File #2500-00-01

ENVIRONMENTAL MANAGEMENT SYSTEM MANUAL

Review frequency: Yearly

Management Review Committee		
Name:	**Signature:**	**Review Date:**
Director Operations		
Director Resource Planning & CIO		
Director Technical Services		
Manager Operations, Health & Safety		
Resource Management Engineer		

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Revision History

The following table must be filled out when changes are made to the EMS manual or supplementary documents.

Document Release and Revision History

Revision #	Revised Section/Page #	Purpose of Release: Details of Revisions/Amendments	Approved By:	Effective Date
00		EMS manual release	President & CEO	January 2003
01	Section 1.4, Section 3, EMS-001-A thru G, Section 4.3, Section 5, Section 6.1 & 6.2 New EMS-001-J & K	Changes made reflecting the 2003 EMS audit corrective action plan & organizational changes	President & CEO	August 2004
02	Section 3, page 13 of 97, Appendix D, Appendix F	First addition “for” Yukoners, Appendix D was updated to reflect current org chart, and Appendix F was updated with a current list of employees		

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Section 1

Manual Overview

1.1 - Introduction

For many years now, the Yukon Energy has taken measures to prevent and/or reduce impacts to the environment by applying environmental considerations to everyday operations.

One way to systematically address environmental impacts is through an Environmental Management System (EMS). An EMS is a systematic application of business management to environmental issues. Once implemented, an effective EMS can reduce operating and maintenance costs, identify future potential liabilities, reduce incidental and penalty related costs and provide assurance to Yukon Energy, regulators and stakeholders that environmental risks are being managed and minimized.

As national and international environmental awareness has heightened over recent years, environmentally related business costs have increased in response to stricter environmental legislation, public pressures and an effort toward improved corporate image. As such, a cost effective and dependable system for managing environmental liabilities was needed. The International Standards Organization (ISO) met this challenge and created the ISO family of standards for environmental management. This has evolved into the current ISO 14001 EMS that is utilized, in whole or in part, by most electrical utilities today to manage their environmental issues.

Yukon Energy is developing this EMS, by utilizing in whole or in part, the key principles laid out in the ISO 14001 standards. The ISO compatible EMS will allow us to focus on audits, environmental management measures and remediation while creating a structured system to assess key liabilities associated with power generation, transmission and distribution of electricity and document all processes and actions taken. The EMS will define and implement environmental procedures and standards for the whole of Yukon Energy to follow, creating consistency across Yukon Energy.

1.2 - Purpose and Goals

The purpose of this manual is to:

- ✓ Provide employees that have a direct impact on the environment with a reference document on the various components of Yukon Energy's Environmental Management System (EMS), and
- ✓ Ensure that environmental information pertaining to the activities at Yukon Energy is kept current and is readily accessible to all employees and contractors.

The goals of this manual are to:

- ✓ Ensure that Yukon Energy staff understand the key elements of the EMS, in particular how their work relates to the EMS, and
- ✓ Provide direction and reference to related records and documents.

1.3 - About this Manual

This EMS manual contains the following sections:

Title Pages	Contain information on the EMS Manual, revision history and index
Definitions	Lists definitions used in EMS
Section 1	Introduces EMS and ISO 14001 standard
Section 2	Overview of scope of EMS and Facilities included
Section 3	Introduces Yukon Energy's Environmental Policy
Section 4	Describes the Key Environmental Aspects, legal requirements, and environmental objectives, targets and programs
Section 5	Describes Yukon Energy's procedures and practices associated with daily operational activities, training, communication, emergency preparedness, structure & responsibility, document control
Section 6	Describes monitoring programs in place, corrective action procedures
Section 7	Describes the management review process for the EMS
Appendices	Contain supporting information to the EMS Manual

1.4 – Control of the EMS Manual

The EMS Manual is intended as a working document to be reviewed yearly, to ensure that it contains current information regarding practices and procedures associated with the EMS. Controlled versions of the EMS Manual will be maintained at:

PAPER COPIES

- Whitehorse Corporate Office – Resource Management Engineer (Master Copy)
- Whitehorse Systems Control Centre (SCC)
- Director Operations
- Director Resource Planning & CIO
- Director Technical Services
- Manager Operations, Health & Safety

ELECTRONIC COPY

- S:\Health, Safety and Environment\Environment\EMS\EMS Manual rev ##.##.####.doc

Any copies made of the EMS Manual are considered to be uncontrolled and will not be updated.

