

**REPORT and RECOMMENDATIONS**

on the

**STELLARTON PIT MINE**

**PIONEER COAL LIMITED**

submitted to the

**MINISTER of the ENVIRONMENT**

prepared by

**ENVIRONMENTAL ASSESSMENT ADMINISTRATOR**

**October 14, 1995**

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## **STATEMENT ON PROJECT ACCEPTABILITY**

Surface mining is a carefully regulated activity, and the semi-urban location of this proposed mine lends itself to intense public scrutiny. Because the activity is highly regulated, and the environmental impacts well understood, mitigation of these impacts is well known, and if consistently and stringently applied, very effective in reducing or eliminating adverse environmental impacts.

The lands slated for mine development in Stellarton are undermined by shallow, abandoned mine workings, and therefore not suitable for any form of development because of the potential for subsidence. Surface mining is the only known effective method of restoring the lands to other uses. If not surface mined, the land will remain as a hazard and be of no use to the Town of Stellarton.

Nova Scotia depends upon a secure coal supply for power generation. Over 74% of the provinces' electricity comes from coal fired generating plants, which support a coal industry that directly employs over 2,000 persons. It is appropriate to provide Nova Scotia's energy needs from indigenous sources, where labour and environmental laws strictly control the coal industry. Security of supply of Nova Scotian coal to the power plants depends both upon a healthy mainland and Cape Breton coal industry.

The coals proposed to be mined have low sulphur contents, and their use in power production will greatly assist Nova Scotia in achieving its national commitments for sulphur emission reductions. Coal used in power plants that is produced from a blend of low sulphur Stellarton coal with higher sulphur content Cape Breton coal, will produce an optimum blend to meet NSPI specifications at the Trenton generating station.

This Report and Recommendations concludes that the surface mine can be developed and operated without adverse environmental impacts. Any environmental impacts can be mitigated or lessened through application of controls and measures proposed by the proponent, and in accordance with provisions of environmental assessment approval, and with provisions of the required subsequent environmental and mining approvals.

**It is therefore recommended that the Minister of the Environment approve the Stellarton Pit Mine proposal of Pioneer Coal Limited, subject to the recommendations contained in this Report and Recommendations, and in consideration of the Report and Recommendations from the Environmental Assessment Board.**

## **SECTION 1.0 INTRODUCTION**

### **1.1 Review Chronology**

The Stellarton Pit Mine project was registered by Westray Coal, a Division of Curragh Resources, as a Class I undertaking with the Environmental Assessment Act (1989) on April 21, 1992. At the conclusion of the environmental assessment screening, the Minister of the Environment determined that more information was necessary to assess the impacts of the project, and on May 15, 1992, required the proponent to produce a Preliminary Report.

Guidelines for preparation of a Preliminary Report were provided to the proponent on May 28, 1992, and the Preliminary Report was submitted for review on July 29, 1992. Review of this report by government agencies led to the September 3, 1992 decision by the Minister for additional information to be provided in the form of an Environmental Assessment (E.A.) Report.

The public was invited to provide comments on the Draft Guidelines for the preparation of the E.A. Report from October 9, 1992 until November 16, 1992. The Draft Guidelines were amended to reflect comments received from government agencies and from the public, and the resulting Final Guidelines were provided to the proponent on December 10, 1992.

Westray Coal submitted Draft Terms Reference for preparation of the E.A. Report on December 21, 1992, which were found to be acceptable, and approved by the Minister on January 4, 1993. Inactivity of Westray Coal led to that company's forfeiture of coal rights in the Stellarton Pit mine area. On August 19, 1994, the Nova Scotia Department of Natural Resources made a request for proposals for the exploration and surface mine development of coal resources in the area. Five proposals were submitted in response to the request, and the bid and proposal of Pioneer Coal Limited of Antigonish was the successful application.

To reflect differences in the Pioneer Coal Ltd. proposal with the original proposal registered by Westray, Pioneer Coal Limited submitted revised Draft Terms of Reference on February 20, 1995. These revised Draft Terms of Reference were found to adequately address the Terms of Reference, and were approved by the Minister on March 1, 1995.

The Draft E.A. Report was submitted by Pioneer Coal Ltd. on April 21, 1995, and was found to address the Terms of Reference, and therefore approved by the Minister on May 2, 1995.

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On May 4, 1995, the E.A. Report was submitted, and made available to the public and to government review agencies from May 12, 1995 until June 29, 1995.

