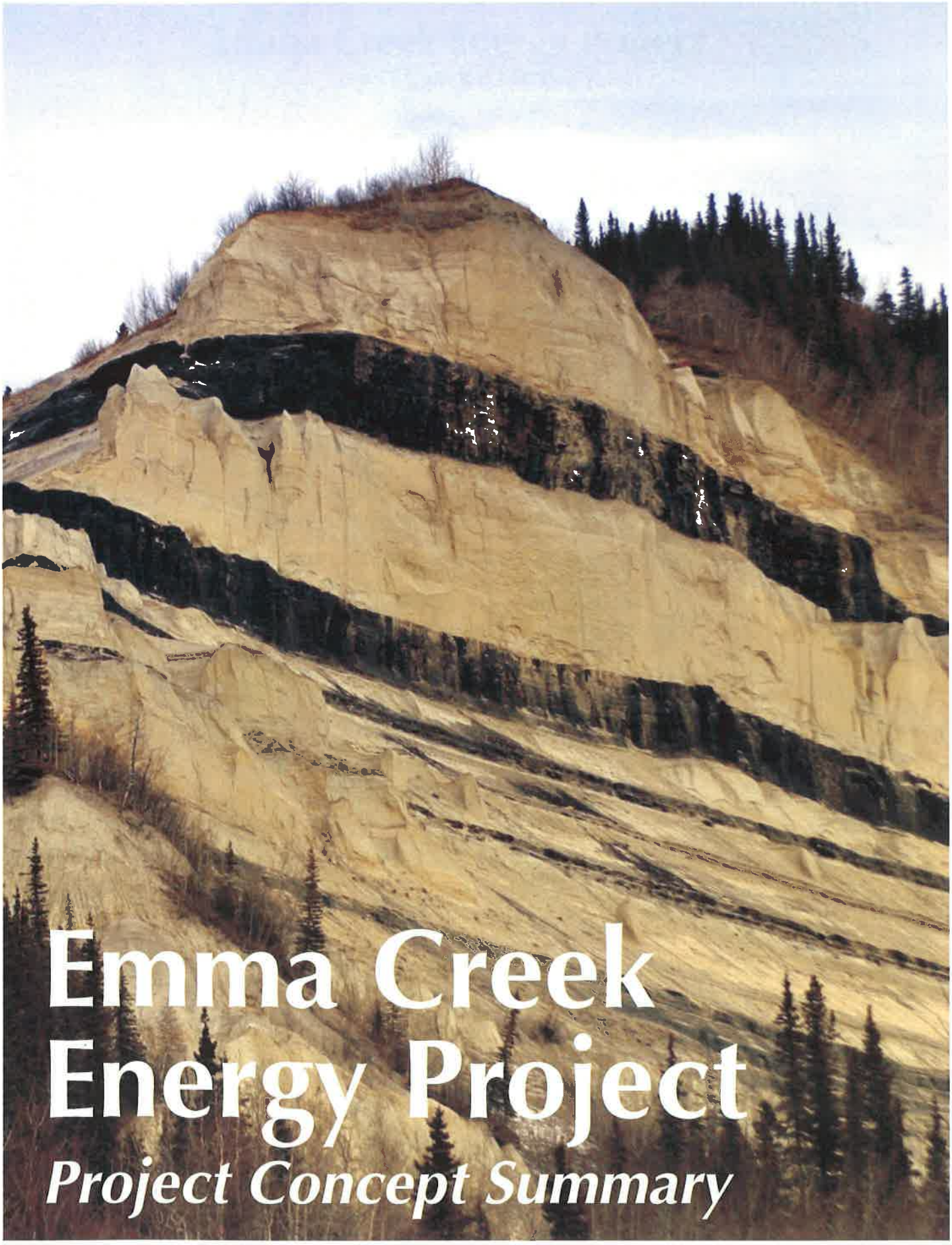


# Emma Creek Energy Project

## *Project Concept Summary*

# Executive Summary

- Usibelli Coal Mine Inc. has performed a conceptual design and fatal flaw analysis for a coal fired power plant to be built near their coal leases about 16 miles northeast of Healy, Alaska, close to the new Healy to Fairbanks Intertie.
- The intended project will be a 200 megawatt (MW) net plant, fueled by Usibelli coal from their Emma Creek Mine. This is based on an analysis of the Alaskan power grid, comparison of the economics of this plant versus existing plants in Alaska and discussions with Usibelli regarding the capability of the coal mine.
- The unit will have two half-size fluidized bed boilers and a single steam turbine producing 232 MW gross. The emissions controls will include limestone addition to the fluidized bed boilers for $SO_2$ control, controlled $NO_x$ production in the fluidized bed boiler via specific low $NO_x$ combustion design and a baghouse for particulate control. Ash will be returned to the mine. There will be a new raw water reservoir constructed to provide a consistent flow of water to the plant.
- The technology chosen for the combustion of the fuel is a circulating fluidized bed (CFB) boiler. A sketch of the combustor is included with this summary. The choice of this technology is based specifically on its environmental and commercial characteristics . The emissions from a CFB meet and exceed the existing environmental regulations. CFB's are tried and proven technology with hundreds of units in operation, demonstrated reliability and competitive capital and operating costs.
- The permitting requirements for the project are outlined in Section 4. At the present time, there do not appear to be any permitting fatal flaws. There are also no technical fatal flaws associated with the project. There do not appear to be any economic fatal flaws based on today's economic conditions.
- The schedule for the project anticipates a permitting duration of 38-months and an engineer, procure, and construct (EPC) schedule of 52-months for a total duration of 7.5 years.
- The total Capital requirement is estimated at $421 million.
- Operating and Maintenance costs, exclusive of fuel are estimated at $10,197,000 or $0.00646/kWh on a yearly basis. Fuel costs are estimated at $22,066,000 or $0.0140 / kWh based on coal supplied at $1 per million BTU (mmBtu) delivered.
- The economic analysis shows power cost at $0.0411 / kWh, compared to current Railbelt firm cost of approximately $0.050/kWh. Based on a 30-year debt term at 6% interest, the cost components are:

| | |
|---|---|
| Fuel | $0.0140/kWh |
| Labor | $0.0030/kWh |
| Fixed O&M | $0.0015/kWh |
| Variable O&M | $0.0020/kWh |
| Debt Service | $0.0205/kWh |

- Emissions are expected to be less than:

| | | |
|---|---|---|
| $SO_2$ | 0.167 lb/mmBTU or | 1842 tons/yr |
| $NO_x$ | 0.180 lb/mmBTU or | 1986 tons/yr |
| CO | 0.220 lb/mmBTU or | 2427 tons/yr |
| Particulate | 0.030 lb/mmBTU or | 331 tons/yr |

It is expected that these emission levels are permittable at the Emma Creek site.