Definitions

Environmental Management System (EMS) is the part of the overall management system which includes organizational structure, planning, activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

Continual Improvement is the process of enhancing the EMS to achieve improvements in overall environmental performance in line with Yukon Energy s' environmental policy.

Environmental Aspect is an element of an organization's activity, product or service, which can have a beneficial or adverse impact on the environment (e.g. potential spill, waste generation, air emissions).

Significant Environmental Aspect (SEA) is an environmental aspect, which has or can have, a significant environmental impact.

Environmental Impact is any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services.

Environmental Objective is an overall environmental goal, arising from the Environmental Policy, that an organization sets itself to achieve, and which is quantified where practical.

Environmental Target is a detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.

Environmental Performance Indicator is a measurable result of the EMS, related to the organization's control of its environmental aspects, based on the Environmental Policy, objectives and targets.

Document is any paper or computer data file that contains EMS information to be followed (e.g. procedures, job instructions, records & forms).

Controlled Document is defined current documents that are used to plan and/or control any process or operations that affect the EMS.

Uncontrolled Documents is any hard copy of an EMS document used for reference purposes only.

Obsolete Documents are those documents that have been replaced by a new version or are no longer required.

Non-conformance is defined as a failure to fulfill a specified EMS requirement (e.g. inadequate procedures, procedures not followed, objectives and targets not met, regulatory non-compliances, etc.).

Incident is defined as an occurrence of non-conformance to an EMS requirement (e.g. spills, procedures not followed, complaints, etc.)

EMS Audit is a systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organization's EMS conforms to the EMS criteria set by the organization, and for communication of the results of this process to management.

Legal Requirements are federal, territorial, and local environmental laws, regulations, directives, ordinances, permits, licences, and other governmental authorizations.

Other Requirements are voluntary, and obligatory actions geared for environmental protection such as: corporate requirements, supplier requirements, voluntary agreements, etc.

Interested Parties are any people such as regulators, customers, suppliers, public interest groups, neighbours, media and employees.

Best Practices are generally defined as voluntary measures taken by YEC to minimize or mitigate actual/potential environmental impacts, and are implemented in all instances unless there are unique circumstances where the "Best Practice" is not appropriate and for which specific measures must be developed.

Procedures are a sequence of steps, such as a method or set of instructions, to apply to specific situations, or to define a method for performing a specific task.

Management Review Committee consists of at least the Director Technical Services, Director Operations, Director Resource Planning & CIO and Manager Operations, Health & Safety.

EMS Committee consists of the Management Review Committee members as well as the supervisor's/leadhands in operations, technical service and the resource management engineer.

EMS Coordinator is the Resource Management Engineer

NOTE
Some of these definitions were taken from ISO 14001 EMS – Specification with guidance for use 1996.

Section 2

Site Overview and EMS Scope

2.1 – Site Overview

There are 3 hydroelectric generating stations owned and operated by Yukon Energy with a combined installed capacity of 75 MW. The Whitehorse Rapids and Aishihik Generating Stations are located in southwest Yukon, and provide electricity on the Whitehorse-Aishihik-Faro (WAF) electrical system. The Mayo hydro station is an isolated system located in central Yukon, and provides electricity to the towns of Mayo, Elsa and Keno and to Dawson City by virtue of a 69kV transmission line recently constructed, as well as various PT sites along the way.

In addition to the hydro generating facilities, Yukon Energy also owns and operates diesel-generating units in Whitehorse, Dawson City, Faro and Mayo, and two wind turbines located near Whitehorse on Haeckel Hill.

Transmission and distribution lines deliver electricity to communities around the Yukon, by way of the 138kV transmission lines known as the Whitehorse-Aishihik-Faro (WAF) grid. A 69kv transmission line connects our Mayo Hydro grid to communities of Elsa/Keno City in central Yukon and extends approximately 230km to service Dawson City and various PT sites along the way. There are approximately 509km of transmission lines in total. In addition, distribution lines deliver power from the generating stations in Dawson City, Faro and Mayo to and within the communities. There are approximately 240km of distribution lines in total.

