

**Table 5.1
Potential Effects Identification Matrix**

| Criteria | Potential Level of Effect | | | | | | Comments, Rationale | Mitigation Measures |
|---|---------------------------|----|-----|-----|----|----|---|--|
| | -H | -L | Nil | Unk | +L | +H | | |
| General Natural Environment Considerations | | | | | | | | |
| Air quality, including GHG offsets | | X | | | | X | <ul style="list-style-type: none"> Potential adverse effects during construction due to equipment exhaust, smoke from burning waste materials and dust emissions Potential adverse effects during operations due to diesel generator emissions Potential positive effects due to GHG offsets | <ul style="list-style-type: none"> Standard construction site best management practices to minimize air emissions due to exhaust, waste burning and dust Diesel generator operates very infrequently (typically only in emergency situations) |
| Water quality or quantity (surface water) | X | | | | | | <ul style="list-style-type: none"> Potential adverse effects on water quality during construction due to erosion and sedimentation and accidental spills Potential effects on water quality during operation due to shoreline erosion, inundation of terrestrial land in head ponds (e.g., nutrients, mercury inputs) and accidental spills Change to flow volume through bypass reach | <ul style="list-style-type: none"> Standard construction site best management practices to control erosion and sedimentation and prevent accidental spills from occurring Spill prevention and containment measures to be in place throughout operational period Run of river mode of operation will minimize water level fluctuations which could cause excessive shoreline erosion and associated adverse water quality conditions – shoreline erosion protection utilized on sensitive areas Small increase above ambient river level and clearing of vegetation in proposed head ponds to limit nutrient availability in inundated area Determine volume requirements through bypass reach on basis of biological needs |
| Water quality or quantity (groundwater) | | X | | | | | <ul style="list-style-type: none"> Potential adverse effects on groundwater quality during construction due to accidental spills Potential decreases in local groundwater quantity during construction due to groundwater leakage into project excavations | <ul style="list-style-type: none"> Standard construction site best management practices to prevent accidental spills and manage groundwater |
| Species at risk or their habitats | | | | X | | | <ul style="list-style-type: none"> Currently unknown if species at risk or their habitats would be adversely affected by the development since site specific inventories have not been undertaken yet | <ul style="list-style-type: none"> Baseline inventories will be conducted on several occasions in 2010 to document the presence/absence of species at risk – potential effects and required mitigation will be assessed subsequently. Avoiding impacts on species at risk the preferred mitigation strategy. |
| Significant earth or life science features | | | | X | | | <ul style="list-style-type: none"> Manitou Falls is identified as an International Biological Program site due to its representative successional pattern of coniferous forest. Potential effects are not yet known, since site specific vegetation inventories have not been completed to document the extent of the representative features. | <ul style="list-style-type: none"> Vegetation inventory will be conducted in 2010 and the extent of the representative features will be documented. Minimizing the overall effects on the natural vegetation at the site may be sufficient to minimize adverse effects on the representative features. |
| Land subject to natural or human-made hazards | | | | X | | | <ul style="list-style-type: none"> It is currently unknown if any natural hazards exist at the proposed development sites. | <ul style="list-style-type: none"> Field investigations will be conducted to assess presence/absence of natural hazards (e.g., significant existing erosion areas). |
| Terrestrial wildlife (including numbers, diversity and movement of resident or migratory species) | | X | | | | | <ul style="list-style-type: none"> Terrestrial wildlife could be affected by loss/fragmentation of habitat (associated with construction of site facilities and associated infrastructure, head pond creation, etc.), and disturbance associated with construction and operations of the proposed facilities | <ul style="list-style-type: none"> Habitat loss associated with the project will be minimized to the greatest extent possible Mitigation measures will be developed to minimize potential effects on terrestrial wildlife from loss/fragmentation of habitat and disturbance |
| Natural vegetation and terrestrial habitat linkages | | X | | | | | <ul style="list-style-type: none"> Natural vegetation and terrestrial habitat linkages could be affected by clearing associated with construction of site facilities and associated infrastructure, head pond creation, etc.), accidental spills/malfunctions Elevated groundwater levels associated with the head pond may impact vegetation species in close proximity to the headpond | <ul style="list-style-type: none"> Extent of clearing associated with the project will be minimized to the greatest extent possible Other best management practices will be employed to minimize potential impacts. |
| Soils and sediment quality | | X | | | | | <ul style="list-style-type: none"> Soil and sediment quality could be adversely affected by excavation and removal, compaction, loss due to fugitive dust or erosion or accidental spills during construction or operation | <ul style="list-style-type: none"> Construction site best management practices will be implemented for erosion and sedimentation control, dust management and prevention/containment of accidental spills to limit the potential for adverse effects on soil and sediment quality |