## Note

Harris Group Inc. provided the conceptual design and cost analysis and Steigers Corporation provided the environmental analysis.

**USIBELLI COAL MINE, INC.**

Emma Creek Energy Project Concept Summary prepared by
Harris Group Inc. & Steigers Corporation, April 2003

# Project Opportunities

The proposed Emma Creek Energy Project provides unique benefits to the Railbelt utilities. 1200 MW of capacity is currently interconnected by the Railbelt transmission system, which distributes energy to the Railbelt utilities. Approximately 4.0 million megawatt-hours (MWH) of energy are currently sold by these Railbelt utilities. Oil and gas units over 25 years old produce over 70% of this capacity and energy. The Railbelt utilities are likely to experience decreasing reliability and unpredictable escalating retail energy prices due to aging units and dependence on oil and gas fuel.

Emma Creek will add 200 MW of new base loaded firm coal fired generation to the Railbelt, providing energy for future growth and retirement of aging oil and gas fired units. As a new unit with boiler redundancy, Emma Creek will be capable of a high capacity factor adding reliability to the Railbelt. Emma Creek can produce 1.6 million MWH of energy annually, while adding stability to energy prices for the Railbelt consumers.

Non-firm electricity on the Railbelt has varied between an average of 3.4 cents per kWh in 2000 to over 4.2 cents during oil and gas cost spikes in 2001. During this same period, firm electricity on the Railbelt averaged 4.7 cents per kWh. Emma Creek will produce firm wholesale electricity at approximately 4.11 cents per kWh or about 0.6 cents per kWh less than current firm electric rates on the Railbelt. If oil and gas prices are assumed to escalate 2% per year faster than coal, Emma Creek firm energy after five years of operation could provide approximately $15 million annual savings to Railbelt utilities.

# Project Description

The intended project will be a 200 MW net atmospheric circulating fluid bed power plant, fueled by Usibelli coal from their Emma Creek Mine. The unit will have two half-size fluidized bed boilers and a single steam turbine producing 232 MW gross. The emissions controls will include limestone addition to the fluidized bed boilers for $SO_2$ control, controlled $NO_x$ production in the fluidized bed boiler via specific low $NO_x$ combustion design and a baghouse for particulate control. Ash will be returned to the mine.

## General Plant Design Criteria

A 44.4 acre site is selected near new coal leases about 16 miles northeast of Healy, Alaska at 2,200 ft elevation. The site is located about 3 miles east of the Golden Valley Electric Association (GVEA) Northern Intertie transmission line. Coal is trucked via coal mine haul roads to the site. Cycle heat is rejected to atmosphere via a cooling tower. Both bed and fly ashes are trucked back to the coal mine and used as restoration material. Cooling tower and boiler makeup waters are supplied from a raw water reservoir to be built adjacent to the plant, located on Emma Creek.

Coal used by the plant has a BTU content of approximately 7,200 BTU/lb and an average sulfur content of 0.2%.

The plant generates nominally 200 MW net, 232 MW gross output with two circulating fluidized bed boilers. The steam turbine generator (STG) is designed for 250 MW gross, at valves wide open and throttle conditions of 1,250 psig and 950° F; however, expected output is 232 MW gross.

Crushed limestone from Alaska is trucked to the site and pneumatically unloaded into 60-day storage silos (5,400 tons).

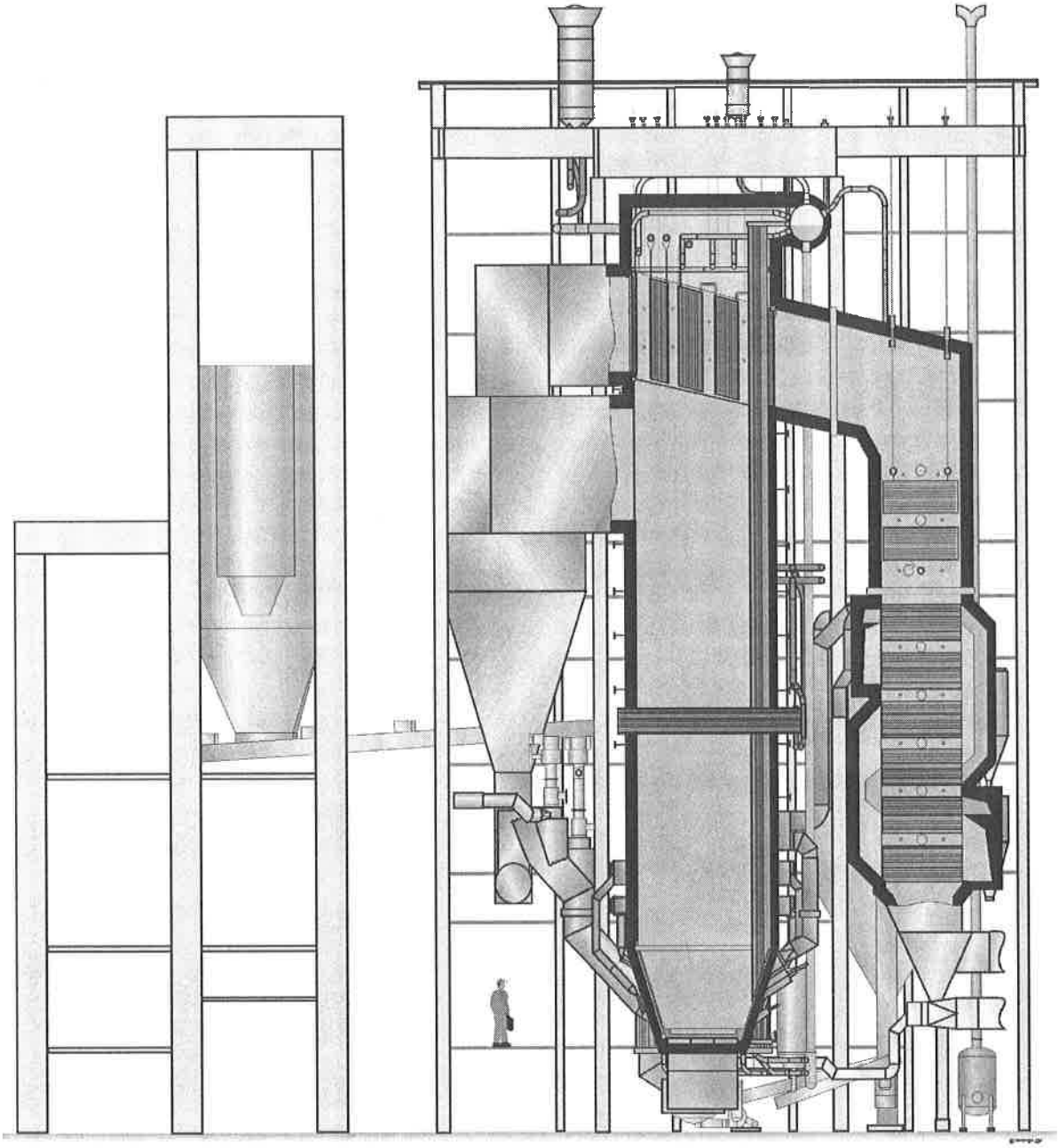
Process wastewater is used to condition ash to meet the landfill requirements or returned to the raw water reservoir.