On May 9, 1995, the Minister referred the E.A. Report to the Environmental Assessment Board, who convened public hearings on the Stellarton Pit Mine proposal in the Town of Stellarton on the 4th, 5th, 6th and 10th of July 1995.

### **1.2 Environmental Review Participants**

The Environmental Assessment Administrator coordinated a technical review of the E.A. Report by government agencies and by the public. Comments were submitted by the following departments and agencies.

Nova Scotia Department of the Environment  
Industrial Pollution and Control  
Water Resources  
Pictou District Office

Nova Scotia Department of Natural Resources  
Forest Resources, Truro Office  
Mining Engineering

Nova Scotia Department of Education and Culture  
Nova Scotia Museum

Nova Scotia Economic Renewal Agency  
Project Analysis

Nova Scotia Department of Transportation and Communications  
Environmental Engineering

Nova Scotia Department of Municipal Affairs  
Provincial Planning Section

Fisheries and Oceans Canada  
Habitat Management Division, Gulf Region

Environment Canada  
Environmental Protection

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Public input for review of the Environmental Assessment Report was solicited through newspaper notices published in the Chronicle - Herald and in the New Glasgow Evening News on May 12, 1995. Sixteen individually signed letters from the public expressing opinions on the strip mine proposal were received by the Environmental Assessment Administrator during this period.

### **1.3 Scope of Report and Recommendations**

This Report and Recommendations is based upon information submitted to the Environmental Assessment Administrator within the prescribed 40 day review period, excluding Sundays and statutory holidays, from May 12, 1995 until June 29, 1995. During this period, the Environmental Assessment Report (E.A. Report) of the Stellarton Pit Mine proposal was made available to the public and to government review agencies.

The low level of public input during the 40-day review period for the E.A. Report (16 letters) is assumed to result from a greater degree of satisfaction for individuals to make oral presentations and have the opportunity to direct questions and comments to the proponent and the review panel in the Public Hearings. Thus the social issues and environmental health issues, of the most concern to the public, receive less attention in this Report and Recommendations than they are expected to receive in the Environmental Assessment Board's Report and Recommendations.

## **SECTION 2.0 PROJECT DESCRIPTION**

### **2.1 Introduction**

Pioneer Coal Limited is proposing to develop and operate a series of surface strip mines in the MacGregor Avenue/Foster Avenue area of Stellarton in Pictou County, Nova Scotia. Areas identified by Pioneer Coal Limited for mining contain an estimated four million tonnes of coal in the Foord, Cage, Third, Fleming and MacGregor coal seams to a depth of approximately 120 metres. The company proposes to extract up to 200,000 tonnes coal per year, giving a mine lifespan of about twenty years. Approximately 50 people will be employed at the mine.

The proposed mine site is located in the central portion of the Pictou coalfield, which has yielded more than 65 million tonnes of coal over more than 165 years. Extensive underground mining in the Stellarton - Westville - New Glasgow area has left many areas of land rendered unsafe, unattractive and unusable for other land uses because of abandoned mine workings, coal and wasterock dumps, and areas prone to subsidence and surface collapse due to shallow underground workings.

### **2.2 Mine Development and Operation**

The initial development is to involve three pits on the west side of MacGregor Avenue that would extract coal from the Foord, Cage/Third, and McGregor/Fleming seams. Following progressive reclamation and rehabilitation of these three pits, mining of the Cage/Third and McGregor/Fleming seams to the east of MacGregor Avenue is proposed. The feasibility of developing a third pit east of the avenue to extract coal from the Foord seam will be evaluated sometime after approximately the 15th year of mine operation, depending on geological, economic and environmental experience obtained from preceding operations. The mining schedule proposed by Pioneer Coal indicates that normally only one pit will be open at once, with development of a subsequent pit to start in the final mining and reclamation phases of a preceding pit.

Mining will be conducted by conventional earth moving equipment; blasting is not contemplated. Topsoil, overburden and wasterock overlying the coal seams will be excavated by bulldozers equipped with mechanical hydraulic rippers, and stockpiled initially by dumptrucks next to the pit. The company is proposing to use a conveyor system to move rock out of the pit once initial earth moving and site preparation operations for the first pit have been completed.