Substations are integral to any operating system, and there are 13 of these located in the south and central parts of Yukon that are owned and operated by Yukon Energy. These include the Riverside (S171), Takhini (S164) and Whitehorse (S150) substations in Whitehorse, as well as the various substations/switching stations near communities and small highway communities.

In conjunction with generating and delivery of electricity to its customers throughout the Yukon, Yukon Energy owns and manages the Whitehorse Fish Hatchery and fish passage facilities at the Whitehorse Rapids dam, the Lewes Dam and at the Aishihik Lake control structure.

2.2 – EMS Scope

This EMS is intended to cover any activity related to the capital improvements, operations and the maintenance of all generation, transmission and distribution systems that are required to provide electricity to Yukon Energy's customers throughout the Yukon. It also covers activities related to the operation and maintenance of the fish hatchery, and the fish ladders used to assist the passage of fish around the dams. Any contractors, consultants and suppliers working at any of Yukon Energy's facilities whose activities may have a significant effect on the environment are required to adhere to the EMS**.**

The scope of this EMS would not normally include any Health and Safety Policies with one exception. Yukon Energy's Joint Health, Safety and Security Committee (JHS&S Committee) is responsible to

ensure that all environmental incidents are investigated for root cause and corrective action by utilizing Yukon Energy's incident investigation procedure HS-000-E.

References:

- HS-000-E Incident Investigation Procedure
- Yukon Energy's Annual Reports
- Yukon Energy's web site http://www.yukonenergy.ca/about/polices/environmental

Section 3

Environmental Policy

The environmental policy is the impetus for implementing and improving Yukon Energy's EMS so that environmental performance can be continuously improved and maintained. The policy forms the basis from which the EMS is developed, including commitments to complying with legal and regulatory requirements, setting appropriate objectives and targets, continual prevention of pollution, and checking and improvement of its operations and activities.

3.1 – Purpose

The purpose of this section is to:

- Describe how the environmental policy is reviewed by management and communicated to staff and others.

3.2 – Responsibilities

- The Board of Directors approves the environmental policy put forward from the Senior Management.
- The Resource Management Engineer is responsible for ensuring the policy is communicated to all staff.
- The Administration Assistant is responsible for ensuring that the most recent version of the policy is posted in key locations, as follows:
  - Health & Safety Manual
  - Corporate file server - S:\\Environment\BD-011 Environmental Policy rev 02-May-2004.doc

3.3 – Yukon Energy's Environmental Policy – Dated May 2004

Mission

Yukon Energy will help sustain a healthy environment for Yukoners by maintaining a high standard of environmental responsibility and performance through the implementation of a comprehensive environmental management system. In so doing, Yukon Energy undertakes to respect and protect the environment in all its activities.

Yukon Energy recognizes its responsibility to protect the environment. This includes using resources effectively to produce electricity, minimizing impacts on the air, soil, and water, and safeguarding the health, safety and well being of employees and the public.

Yukon Energy, through its mandate to provide safe and reliable electricity, commits to act in an environmentally responsible manner while developing and maintaining energy infrastructure and services in the Yukon.

Principles

The following guiding principles set out Yukon Energy's environmental responsibility. We will:

- ✓ Integrate environmental considerations into decision making and planning;
- ✓ Provide employees with appropriate training to ensure their work is conducted in an environmentally responsible manner;
- ✓ Strive to achieve continuous environmental improvement through periodic environmental audits of facilities and processes;
- ✓ Use energy and natural resources as efficiently as possible during the generation, transmission and distribution of electricity and the operation of its facilities and promote efficient use of electricity by our customers;
- ✓ Implement reasonable actions to prevent pollution of air, water and soil and minimize the impact of any pollution which is accidental or unavoidable;
- ✓ Meet or exceed environmental requirements defined by legislation, regulation and other commitments and agreements to which Yukon Energy subscribes;
- ✓ Be accountable to stakeholders and regulatory authorities;
- ✓ Report bi-annually to the Board of Directors on environmental performance, and activities; and
- ✓ Communicate this policy to all employees and make it available to the public.