Coal storage pile storm drainage is collected and treated before being routed to the raw water reservoir. A single, storm drainage point is formed by grading open channels that are routed to a low point and then pumped or routed by gravity to the raw water reservoir.

An earthen containment consisting of approximately 2 million cubic yards of mine overburden is planned to hold 5,855 acre-feet of water drained from Emma Creek during periods of high run-off flow and pumped from Marguerite Creek when Emma Creek can't supply the needs.

## Permitting and Environmental Summary

Usibelli Coal Mine, Inc. (Usibelli) has had a permitting feasibility and fatal flaw analysis performed for construction of the 200 MW net circulating fluidized bed coal-fired power facility to be located near Healy, Alaska. The generating facility would be located near a proposed surface coal mine to be developed by Usibelli. This is a preliminary assessment of major issues based on limited data and as such provides only a basic review of these issues. Some of the information presented in this assessment was provided or corroborated through consultation with federal, state, and local agency staff, and we have relied on their representations in this assessment.



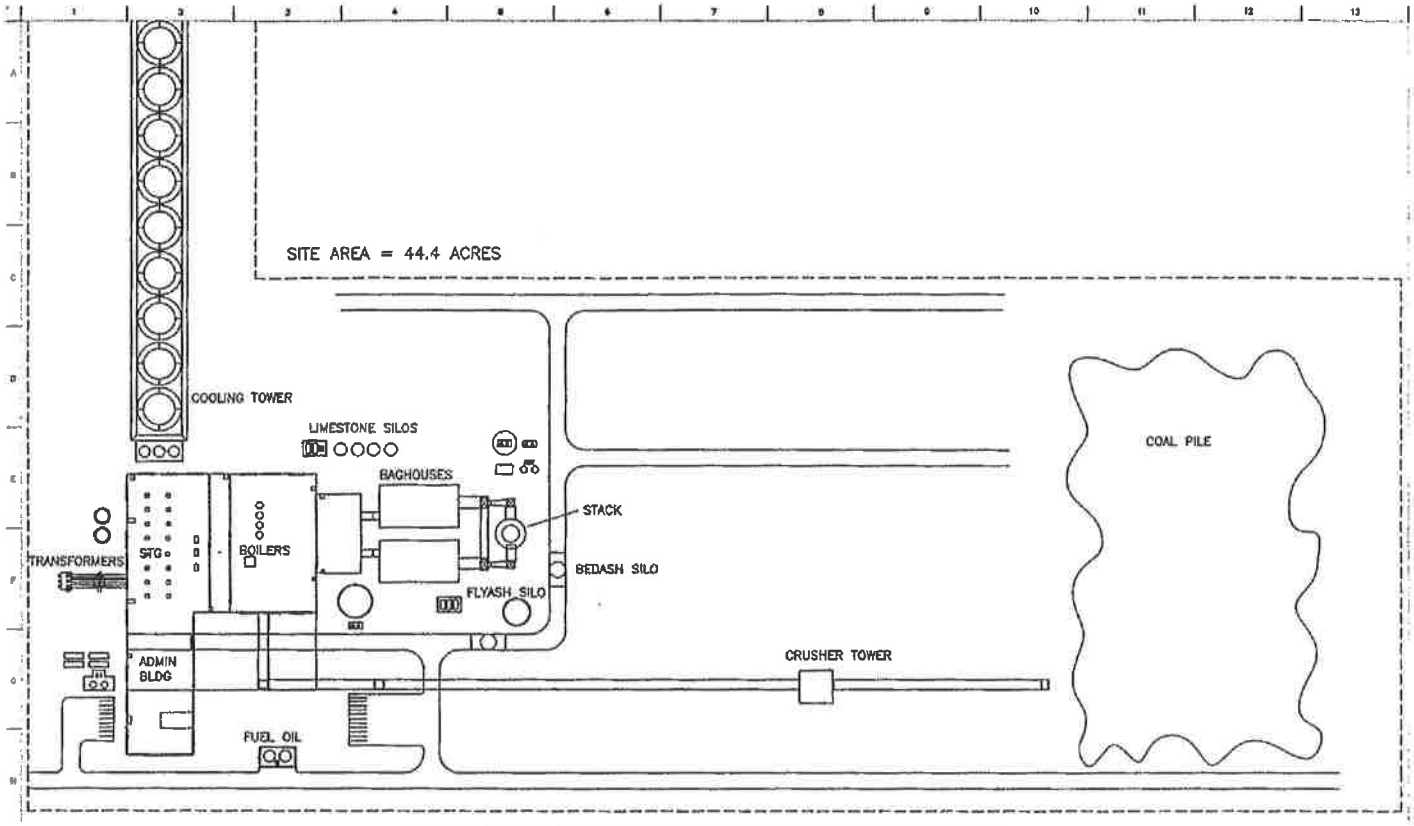
**Circulating Fluidized Bed Boiler**

A number of environmental issues were evaluated, and several major permits and investigations required for project development were identified. Project development will likely require a number of less significant permits, but these typically have a lesser effect on project feasibility and were not included here. A list of major permits and investigations that either would likely be required or could be required based on current project design alternatives includes:

- Air Quality Permitting
- Wetlands Permitting
- National Environmental Policy Act Compliance
- State Land Use Permitting
- Fish Habitat Permitting
- Dam Safety Permitting
- Transmission Line Construction Permitting.