Strip mining involves removing topsoil, overburden and wasterock and excavating the exposed coal seam. This operation moves along the strike length of the coal seam, with the excavated waste rock being replaced back into the pit once the coal has been removed. Normally no depression on the land surface is left due to removal of the coal,

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because waste rock when placed back into the excavation experiences an apparent increase in volume, due to the increased number of void spaces that result from the broken rock. The final stage of this progressive rehabilitation involves placement of stockpiled topsoil back over the wasterock that has been placed in the excavation, and re-seeding the area.

Pioneer Coal proposes to mine coal 200 to 215 days per year, yielding a daily production of about 900 to 1000 tonnes of coal per day, on a 2 work shift per day, Monday to Friday schedule. There is no planned coal production for July and August, due to decreased demand from the power generating plant, and due to efforts to minimize dust emissions in the dry warm months of the summer.

To ensure that coal produced at the mine meets Nova Scotia Power Inc. specifications for delivery to the electrical generating plant in Trenton, Pioneer Coal Ltd. indicates that some coal blending and washing will be necessary. The company proposes to establish a coal blending facility on a paved site next to the mine site entrance. The blending operation involves mixing of the generally higher ash percentage coals from the site with lower ash content coals from other mines, to produce a coal product of acceptable characteristics, (e.g., ash, 502, BTU/lb, volatile contents) for delivery to the power plant. Any necessary coal washing would be done at Pioneer Coal Ltd.'s existing wash plant in Westville.

Coal is to be transported from the site to the Trenton electrical generating station approximately three times per hour in standard 35 tonne tractor trailers. The trucks will have fitted tarpaulins that cover the coal to prevent fugitive dust emissions and coal spillage. Coal trucking routes are selected to minimize transport through residential areas.

### **SECTION 3.0      ISSUES**

Coal mining has a long history in Nova Scotia. Many areas were significantly aided in their growth through coal mining, such as the Sydney, Glace Bay and Inverness areas of Cape Breton, and the Springhill, Joggins, and the Stellarton - Westville - New Glasgow areas of the mainland. Settlements grew up around the underground coal mines, and unfortunately on top of many remaining surface deposits. Land use conflicts between surface mining and nearby residential settlements therefore are common.

Environmental concerns and impacts of surface mining in semi-urban areas are very similar from project to project, and commonly result from the usual proximity of surface mines to residential areas, i.e., dust and noise, water quality impacts, truck traffic, perceived devaluation of residential properties, etc. Similarly, the mitigation or elimination of these commonly occurring impacts is normally handled through well known, effective methods and procedures.

Submissions from government agency reviewers primarily concerned details of the proposed development such as mining plans, procedures and plans regarding coal washing and blending, and mitigative measures designed to protect surface watercourses. Some concern was expressed over a lack of current environmental baseline data on surface and groundwater conditions, and on fish habitat.

Table 1 provides a first glance comparison of the Stellarton mine proposal with other coal mine proposals in Nova Scotia that have been subject to environmental assessment; Alder Point Coal Mine, Sullivan Creek Mine, Evans Coal Mine, Toronto Road Mine, McBean Surface Mine and the Springhill surface mine developments.

**Table 1**

### 3.1 Social Issues

Proposals to strip mine coal at this site in Stellarton have been of significant concern to residents ever since the land surface was initially disturbed by the 23,000 tonne bulk sample program of George F. Wimpey Canada Limited in 1978. Public concern was heightened from activity at the site associated with the 100,000 tonne bulk sample mined by Westray Coal in 1992.

The prevalent issue noted in the public submissions was a perceived disruption of lifestyle resulting from operation of the project for an approximately 20-year period. Many submissions of those opposed to the proposal maintain that residents in homes adjacent and near to the mine site, will have to endure many environmental impacts including increased noise, dust, traffic, and potential surface subsidence, all of which will disrupt a quiet, semi-rural lifestyle. The experience of Westville residents with noise, dust and lifestyle disruption caused by the strip mine that operated in the centre of their town for many years was presented as an example of what Stellarton residents can expect. Many also argue that the coal is not necessary, as cheaper coal supplies are available from other sources.

The proponent does concede that there would be negative impacts to residents from the proposed development; "There is however, some cost of negative impact to be borne during the operational period. This will include the ongoing physical land disruption, occasional effects of noise, and possibly elevated dust levels in the immediate area of the mine."

As mentioned previously, most public involvement to this environmental assessment process occurred at the public hearings. The issue of social impact is therefore expected to be dealt with in more detail in the Report and Recommendations to the Minister from the Environmental Assessment Board.