Original signed by President & CEO May 2004	Board of Directors approved by Board Chair May 2004

3.4 - Controlled Copies of Environmental Policy

- A controlled copy of the Environmental Policy can be found on Whitehorse Corporate file server S:\\ Health, Safety & Environment\Environment\BD-011 Environmental Policy rev ##.##.##.doc

3.5 – Communication

The Environmental Policy is communicated to all staff through the following means:

- Distribution of a copy of the Policy to all staff members
- Environmental Awareness Training
- Electronic version located on Whitehorse Corporate file server S:\\Environment\BD-011 Environmental Policy rev 02-May-2004.doc

The Environmental Policy is made available to the public through the following means:

- Yukon Energy's web site http://www.yukonenergy.ca/about/policies/environmental/
- Available in handout form at Yukon Energy's offices located in Whitehorse, Faro, Mayo, Dawson City

3.6 – Revision process

Every three (3) years the senior management team will review and make any necessary changes to the policy. Amendments to the policy may be suggested by any employee, and should be directed to the attention of the President and CEO. The President approves and submits proposed amendments to the Board for their consideration. Proposed amendments must receive Board approval, and be signed and dated by the Board Chair.

References:

- BD-011 Environmental Policy rev 02-May-2004.doc
- http://www.yukonenergy.ca/about/policies/environmental/

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Section 4

Planning

Section 4.3 of the ISO 14001 standard describes an effective planning process that ensures the success of an EMS for any organization. This section of the manual describes the process by which significant environmental aspects (SEA's), legal & other requirements, objectives and targets, and management program's of Yukon Energy's operations and activities are identified, revised, reviewed and updated.

4.1 - Environmental Aspects

Environmental aspects are those elements of Yukon Energy's activities that interact with the environment, including the hydro, wind and diesel generating units, the transmission and distribution systems, and all associated infrastructure, as well as the infrastructures associated with the fish hatchery or fish ladders. Power generation systems, be they renewable resources such as wind and hydro, or non-renewable, such as diesel, all use natural resources to generate electricity in Yukon. The process of converting these resources into electricity involves some inputs (e.g. water, diesel fuel, lubricating oils), and some outputs (e.g. water, emissions to air, waste oil, solid waste and electricity) all of which have potential environmental impacts.

Transmission and distribution systems, including the substations, also involve some inputs (e.g. cooling oils in the transformers, treated poles) and outputs (waste oil) and maintenance of the rights-of way for the transmission lines that require removal of vegetation from time to time.

The Whitehorse fish hatchery and its operation and maintenance procedures, as well as any fish ladder operation and maintenance procedures will be reviewed for significant environmental aspects.

The identification of significant environmental aspects considers normal operations, shutdown and start-up conditions, as well as scheduled and unscheduled maintenance and potential emergency situations.

Appendix C contains guidelines, procedures and best practices associated with the generation, transmission and distribution systems owned and operated by Yukon Energy, as well as the infrastructures associated with the fish hatchery or fish ladders.

4.1.1 – Purpose

The purpose of this section is to:

- Describe the process used to identify the environmental aspects of "Yukon Energy" activities, products and services that can be controlled or over which it can be expected to have an influence. Furthermore, this procedure describes the methodology used for the determination of significant environmental aspects.

4.1.2 – Responsibilities

- The Director Operations is responsible to ensure all documents pertaining to the operation and maintenance of all generation, transmission and distribution assets considers the SEA's as identified in section 4.1.3.
- The Director Resource Planning & CIO is responsible to ensure resource planning considers the SEA's as identified in section 4.1.3.
- The Director Technical Services is responsible to ensure each capital improvement considers the SEA's as identified in section 4.1.3.
- The Resource Management Engineer is responsible to ensure water management planning as well as operations and maintenance of fish facilities, considers the SEA's as identified in section 4.1.3.
- Project leaders are responsible to ensure each project considers the SEA's as identified in section 4.1.3.
- Supervisors are responsible to ensure the work planning process considers the SEA's as identified in section 4.1.3.

4.1.3 - Identification and Assessment of Environmental Aspects

Step 1 – Identify Specific Activities, Products & Services (APS) EMS-001-A

Directors/Managers/etc are responsible for the identification of all the activities, products or services (APS) included in their functional areas. The assessment shall include past and present APS, and consider normal, abnormal and emergency conditions. A listing of activities, products and services is available in *EMS-001-A.*

The identified APS's will be added to the "Activities, Products and Services" column #1 of the Environmental Aspect Listing, *EMS-001-E*.