Each of these permits and investigations was evaluated for any potential major issues that could complicate or impede project development. Our analysis did not identify any fatal flaws or exceptionally problematic issues associated with permitting the proposed facility.

The following is a summary of the permitting and environmental assessment results, including the estimated relative level of effort for permitting and the anticipated schedule.




**Emma Creek Energy Project Civil/Structural Site Plan**

## Air Quality Permitting

As a new fossil-fuel-fired source of air pollutant emissions with a heat input rating of more than 250 mmBtu/hr and the potential to emit more than 100 tons per year (tpy) of nitrogen oxides ($NO_x$), carbon monoxide (CO), sulfur dioxide ($SO_2$), and particulate matter ($PM_{10}$), the Emma Creek Energy Project will require a Prevention of Significant Deterioration (PSD) air quality construction permit from the Alaska Department of Environmental Conservation (ADEC).

Review of the air quality requirements did not identify any fatal flaws or exceptionally problematic issues associated with development of the PSD air quality construction permit. Because there are no existing meteorological data available that are representative of the project site, a 1-year pre- construction meteorological monitoring program would be required before dispersion modeling, which is an essential part of the PSD permit application process, could begin. Existing ambient air quality data are available that should be deemed by ADEC as representative of the project site; therefore, no pre-construction air quality monitoring should be necessary. The main air quality-related issue is expected to be the visibility impact to Denali National Park and Preserve (DNPP). The post-construction visibility monitoring for the Healy Clean Coal Project (HCCP) did not result in any concerns at DNPP and this is expected to be the case for the Emma Creek Project, which is located farther away from DNPP than the HCCP.

Air quality permitting for the project, including the 1-year pre-construction meteorological monitoring program, is estimated to take approximately 38 months to complete.

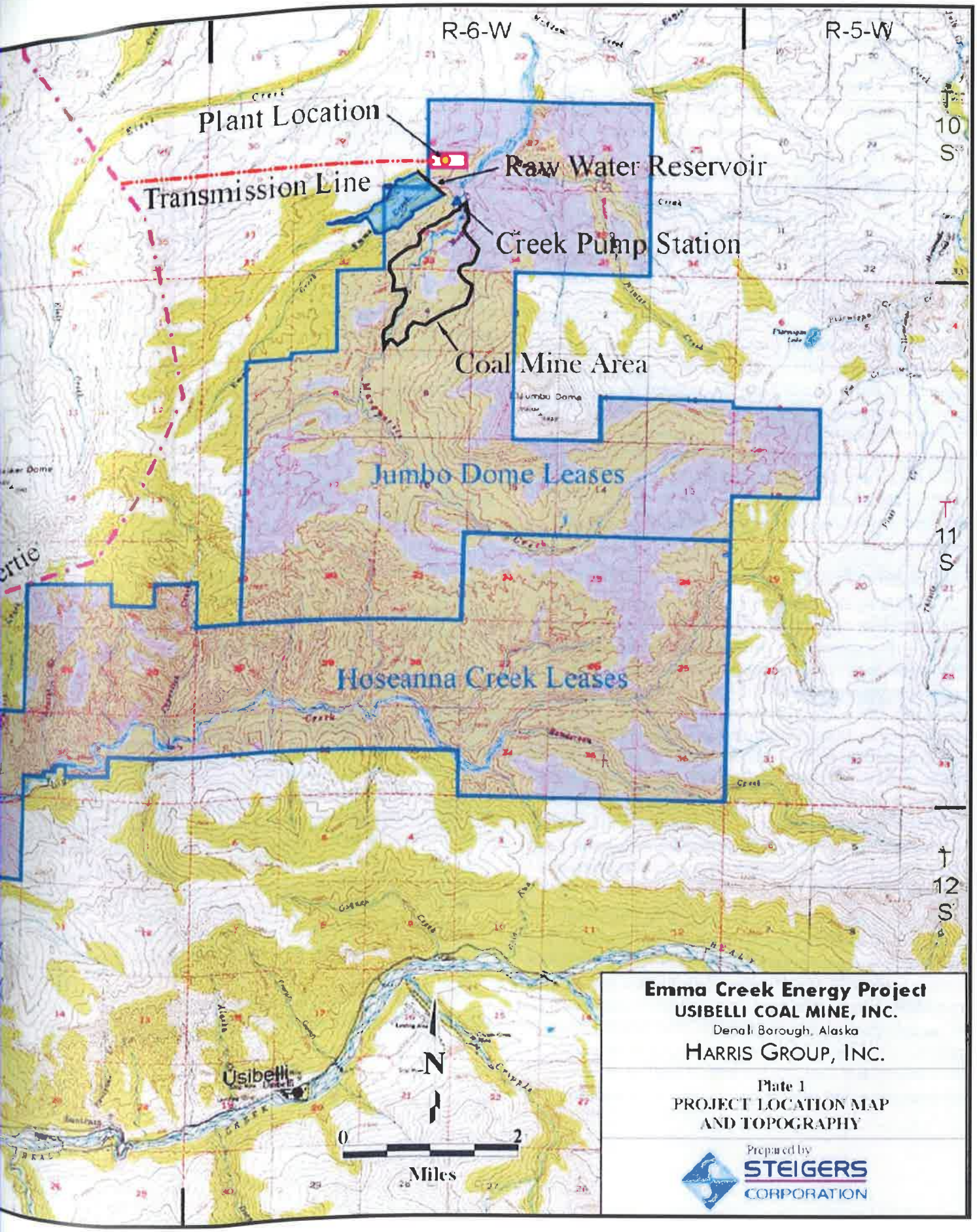
## Wetlands Permitting

The United States Army Corps of Engineers (USACE) regulates impacts to wetlands and waters of the U.S. by enforcing the requirements of Section 404 of the Clean Water Act. It appears that development of the Emma Creek Project would result in permittable impacts to wetlands and/or waters of the U.S. It also appears that USACE Section 404 permitting for the project would likely be accomplished through securing an Individual permit. There is no indication that securing an Individual permit for the Emma Creek Project will require an unusually high level of effort or require an unusually long processing time for permit approval. It is expected that wetlands permitting could be accomplished in approximately 14 months.