#### **Conclusion**

It is concluded that residents in the immediate vicinity of the undertaking will certainly be aware of daily operations at the mine, and may occasionally experience undesirable noise, dust or truck traffic levels. The company has expressed a willingness to meet with any residents in the area who feel they are being adversely affected by the mine, and has suggested that a Community Liaison Committee be formed as a means by which local area concerns can be brought to the companies attention, and by which Pioneer Coal can keep the community informed of the project's progress.

### **Recommendation**

The company form a Community Liaison Committee (CLC) with local areas residents.

- 3.1.1 The purpose of the CLC is to allow local resident concerns to be brought forward to the company for response and possible resolution, and for the company to keep the local community advised of mine developments. The CLC is an advisory body to the company, with a role to facilitate this communication between the community and the company.
- 3.1.2 Individual membership on the CLC is to be undertaken and continued on the understanding that the mine project has received government approval to proceed, and will proceed in accordance with all other environmental assessment conditions of release, and in accordance with all other required approvals.
- 3.1.3 As a general guide for the conduct of the CLC, the Guidelines for the Formation of a Community Liaison Committee are suggested as a format to be followed.
- 3.1.4 Terms of Reference and membership for the Community Liaison Committee shall be jointly developed by the Proponent and the CLC, and provided to NSDOE.

### **3.2 Mining Plans and Operations**

The first 15 years of the approximately 20 year project are to involve development of three separate pits in an area south of Foster Avenue and west of MacGregor Avenue. The coal seams the company wishes to mine in this area continue easterly and northwards into blocks of land on the other side of Foster and MacGregor Avenues. Although the company has indicated that it may wish to mine coal in these areas should economic conditions be favourable, the mining plans submitted as part of the environmental assessment do not provide details on how these areas would be developed. Of more concern is how the company would plan to relocate, remove or close the avenues, should it be necessary. It is also not clear how the company would deal with the few residences presently located on Foster Avenue, above the areas where the coal crops are believed to lie.

These details could only be provided after mining experience has been gained from operations in the initial areas, and after exploration work has confirmed and accurately delineated the locations of the coal outcrops in the east and north sections of the site.

The company has stated that mining operations will cease in July and August of each year for annual maintenance. It is not clear if coal will be transported to the blending area on site for processing during this shut-down period. If so, it is not clear what

environmental controls, dust suppression methods and site security will be employed during this period.

### **Recommendation**

- 3.2.1 Blasting is not permitted.
- 3.2.2 All mining and related site activity is prohibited between the hours of 11:00 p.m. and 07:00 a.m. The proponent shall provide NSDOE with advance notice for approval, of any activities planned to occur between these hours, that have the potential to cause disturbance to local area residents, such as excessive machinery and vehicle movements, truck operations, blending facility operation, etc.
- 3.2.3 The following information is to be submitted as part of the application of any necessary Industrial Approvals required under the Environment Act.
1. Mining plans for all areas, including areas located north of Foster Avenue and east of MacGregor Avenue.
  2. Summer mine activity plans, including maintenance, environmental monitoring plans and schedules, and site security procedures.

### **3.3 Coal Preparation, Washing and Blending**

The primary customer of Stellarton Pit Mine coal is the Nova Scotia Power Trenton power plant, which requires coal with a maximum ash content of 20%. With Foord Seam coal ash contents of about 25%, and Cage/Third ash contents from 22.5 - 31.6%, it is necessary to blend the higher ash content Stellarton coal with lower ash content coals to produce a product suitable for the Trenton power plant. Pioneer is proposing to blend coals on a paved site near the entrance of the Stellarton Pit Mine. Any reject coal produced by the blending operations will be backfilled in the pit, along with waste rock. Pioneer also indicates that on occasion it may be necessary to transport coal to the coal washplant operated by Pioneer in Westville.

A number of environmental problems can be created from blending operations if not properly mitigated. It is not known what other low ash coals the company intends to import for blending at the site. Characteristics such as volumes, sulphur content, acid runoff generation potential, and ash content of all imported coals will have to be known in order to characterize the reject coals. Should any coal rejects from the imported coals be found to have a potential to generate acidic runoff, then separate handling and disposal procedures will have to be implemented to deal with the material.

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Details of the blending plant such as its size, blending rate and capacity, liquid effluent and air emission controls, will be required for the Industrial Approval. Coals must be crushed to a uniform size prior to blending, and details concerning crushing operations must also be provided.