Step 2 – Identify Environmental Aspects of the APS EMS-001-B

The responsible Director/Manager shall then identify the environmental aspect(s) of each APS identified that the Company can control and/or over which it can be expected to have an influence. A listing of Environmental Aspects is available in Environmental Aspects, *EMS-001-B.*

This information shall be added to the "Environmental Aspect" column #2 of the Environmental Aspect Listing, *EMS-001-E*.

The following sources of information can be used to identify environmental aspects related to the APS, but is not limited to this list:

- Regulatory requirements
- Voluntary programs
- Industry Codes of Practice
- Process Diagrams (each area)
- Operator reports
- Monitoring reports
- Environmental meetings
- Environmental inspections
- Internal checklists (Operations)
- Environmental audits

- EMS management review meeting minutes
- Discussions with personnel
- Other sources as appropriate

The responsible Director/Manager shall also identify operating conditions by considering environmental aspects under normal operations, abnormal operations – where procedures are not followed, shutdown and start-up, and potential emergency situations.

Step 3 – Categorize the Environmental Aspects EMS-001-C

Environmental aspects shall be categorized into one of the categories in *EMS-001-C*.
This information shall be added to the "Environmental Aspect Category" column #3 of the Environmental Aspect Listing, *EMS-001-E*.

Step 4 – Identify Environmental Impacts of the APS EMS-001-D

The EMS committee will identify the actual/potential, adverse/beneficial environmental impacts and stakeholder interests if applicable, based on professional judgment. A listing of potential Environmental Impacts and stakeholder concerns is listed in Environmental Impact and Stakeholder Concerns, *EMS-001-D*.
Record the environmental impact and any applicable stakeholder concerns in the "Environmental Impact" and "Stakeholder Impact" column #4 of the Environmental Aspect Listing, *EMS-001-E*.

Step 5 – Identification and Prioritization of Significance EMS-001-E

In order to classify an environmental aspect as "significant", an assessment is performed on the EMS impacts that are associated with each environmental aspect. The significance of the Environmental Aspects is determined using *EMS-001-E*.
The EMS Committee shall use past experience and professional best judgment when using *EMS-001-E* to access significance.

Determine the significance of the environmental aspects based on the criteria laid out in EMS-001-F:

If total significance score ≥ 10 then significant
If total significance score < 10 then not significant

Step 6 – Management of Significant Environmental Aspects EMS-001-G

The management of the APS (and therefore SEA's) may take the form of the following:

If total significance ≥ 10 Indicates that "Yukon Energy" shall control these risks by considering these SEA's during the review process of the environmental policy, objectives, targets, appropriate management program(s), operational controls, training, and emergency response.

If total significance < 10 Indicates that the impact(s), effects and damage from or associated with the environmental aspect may be managed by routine operational controls and training exercises

Management Discretion: Not withstanding the previous risk determinations from an environment and business perspective the EMS Committee has the discretion to designate any environmental aspect as significant based on their best judgment. Where this occurs, the committee should provide the rationale for designating the aspect as significant despite its score not reaching the significant threshold. An example might be where operating controls already in place have masked the frequency of an impact, or an issue the committee feels is emerging as a future risk.