| Significant natural heritage features and areas | | | | X | | | <ul style="list-style-type: none"> Manitou Falls is identified as an international Biological Program Site due to its representative successional pattern of coniferous forest. Potential effects are not yet known, since site specific vegetation inventories have not been completed to document the extent of the representative features. | <ul style="list-style-type: none"> Vegetation inventory will be conducted in 2010 and the extent of the representative features will be documented. Minimizing the overall effects on the natural vegetation at the site may be sufficient to minimize adverse effects on the representative features. |
| Other (specify) | | | | | | | <ul style="list-style-type: none"> No other components identified. | |
| Aquatic and Riparian Ecosystem Considerations | | | | | | | | |
| Shoreline dependant species | | X | | | | | <ul style="list-style-type: none"> Shoreline dependant species may be impacted by the creation of head ponds. | <ul style="list-style-type: none"> It is not possible to mitigate this effect Natural regeneration of shoreline habitat will eventually restore these areas for use by shoreline dependent species. |
| Wetland dependant species | | | | X | | | <ul style="list-style-type: none"> It is currently unknown if any wetlands exist at the proposed development sites. | <ul style="list-style-type: none"> Field investigations will be conducted to assess presence/absence of wetlands |
| Fish habitat | | X | | | | | <ul style="list-style-type: none"> Fish habitat could be affected by instream structures (e.g., overflow weir, tailrace excavations, temporary cofferdams and dewatering, water crossings on access roads and transmission lines), changes in flow (bypass reaches) and water level (head ponds) and sedimentation | <ul style="list-style-type: none"> Fish habitat mitigation and compensation measures will be developed to ensure no net loss of the productivity of fish habitat as a result of the project Run of river mode of operation will minimize changes in flow and water level Bypass flow determined on basis of biological need |

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| Fish migration | | | | X | | | <ul style="list-style-type: none"> • Overflow weir at Manitou Falls could potentially block upstream fish movement, although the extent and nature of existing movements is currently unknown. | <ul style="list-style-type: none"> • Fisheries investigations will be undertaken to determine upstream fish movements past Manitou Falls. If movement has the potential to be blocked by the overflow weir, consideration will be given to installing a fishway. |
| Fisheries | | X | | | X | | <ul style="list-style-type: none"> • Fisheries could be affected by changes in habitat and associated changes in fish community. • Head ponds may result in an overall increase in the amount of aquatic habitat available. | <ul style="list-style-type: none"> • Assessment and mitigation measures noted above are intended to assess the potential for changes to fisheries and mitigation significant changes to the extent possible |
| Erosion and sedimentation | X | | | | | | <ul style="list-style-type: none"> • Potential for erosion and sedimentation due to construction activities • Potential for long term bank erosion due to water level and flow management activities | <ul style="list-style-type: none"> • Standard construction site best management practices to minimize erosion and sedimentation potential during construction • Run of river mode of operation to limit unnatural water level and flow fluctuations • Bank stabilization measures, as required, on very susceptible erosion sites. |
| Fish injury or mortality (impingement and entrainment) | | X | | | | | <ul style="list-style-type: none"> • Potential for some impingement on trashracks and entrainment and mortality through turbine flows | <ul style="list-style-type: none"> • Low intake velocities to minimize impingement and entrainment potential • Determine expected turbine mortality using published formulas with site and facility characteristics |
| Water levels, flows and movement (surface or groundwater) | | X | | | | | <ul style="list-style-type: none"> • Water levels in the head ponds will be increased due to the overflow weirs • Flows through bypass reaches will be reduced due to diversion of flow through the powerhouse • Some minor decrease in flow during head pond filling | <ul style="list-style-type: none"> • Run of river mode of operation to minimize changes in water levels and flows • Flow in bypass reaches established on basis of biological need • River flow not to be reduced by more than 10% during head pond filling |
| Drainage, flooding and drought patterns | | X | | | | | <ul style="list-style-type: none"> • Minor changes in local drainage will occur due to facility, laydown, access road and transmission line construction • Extreme flood levels may be somewhat higher in the head ponds due to the water level increase | <ul style="list-style-type: none"> • A drainage network will be installed around the facility to ensure adequate site drainage • Facilities will be constructed to meet flood passage requirements |
| Water temperature | | X | | | | | <ul style="list-style-type: none"> • Changes in water temperature in head pond due to increased surface area and slower flow velocity anticipated to be negligible | <ul style="list-style-type: none"> • No mitigation required – overall thermal regime of the river not likely affected. |
| Other (specify) | | | | | | | <ul style="list-style-type: none"> • No other components identified. | |
| Aboriginal Community Considerations | | | | | | | | |
| First Nation reserves or other Aboriginal communities | | | X | | | | <ul style="list-style-type: none"> • Operation of the project as run-of-river is anticipated to have no adverse effect on local Aboriginal communities including the Ojibways of the Pic River reserve, located on the shores of the Pic River at Lake Superior | <ul style="list-style-type: none"> • N/A |