### **Recommendation**

As part of an application for an Industrial Approval for the Blending Plant at the Stellarton Pit Mine, Pioneer Coal Limited must provide the following information:

- 3.3.1 Blending facility and site design details including coal blending rates and volumes, dust suppression methods, tailings characteristics, reject wasterock stockpile characteristics including acid generation potential, and wasterock and tailings handling procedures, and all points of effluent emission.
- 3.3.2 Blending coal feedstock characteristics, including capacities, sulphur and ash contents, and acid generation potential.
- 3.3.3 Procedures to separate and dispose of any reject coals, wasterock and tailings, with net acid generation potential.
- 3.3.4 Processing of any coal at the Westville wash plant of Pioneer Coal that does not originate from the Drummond mine of Pioneer Coal in Westville, requires separate approval from NSDOE.

### **3.4 Reclamation**

Pioneer Coal Ltd. is proposing to progressively reclaim the land following coal exaction by placing the wasterock back into the excavation. The re-filled excavations are then contoured and covered with overburden and topsoil, and revegetated. Site rehabilitation of surface mines is well controlled by environmental approvals and by the Mineral Resources Act, which requires the company to reclaim the site to an environmentally acceptable state.

In site reclamation, a depression does not remain after coal is mined because the overlying waste rock that is removed occupies a greater volume when placed back in the pit because of a swell factor Pioneer Coal estimates this swell factor to be 30%, however geologists from the Department of Natural Resources observed a swell factor of less than 30% at the surface mining operations of Pioneer Coal Ltd. at Westville. If this observation is valid for the operations at Stellarton, then final rehabilitated land contours may be different from any proposed in consideration of a 30% swell factor.

The company states that *"the waste piles will be constructed in lifts and side slopes will be progressively vegetated as each lift is completed."* As waste rock cannot normally be vegetated without the addition of soil, additional details are required from the company on how they intend to stabilize wasterock piles

Another unknown that could be significant is the method by which the company intends to move wasterock back into the excavation. To reduce site noise and dust creation, Pioneer Coal Ltd. intends to use a conveyor system to move wasterock out of the pit, and back into the pit for the reclamation process. It is unclear how placing the waste back into the pit by this method can be accomplished without creating excessive dust.

### **Recommendation**

The following information is to be submitted for review and approval as part of the application for an Industrial Approval, and also submitted to the Department of Natural Resources for review and approval.

- 3.4.1 A preliminary reclamation plan that includes topsoil and overburden movement and tailings disposal procedures, methods and schedules. These plans are to discuss proposed procedures for wasterock stabilization.
- 3.4.2 A final reclamation plan is to be submitted for review and approval to NSDOE six months prior to cessation of mining work at any pit.

### **3.5 Noise Impacts and Mitigation**

Noise from the surface mine will be produced from a variety of machinery operating at the site, including excavator activity, heavy truck movement, and the conveyor system. Mitigation of noise impacts primarily involve proper maintenance and muffling of vehicle and machinery exhaust. The treed buffer zones will assist in attenuating any noise levels, and noise from operations in the pit will be further attenuated through sound absorption by the pit walls and surrounding stockpiles.

Noise levels approaching the regulatory daytime limit of 65 dBA Leq were produced by dump trucks moving waste rock piles during the bulk sampling program undertaken in 1992. Pioneer Coal Ltd. is proposing to use a 2000 tonne/hour capacity conveyor belt system to move waste rock out of the pit to the stockpiles following establishment and initial pit development. This would greatly help reduce noise from waste moving operations. Blasting operations are not required at the site, therefore blast related noise, air concussion and vibration is not an issue. Modelling by the proponent did however indicate potential noise levels from 59.4 - 70.5 dBA should mining activity take place both west and east of MacGregor Avenue simultaneously.

### **Conclusion**

It is concluded that the normal accepted practices of noise mitigation proposed by Pioneer Coal Limited are appropriate and sufficient to limit noise levels at the site to within regulatory limits. However, it would appear that simultaneous mining activities on both sides of MacGregor Avenue could result in unacceptable noise levels.

### **Recommendation**

- 3.5.1 Pioneer Coal Ltd. shall submit for review and approval, a noise monitoring program as part of an application for an Industrial Approval.
- 3.5.2 Mining related activities that tend to create excessive noise, such as coal extraction and crushing, overburden, topsoil and waste rock stockpiling, not be permitted on both sides of MacGregor Avenue simultaneously.