## National Environmental Policy Act Compliance

Major federal actions require compliance with the National Environmental Policy Act (NEPA), and NEPA compliance generally requires an analysis of the environmental effects of the action, typically through preparation of an Environmental Assessment (EA) and/or an Environmental Impact Statement (EIS). Assuming a USACE Section 404 Individual permit will be required for project development, then it is likely that issuance of this permit would


6 Emma Creek Energy Project


R-6-W
R-5-W
T 10 S
T 11 S
T 12 S
Plant Location
Transmission Line
Raw Water Reservoir
Creek Pump Station
Coal Mine Area
Jumbo Dome Leases
Hoseanna Creek Leases
Usibelli
N
0
2
Miles
Emma Creek Energy Project
USIBELLI COAL MINE, INC.
Denali Borough, Alaska
HARRIS GROUP, INC.
Plate 1
PROJECT LOCATION MAP
AND TOPOGRAPHY
Prepared by
STEIGERS
CORPORATION

result in the application of NEPA to the project. However, for the purposes of this evaluation it is assumed that project development will require preparation of the less involved EA. This assumption is based on the project's ability to minimize its overall impacts and an evaluation of the conditions that typically result in the requirement for an EIS.

### State Land Use Permitting

It has been determined that all project development will be located on state or University of Alaska (UA) owned lands. As a result it will be necessary to secure a right-of-way and/or a lease to meet the regulatory requirements under Alaska Department of Natural Resources (ADNR) jurisdiction. The final location, project configuration, and consultation with ADNR will determine which of the land acquisition requirements will apply to the project. A state and/or UA land lease will likely be required for the facility area, the reservoir, and possibly the water pipeline. A right-of-way will likely be required for the transmission line. There is no indication that any portion of the land acquisition process will be particularly difficult or costly or could result in significant project delays. It is anticipated that land use permitting could be accomplished in approximately 6 months.

### Fish Habitat Permitting

The Alaska Department of Fish & Game (ADF&G) Fish Habitat permit is designed to guarantee efficient passage of fish and to protect and conserve fishery resources and fish habitat in waters designated as important for the spawning, rearing, and migration of resident and anadromous fish. Given the distance of dam/reservoir construction and water withdrawal from waters known to support anadromous fish species, the potential for impacts as a result of the project are very unlikely. It is anticipated that analysis of potential impacts will still be required by ADF&G while a Fish Habitat permit will not. A fish habitat assessment will be required to demonstrate that project related impacts will not impact downstream anadromous fisheries.

Resident fish species are most likely only seasonal occupants of these streams. Consultation with ADF&G staff indicates that regulatory requirements for impacts to these species is unlikely. ADF&G historically has not required a Fish Habitat permit for impacts to resident non-anadromous fish species and it is likely that this will also be the case for this project. It is anticipated that the habitat assessments and consultation with ADF&G to resolve fisheries issues will require approximately 27 months.

### Dam Safety Permitting

ADNR Division of Mining, Land, and Water, Dam Safety Construction Unit (DSCU), regulates all dams in the State of Alaska that impound 50 acre-feet of water or more and are at least 10 feet high. The dam proposed for the Emma Creek Energy Project will impound 9500 acre-feet of water and will be approximately 120 feet high, which would require inclusion of the structure in the State Dam Safety Program. It is assumed that the project will be able to construct a dam that will meet DSCU approvable design criteria. Therefore, no difficulties are anticipated in securing the necessary dam safety permits. Due to the possibility of the dam receiving a Class II hazard rating, it is also anticipated that the project will require an Emergency Action Plan for dam operations. Dam Safety permitting is usually accomplished in approximately 1 month.

### Transmission Line Construction Permitting

As an additional component of project development, the installation of an approximately 3-mile-long 230 kV transmission line from the substation located on site to the GVEA Northern Intertie will be required. Permitting for the transmission line is expected to require a number of relatively minor permits and clearances, assuming that no major resource complications are encountered. By locating the transmission line in a corridor without wetlands or potentially sensitive sites, additional permitting effort may be avoided. Approvals for construction of the transmission line should be completed in approximately 6 months.

## Conclusion

As with any large development project there will be issues that arise during development that were not anticipated. However, our analysis did not identify any significant issues that would prevent or significantly complicate project development. Additional effort will be required to resolve issues associated with construction of the reservoir and the water collection structure as well as visibility issues but there is no indication that this level of effort will be excessive or resolutions to permitting issues will be unavailable. Considering the project as a whole, it is anticipated that the overall permitting effort, schedule, and cost would be moderate and consistent with a project of this size.

The overall permitting effort would likely be completed in 38 months and permitting costs are estimated at $1,850,000.

# Project Costs

## Capital Cost Estimate

The capital cost estimate or "Total Capital Requirement" for the project is $420.2 million. This equates to $2,101 per net kilowatt. This estimate is based on vendor budgetary quotes for major equipment, factored estimates for other equipment, construction cost estimates from the recently constructed Healy Clean Coal Project and information from other recent projects constructed in the lower 48 states.

## Operating and Maintenance Cost Estimate

The O&M cost estimate shows yearly fuel costs of $22 million based on coal supplied at $1 per million BTU's and 10.2 million yearly for other fixed and variable O&M costs. This equates to a total of about $0.0205/kWh. The O&M estimate is based on utilizing 53 personnel, experience at Healy unit 1 and the Healy Clean Coal Project, historical data from other projects of similar size and commodities estimates from Usibelli personnel and local providers.