| Spiritual, ceremonial, cultural, archaeological, or burial sites | X | | | | | | <ul style="list-style-type: none"> • Disturbance to spiritual, ceremonial, cultural, archaeological or burial sites could occur during construction and operation activities | <ul style="list-style-type: none"> • Aboriginal consultation to identify local resources will be conducted to mitigate potential negative issues. A Stage One Archaeological Assessment will be completed to identify local resources (or resource potential) |
| Traditional land or resources used for harvesting activities | X | | | | | | <ul style="list-style-type: none"> • Effects to the aquatic and terrestrial environment (discussed above) may result in negative effects to traditional lands and resources used for harvesting activities | <ul style="list-style-type: none"> • Mitigation measures, as appropriate, are provided above. |
| Employment | | | | | X | | <ul style="list-style-type: none"> • Construction and operation of the project by a First Nation will result in opportunities for employment of community members | <ul style="list-style-type: none"> • N/A |
| Lands subject to land claims | X | | | | | | <ul style="list-style-type: none"> • The project is proposed within the boundaries of an Exclusive Aboriginal Title Area claimed by the Pic River First Nation originally issued on January 7, 2003. • The project is proposed within the boundaries of the Robinson Superior Treaty. Currently the Pic Moberg First Nation has an active Specific Claim, the subject of which is reserve allocation. | <ul style="list-style-type: none"> • The Ojibways of the Pic River First Nation is the project proponent. Community consultation during the Class EA process will be undertaken to identify local resources and address potentially negative effects. • Pic Moberg have been identified as a potentially affected First Nation, and will be consulted during the Class EA process. |
| Economic Development | | | | | X | | <ul style="list-style-type: none"> • Ownership and operation of the project by the Ojibways of the Pic River First Nation will provide income and employment opportunities to the community. | <ul style="list-style-type: none"> • N/A |
| Other (specify) | | | | | | | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • N/A |
| Land and Resource Use Considerations | | | | | | | | |
| Access to inaccessible areas (land or water) | | | X | | | | <ul style="list-style-type: none"> • The High Falls and Manitou Falls areas are currently accessible via land and water. Access road upgrading to accommodate construction equipment and material delivery will result in improved access to the areas by land. Access to the area by water will remain via portage routes. | <ul style="list-style-type: none"> • Public access to the construction area will be prohibited to ensure public safety. Portage routes around the falls will be constructed/restored to ensure safe passage around the falls during construction and operation. |
| Navigation | | X | | | | | <ul style="list-style-type: none"> • Navigation and portage routes could be affected by the proposed developments | <ul style="list-style-type: none"> • Existing portage routes will be identified, and a commitment will be made to maintain or temporarily re-route portage routes during construction to ensure safe passage around the sites for canoers/kayakers. Portage routes will be restored/maintained during operation. |
| Riparian rights or privileges | | | | X | | | <ul style="list-style-type: none"> • The project area, including the headpond shoreline will exist on Crown land. At present, effects to riparian resource use are not known. | <ul style="list-style-type: none"> • Consultation with stakeholders will determine appropriate mitigation |

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| Energy/Electricity Considerations | | | | | | | | |
| Reliability (e.g., voltage support) | | | | X | | | <ul style="list-style-type: none"> • New power generation units are of a relatively small capability, and operation of them in parallel with the existing power grid will provide minor impact on the overall power system reliability and power quality - voltage and frequency • The power generation interconnection to the power grid may reduce the reliability of the interconnection feeder | <ul style="list-style-type: none"> • N/A • Appropriate mitigation technical measures will be proposed in protection and control to minimize a power outage |
| Security (e.g., black start) | | | | | | X | <ul style="list-style-type: none"> • Operation of the projects will improve distribution customer service reliability in this area. The power generation units will be able to provide a black start and island mode of operation (assuming that is allowed by HONI) to continue to supply or electrically energize in a safe, controlled and reliable manner, part of the distribution system, including customer load that is separated from the rest of distribution system | <ul style="list-style-type: none"> • The island mode of operation could require the change of the interconnection protection and control scheme/settings in the HONI distribution system. Further consultation with HONI required. |
| Electricity flow patterns | | | | X | | | <ul style="list-style-type: none"> • Operation of the new power generation units will redistribute power flow in the existing distribution system. | <ul style="list-style-type: none"> • Appropriate mitigation technical measures will be proposed in the control system of the power grid and new generation units if required. |
| Other (specify) | X | | | X | | | <ul style="list-style-type: none"> • Operation of the new power generation units will affect existing protection and control settings in the distribution system. • Oil filled electrical and mechanical equipment can potentially spill oil into the environment | <ul style="list-style-type: none"> • Appropriate mitigation technical measures will be proposed in protection and control system of the power grid. • Appropriate preventive measures will be proposed to eliminate the risk |