### **3.6 Dust Impacts**

One of the most significant public concerns are the potential impacts of coal and waste rock dust emissions from the proposed mine. Fugitive particulate emissions can result from the mining operation itself, from truck movements, coal stockpiling operations, and from wind eroded particulates from overburden, soil and wasterock stockpiles.

Pioneer Coal Ltd. intends to use wet suppression as the primary mitigative measure for the waste piles at the site and on all truck haul roads. Wet suppression for dust control is acknowledged to be very effective if applied consistently. Vegetative cover is proposed for stabilization and erosion control of overburden and wasterock stockpiles.

A common source of public complaint is from dust, mud and dirt being carried by trucks leaving mine sites and deposited on public highways, and blowing off the trucks into off-site areas. This dust source can be adequately mitigated by washing and inspecting trucks leaving the site.

Pioneer Coal has indicated that tractor trailers leaving the site with coal shipments will be fitted with tarp covers to minimize dust emissions and spillage. In addition, the company states that coal haulers be restricted to the paved entrance and coal blending area of the site, and will not enter disturbed, non-paved areas. Trucks leaving the site are proposed to be washed.

### **Recommendation**

Given the high degree of public concern over dust emissions, the following recommendations are made to ensure an appropriate level of dust monitoring and control for the proposed mine.

- 3.6.1 A dust suppression and monitoring program shall be submitted to NSDOE for review as part of the application for an Industrial Approval. No site disturbance shall be undertaken without the approval of NSDOE until the plan is approved, and until monitoring sites and procedures are established.
- 3.6.2 All coal and waste rock transportation trucks are to be washed in the paved blending – truck wash area before leaving the site. All coal shipments from the site are to be covered with fitted tarps.
- 3.6.3 Coal transportation trucks are restricted to the paved blending and truck wash area near the mine site access.
- 3.6.4 Activities that have the potential to create significant dust, such as wasterock and overburden stockpiling, coal extraction and processing, operation of the conveyor system and other earth moving activities can only be undertaken during the months of July and August by approval from NSDOE.

### **3.7 Surface Water Quality and Fish Habitat**

Undertakings such as the proposed surface mine that disturb large areas of land must have in place effective erosion control structures and surface water interception and water treatment facilities to ensure that surrounding natural watercourses and their fish habitats are minimally impacted.

Significant concern was expressed by government agency reviewers over the lack of recent baseline environmental data for water quality and fish habitat presented in the Environmental Assessment Report. The company concluded that the principle nearby watercourse, Bear Brook, presents a "limited (available) amount of salmon habitat" (EAR, pg. 80) because of poor water quality and siltation of the brook. According to the Report, the poor water quality of the brook is due to discharges from the Westville sewage treatment plant located upstream on Bear Brook, which the proponent contends, likely is contributing elevated levels of ammonia to Bear Brook.

The 1992 water quality data does not reflect the present state of Bear Brook, which has recently greatly benefitted from community based fish habitat enhancement programmes which have improved the productive capacity of the brook since the environmental baseline studies were conducted in 1992. In addition, the Bear Brook sewage treatment

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plant is no longer functioning, and sewage is now pumped to the East River Pollution Abatement System.

The proponent has indicated that should fish habitat remediation be required in Bear Brook because of impact from the mining operation, then they would follow the Fisheries and Oceans Canada policy of "no net loss" of productive fish habitat. Determination of negative impact to fish habitat in Bear Brook and in other nearby surface watercourses to make any remediation necessary can only be made if accurate environmental baseline information of the habitat has been collected.

### **Conclusion**

It is concluded that characterization of baseline environmental conditions for natural surrounding surface water bodies that could be impacted by the project is inadequate. The information must be updated so that current water quality, quantity, and fish habitat can be accurately described, and serve as a baseline to which future environmental data can be compared.

### **Recommendation**

Before any new excavations are started, or other surface activities that in the opinion of appropriate NSDOE staff have the potential to adversely impact surface water quality or fish habitat, the proponent shall:

- 3.7.1 Conduct an environmental baseline water quality and quantity survey of receiving waters. Water flows in Bear Brook shall be determined to check on theoretically determined values. Survey sample suite, sample locations and frequency and other monitoring parameters shall be submitted to NSDOE for review and approval.
- 3.7.2 Undertake a baseline fish habitat survey and benthic organism inventory survey of receiving waters. The proponent shall consult with Fisheries and Oceans Canada as to details of the survey, including extent. Survey results are to be submitted to NSDOE for review and approval.
- 3.7.3 Submit for review and approval as part of the application for an Industrial Approval, an environmental effects monitoring program to gauge the long term impacts of site effluent discharges on water quality and fish habitat of nearby streams and water bodies.