### Capital Cost Estimate

| Area | Total Installed Equipment Cost | $10^6$ | $/net kW |
|---|---|---|---|
| 100 | Coal Unloading and Handling | 5.8 | 28.83 |
| 200 | Sorbent Unloading and Handling | 2.8 | 14.11 |
| 400 | Combustion/Steam Generation | 130.6 | 653.00 |
| 700 | Power Generation | 65.0 | 325.00 |
| | Dam, Reservoir, Pumps and Condenser | 10.0 | 50.00 |
| 1000 | Particulate Removal | 9.8 | 49.07 |
| 1400 | Ash Collection and Removal | 4.3 | 21.47 |
| 1500 | Civil/Structural/Architectural | 29.3 | 146.68 |
| A | Total Process Capital | 257.6 | 1,288.18 |
| B | General Facilities (10% of A) | 25.8 | 128.82 |
| C | Engineering & Home Office (15% of A+B) | 42.5 | 212.50 |
| D | Total EPC Contract (A+B+C) | 325.9 | 1,629.53 |
| E | Development (Owners & Permits) | 5.1 | 25.26 |
| F | Project Contingency (10% of D) | 32.6 | 162.95 |
| G | Electrical Interconnect | 1.7 | 8.50 |
| H | Bank's Reserve Fund | 6.8 | 34.00 |
| I | Total Plant Cost (D+E+F+G+H) | 372.1 | 1,860.50 |
| J | Interest During Construction (14% of EPC) | 45.6 | 228.00 |
| K | Total Plant Investment (E+F) | 417.7 | 2,088.50 |
| L | Preproduction Costs (3 months of startup) | 1.2 | 6.13 |
| M | Inventory Capital | 1.2 | 6.13 |
| N | Initial Chemicals | 0.1 | 0.50 |
| O | Total Capital Requirement (J+K+L+M) | 420.2 | 2,101.00 |

### Operating and Maintenance Cost Estimate

| | Units | Qty | $/Unit | $10^6$/yr |
|---|---|---|---|---|
| **Fixed O&M Costs** | | | | |
| Operating Labor | Man hr/hr | 32 | 45.00 | 2.880 |
| Maintenance Labor | | 21 | 45.00 | 1.890 |
| Maintenance Material and Land Lease | | | | 2.100 |
| Administration/ Support Labor | | | | 0.200 |
| Subtotal Fixed Costs | | | | 7.070 |
| **Variable Operating Costs** | | | | |
| **Fuels** | | | | |
| Coal | ton/hr | 190.145 | 14.40 | 22.066 |
| No. 2 Fuel Oil | gallons/hr | 79.0 | 1.40 | 0.126 |
| **Sorbent** | | | | |
| Limestone | tons/hr | 3.58 | 85.00 | 2.466 |
| **Utilities** | | | | |
| Raw Water | kgal/hr | 4.7 | 0.60 | 0.023 |
| Cooling Water | kgal/hr | included | 0.60 | 0.000 |
| Station Service Electric Power | kWh/hr | 2,000.00 | 0.05 | 0.070 |
| **Waste Disposal Charges** | | | | |
| Ash Trucked and Landfilled | tons/hr | 21.958 | 2.50 | 0.442 |
| Subtotal Variable Cost | | | | 25.193 |
| **Total O&M Cost (Fixed + Variable)** | | | | 32.263 |

**Note**: Non-Fuel O&M: Total O&M ($32,263,000) minus coal ($22,066,000) equals $10,197,000

# Project Economic Analysis

## Basis

The economic analysis for the project was developed on the basis that all of the capital required would be financed as debt. This $420.2 million is then paid at a 6% interest rate over a 30-year period. The analysis also assumes that the project will not generate a profit on its own, that is, all power will be sold at cost. This cost number is based on payment of the debt over 30-years and covering all operating costs.

We have assumed the following economic escalators:

| | |
|---|---|
| Coal and ash disposal cost | 2% |
| Power cost to the project | 2% |
| Electric sales price | 1% |
| All other O&M costs | 3% |

These estimated costs and economic assumptions derive an initial wholesale price requirement for power generated by the project to be $0.0411/kWh.

## Sensitivity Discussion

### Capital Cost

If the capital cost is actually 10% different than the estimate, plus or minus, the electric sales price required for a breakeven analysis would change by $0.0018 or about 4.3%, plus or minus. On a practical basis, assume that the project design is changed from a single 200 MW unit to two 100 MW units with independent boilers, steam turbine/generators and transformers, the net price increase in the capital cost is estimated to be about 12 million. This would result in an increase in the wholesale electric sales price of about 1% to $0.0415.

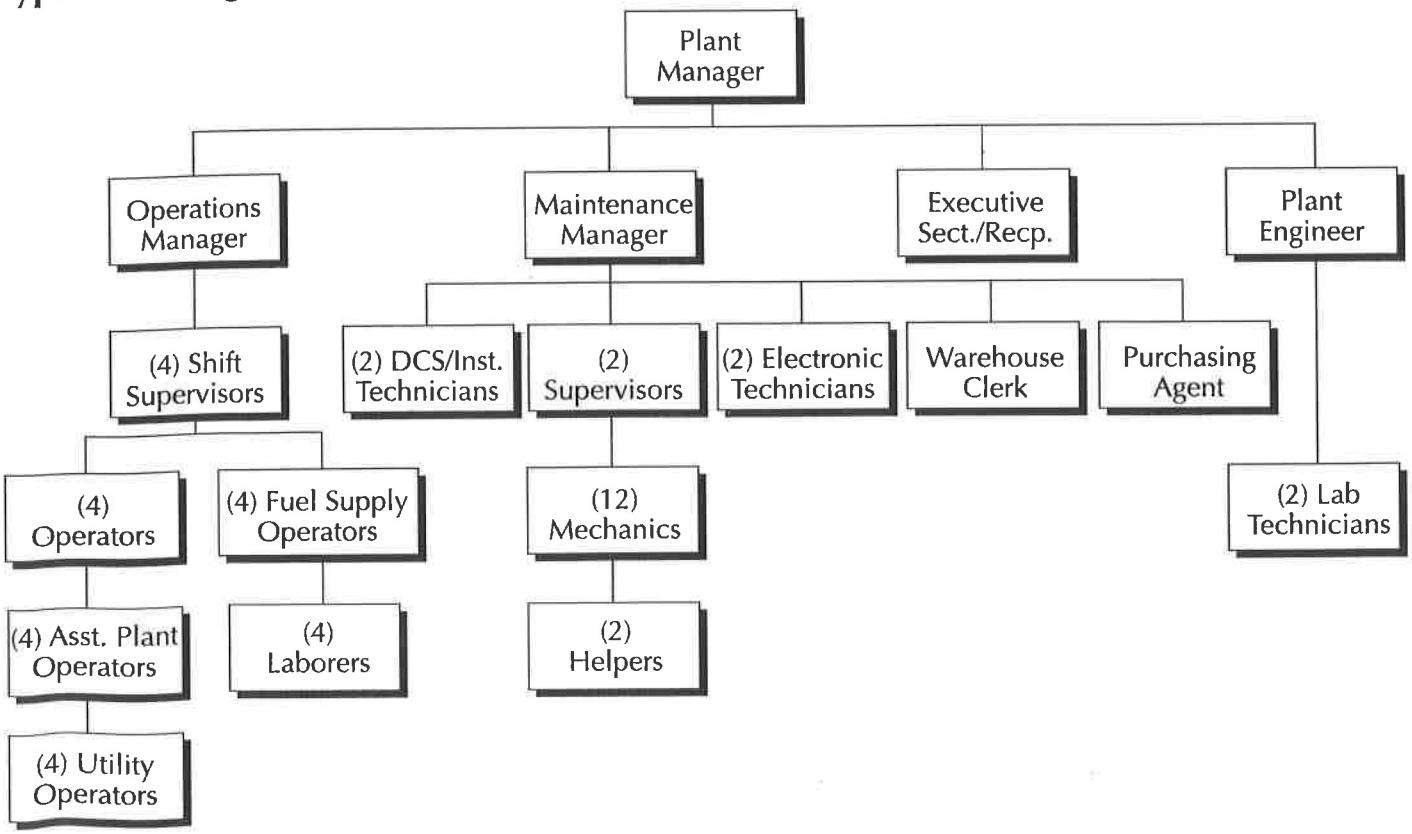
Or, if one assumes that Selective Non-Catalytic Reduction (SNCR) is required for further NOX reduction, the additional 1.2 million in capital costs and additional $500,000 in yearly operating costs would require adding $0.0006/kWh to the initial sales price.