### **3.8 Surface Water Control and Watercourse Protection**

Surface water control, management and monitoring procedures for surface mining activities are well known to the permitting agencies, and proper engineering design can

ensure that all mine site discharges are within acceptable water quality standards. Acceptable water quality parameters and discharge water quality data reporting procedures will be clearly identified in the required Industrial Approval.

Government agency reviewers noted several points in the proponents discussion on mine site surface water control that need clarification. As the mine is projected to operate for 20 years, settling ponds should be designed to capture a 24 hour precipitation event with at least a 20 year statistical recurrence. In the discussion regarding control of surface runoff from the mine site, the proponent indicates (pg. 145) that a 'flow control structure will be constructed of rockfill'. As it is unclear how a water flow structure would be constructed out of rockfill, more detail is required. Both a flow control structure and/or emergency spillway should be considered. The proponent indicated that "coal haulers will be washed as required" at the paved entrance/blending area at the mine entrance, but provided no details on how silt laden runoff from the trucks will be collected and treated.

### **Recommendation**

- 3.8.1 The site shall be maintained to prevent siltation of surface water that is discharged from the property, during periods of mining operations and during summer shutdown periods.
- 3.8.2 Pioneer Coal shall, as part of the application for an Industrial Approval, submit:
1. Plans for soil erosion prevention, sedimentation control, and wastewater effluent treatment systems. These plans shall include, but not be limited to, engineering design of flow control structures, treatment systems and wastewater impoundments, description of parameters and construction materials of all flow control structures, truck wash runoff management, and potential incorporation of spillways into site drainage control structures. Site drainage and runoff control structures shall be designed to capture a 24 hour precipitation event with a 20 year statistical recurrence, or at the direction of NSDOE.
  2. A wastewater management contingency plan that details the control, treatment and disposal steps that would be taken to deal with situations such as encountering acid mine drainage, suspended solids, control of storm water events, sedimentation pond breach, etc.

## **3.9 Groundwater**

### **Groundwater Quantity**

The water table in the immediate vicinity of a surface mine will be lowered through

dewatering of bedrock and surficial cover aquifers into the excavation. Depending upon the areal surface extent of water table lowering, nearby domestic water wells and local surface watercourses could be impacted. Residents in the areas where the water table is affected will experience water supply interruptions if the water table is depressed to an elevation lower than the well supplying water to their homes.

Public concern was expressed that any reduction of the water table in the vicinity of the surface mine could have the effect of removing physical-structural support for the numerous nearby abandoned underground coal workings, potentially permitting their collapse and surface subsidence.

To address these concerns of groundwater levels and quantities, the company notes that from their experience at other strip mines in Nova Scotia, the area of water table influence adjacent to a surface mine is not great, and none of their previous operations resulted in any water supply interruptions in nearby homes or businesses. These observations are reinforced, the proponent contends, by data gathered from a four month pump test conducted in 1981 at the Stellarton surface mine site. This data suggests that the level of groundwater in the immediate vicinity of the excavation will experience a decrease, but that there would be no significant impact to production capacity of local domestic wells.

### **Groundwater Quality**

There is the potential for the surface mine to alter groundwater quality due to chemical changes in the disturbed geological materials, or through contamination from mining activities. It is probable that any groundwater quality changes due to disturbance of the bedrock would be insignificant, temporary, and limited in extent.

To mitigate against adverse impacts to groundwater quality and quantity, Pioneer Coal Ltd. has proposed a network of monitoring wells surrounding the site that would provide advance warning of any problems before they impact domestic wells or surface watercourses. Standard groundwater remediation methods following cessation of mining activities would be adequate to deal with the problems that could occur.

In recognition that domestic water supplies are of vital importance to numerous surrounding homes, Pioneer Coal Ltd. has a corporate policy relative to impairment of water which is summarized as:

- provide temporary water service
- inspection by independent party
- if responsible, repair water supply

### **Review Comments**

Baseline groundwater quality for domestic wells in the vicinity of the proposed mining operation was established through sampling done in 1980 as part of a gas exploration program by Algas Resources Ltd. Four domestic wells were re-sampled in 1992. The proponent has compared this data with that collected as part of an regional water resources survey of Pictou County by NSDOE in 1980, and concluded that there have not been any significant changes in water quality in the vicinity of the site over the last decade.

Such a conclusion is not supported by this data that is over 10 years old, and not supported by the data from only four wells sampled in 1992. Indeed, the re-sampled domestic wells show trends of increasing major ion concentrations and decreasing pH. It is of importance to both the proponent and to users of adjacent and nearby water wells that current water quality and well yield of these wells be established before any site activity takes place that has the potential to induce changes in groundwater conditions.

The E.A. Report presents no hydrogeological studies for the areas it intends to mine east of MacGregor Avenue. Although mining east of the avenue is not projected to occur until the 15th year of mining to the west, it is important for groundwater conditions in the area to be characterised, and impact predictions made before any significant ground disturbance is permitted.

The company indicates uncertainty regarding the possibility of water table lowering created by the excavation because of other land uses in the area that could also influence water levels. Given this uncertainty, and the paucity of recent data to support the contention that water table drawdown is not expected to be significant, it would be a reasonable precaution to confirm the data with new tests.

### **Conclusion**

It is concluded that although groundwater quantity and quality impacts are likely to be insignificant, the considerable size and long duration of the project make it important that baseline groundwater information be accurately documented, and impact predictions made with more confidence. A careful groundwater monitoring program, in combination with the company water supply impairment policy, will ensure that no resident will suffer significant interruption of either water supply quantity or quality that could result from any mining activity undertaken by Pioneer Coal Ltd.

**Recommendation**

Before any new excavations are started, or other surface activities that in the opinion of appropriate NSDOE staff have the potential to adversely impact groundwater, the proponent shall;

- 3.9.1 Undertake additional groundwater pump tests to predict the areal extent of any cone of depression that may be caused by pit dewatering.
- 3.9.2 Undertake a groundwater quantity and quality program to document and characterize baseline site groundwater conditions, domestic well water yield and water quality information.
- 3.9.3 Details regarding procedures and extent of these groundwater tests and monitoring programs are to be submitted by the proponent to NSDOE for review and approval.

**3.10 Acid Mine Drainage**

The proponent has indicated that all coals, with the exception of the Cage seam coal, and all waste rocks at the site, do not have the potential to acidify water they may come in contact with. Consequently, Pioneer Coal has concluded that acid mine drainage (AMD) is not expected to be a problem. Should acidified water be produced from Cage seam coal, then the company proposes to neutralize the water to bring the acidity to neutral or natural background levels.

Reviewers have indicated that the characterization of AMD potential conducted by the proponent is inadequate. The proponent's conclusion was based upon 10 individual samples of coal and waste rock. Coal and associated waste rock from the Purvis, MacGregor, Fleming and New Seam were not tested for this assessment.

**Recommendation**

Before any new excavations are started or bedrock and wasterock piles disturbed, or other surface activities that in the opinion of appropriate NSDOE staff have the potential to acidify water, the proponent shall:

- 3.10.1 Submit to NSDOE for review and approval a plan and methodology for AWED characterization.
- 3.10.2 Conduct a survey to characterize AMD potential of all coals, waste rocks, tailings, and any other bedrock materials expected to be disturbed by the project

3.10.3 As part of the general mining plan to be submitted for government review and approval, the proponent shall include an AMD monitoring, prevention and treatment plan.

### **3.11 Spontaneous Combustion**

Coal can spontaneously combust under certain conditions of fluctuating air and water. The company acknowledged there may be a slight potential for spontaneous combustion when old mine workings are drained of water in the surface mining process.

Staff of the Nova Scotia Department of Natural Resources agree that an uncontrollable spontaneous combustion event is very unlikely, but suggest that a precautionary approach to mining be taken.

#### **Recommendation**

Before any previously undisturbed coal is mined or disturbed, the proponent shall;

- 3.11.1 Be restricted to mining only virgin coal in the Foord seam until the probability of spontaneous combustion is determined.
- 3.11.2 Take representative coal samples from all coal seams to be disturbed, and tested to determine the coal characteristics and susceptibility to spontaneous combustion.
- 3.11.3 Submit this information for review and approval, plus a detailed plan to the Nova Scotia Department of Natural Resources that presents procedures and methods to reduce or eliminate any potential for spontaneous combustion.