### Operating Costs

If the manpower requirements are 10 personnel higher or lower than projected in this analysis, or if rates were 20% higher or lower, the operating costs change by about $1,000,000 per year. The initial wholesale price of power would have change by $0.0011 to either $0.0422 for an increase or would drop to $0.040/kwh.

If the limestone requirements can be reduced by 20%, and Foster-Wheeler has proposed that this is possible by hydrating of ash and re-injection, the project would provide $35 million in added revenue over the 30-year life.

## Typical Staffing



## Economic Assumptions

If the actual escalation rate for O&M costs were only 2% over the life of the project, the project would provide about $73 million in added revenue over those 30 years.

If the actual escalation rate for O&M associated costs were 4%, the required wholesale price of power would have to increase by $0.0016 to $0.0427.

## Interest Rates

The economic analysis for the project is based on an interest rate of 6%. A one percent decrease or increase in the interest rate will decrease or increase the required price of power by about $0.0018/kwh. This is, the price of power at a 5% interest rate will be $0.0393/kWh and conversely, at a 7% interest rate, the price of power would be $0.0429/kWh.

## Conclusions

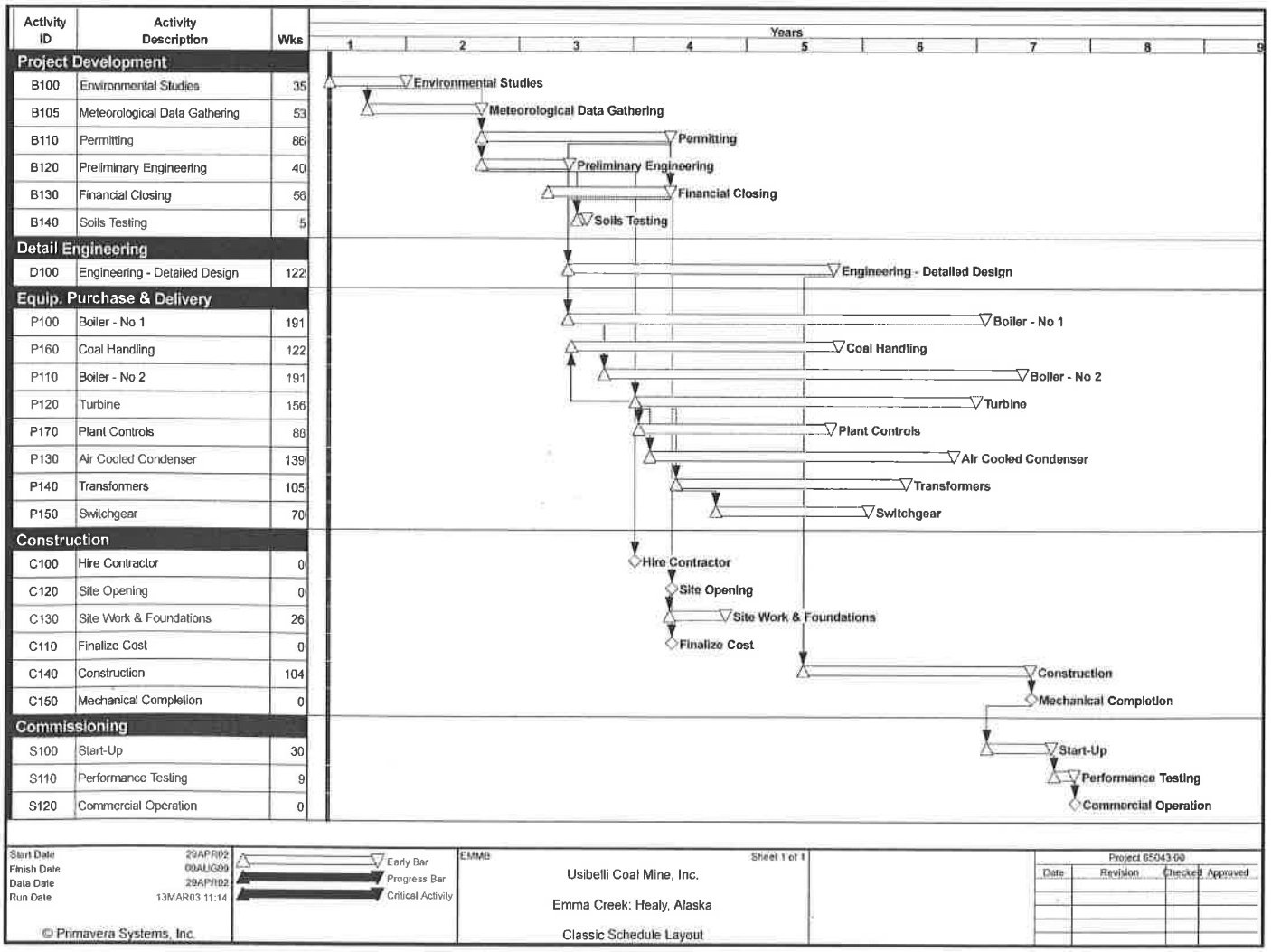
The project is not as sensitive to capital costs as it is to escalation factors and O&M costs. However, it is important to note that we believe the assumptions made and the estimates of capital costs and O&M costs are conservative.

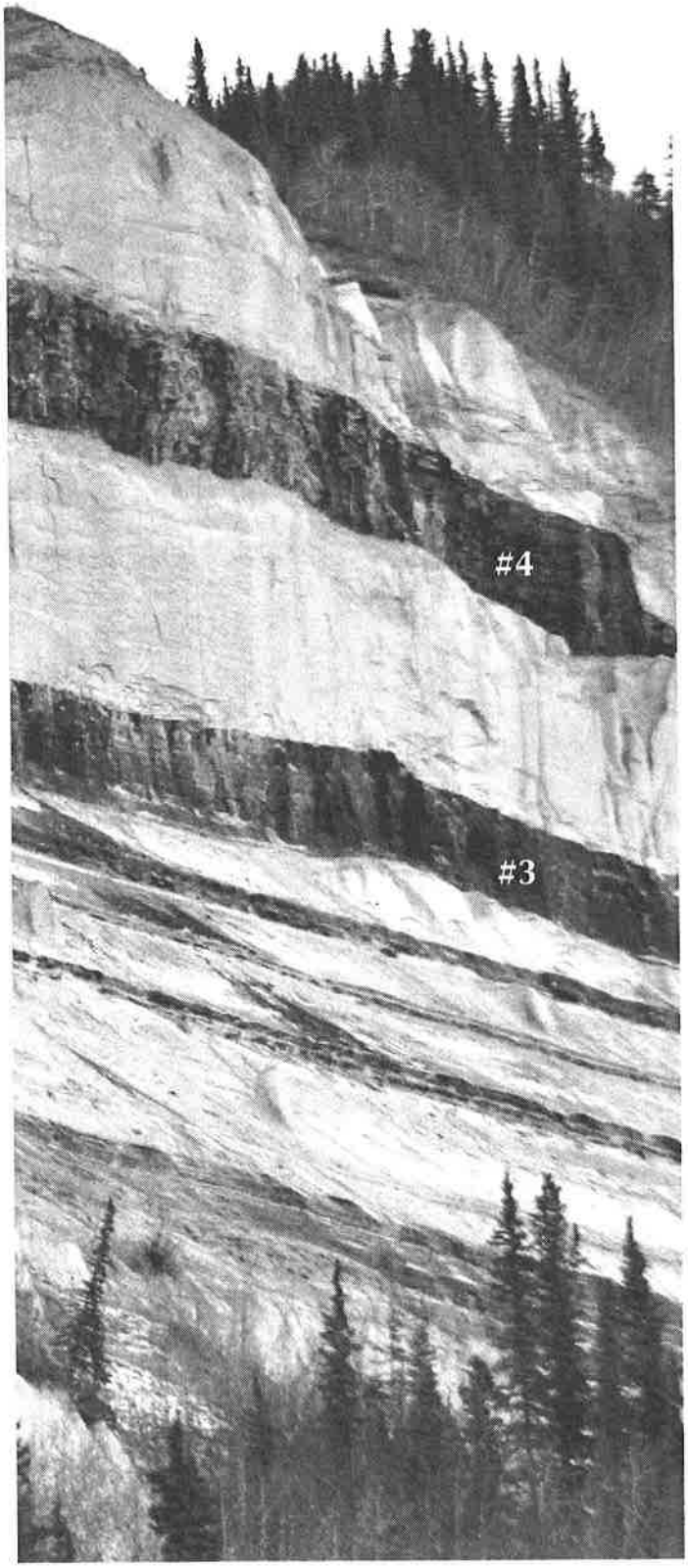
# Schedule

The schedule for the project shows a 7.5-year duration. This is comprised of 38 months of permitting and 52 months of engineering, procurement and construction. It is possible that the permitting cycle could be somewhat shorter; however, this schedule is based on other recently permitted projects in the lower 48 states and on input from project personnel knowledgeable of the Alaska permitting process.

Note that there is a break in the construction schedule in the first winter. This is consistent with the HCCP schedule and normal for major construction projects in Alaska.

| Activity ID | Activity Description | Wks |
|---|---|---|
| **Project Development** | | |
| B100 | Environmental Studies | 35 |
| B105 | Meteorological Data Gathering | 53 |
| B110 | Permitting | 86 |
| B120 | Preliminary Engineering | 40 |
| B130 | Financial Closing | 56 |
| B140 | Soils Testing | 5 |
| **Detail Engineering** | | |
| D100 | Engineering - Detailed Design | 122 |
| **Equip. Purchase & Delivery** | | |
| P100 | Boiler - No 1 | 191 |
| P160 | Coal Handling | 122 |
| P110 | Boiler - No 2 | 191 |
| P120 | Turbine | 156 |
| P170 | Plant Controls | 86 |
| P130 | Air Cooled Condenser | 139 |
| P140 | Transformers | 105 |
| P150 | Switchgear | 70 |
| **Construction** | | |
| C100 | Hire Contractor | 0 |
| C120 | Site Opening | 0 |
| C130 | Site Work & Foundations | 26 |
| C110 | Finalize Cost | 0 |
| C140 | Construction | 104 |
| C150 | Mechanical Completion | 0 |
| **Commissioning** | | |
| S100 | Start-Up | 30 |
| S110 | Performance Testing | 9 |
| S120 | Commercial Operation | 0 |






Coal seams #3 and #4 are exposed in this spectacular natural outcropping of the coal-bearing rocks north of Hoseanna Creek. These two coal seams continue deep below the surface until they outcrop again near the mouth of Emma Creek, about 6 miles to the north. Near-surface coal from #3 and #4 seams southeast of Emma Creek contain enough reserves to feed the Emma Creek Energy Project for over 50 years. Seam #3 is approximately 25 feet thick and seam #4 is approximately 40 feet thick. The two coal seams are typical of the ultra-low sulfur coal found in the Nenana coal field and, using modern combustion equipment, can provide environmentally friendly heat for electricity generation to meet the needs of the Railbelt's growing economy.

**12 Emma Creek Energy Project**