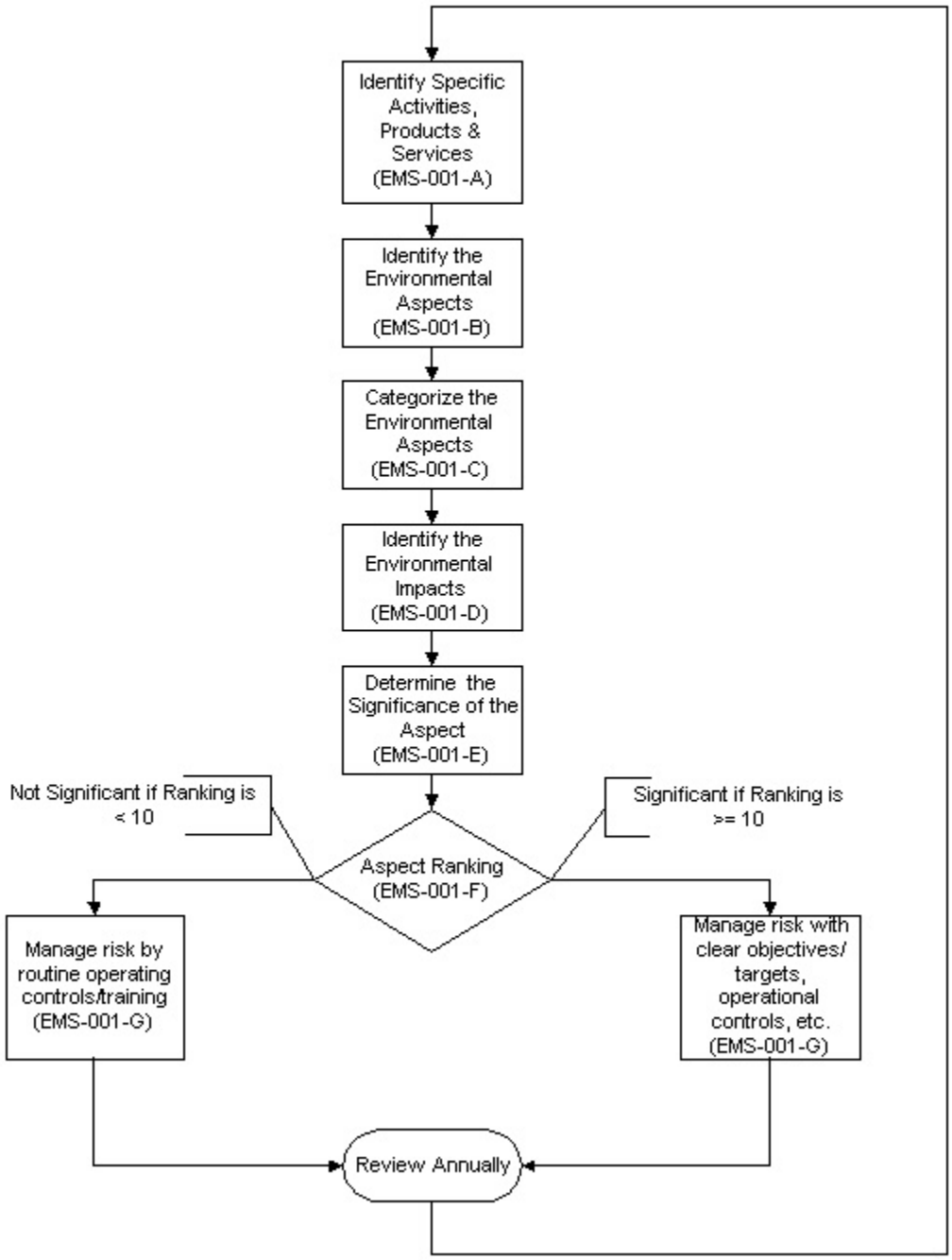
Step 7 – Review/Updates of EMS Aspects List

The identification of SEA's is an ongoing process. The categories and environmental aspects listed in the tables will be reviewed for applicability as an environmental aspect and an assessment of significance conducted at least annually by the EMS Committee. The results of this review will be documented and presented to the EMS Management Review Committee. A listing of all site EMS significant environmental aspects are listed on Environmental SEA Listing, *EMS-001-E.*

The justification for the addition and/or deletion of a significant environmental aspect will be documented as part of this process.

Figure 4.1.3 visibly shows this process.

Figure 4.1.3


Identify Specific Activities, Products & Services (EMS-001-A)
Identify the Environmental Aspects (EMS-001-B)
Categorize the Environmental Aspects (EMS-001-C)
Identify the Environmental Impacts (EMS-001-D)
Determine the Significance of the Aspect (EMS-001-E)
Not Significant if Ranking is < 10
Significant if Ranking is >= 10
Aspect Ranking (EMS-001-F)
Manage risk by routine operating controls/training (EMS-001-G)
Manage risk with clear objectives/ targets, operational controls, etc. (EMS-001-G)
Review Annually

References:

- EMS-001-A Environmental Activities, Products & Services
- EMS-001-B Environmental Aspects
- EMS-001-C Environmental Aspect Categories
- EMS-001-D Environmental Impacts & Stakeholder Concerns
- EMS-001-E Significant Environment Aspect Listing
- EMS-001-F Aspect Ranking Criteria
- EMS-001-G Overview of Activities & Aspects, Objectives & Targets, Operational Controls and Monitoring & Measurements

4.2 - Legal and Other Requirements

Many activities associated with the operation and maintenance of Yukon Energy's power generation, transmission and distribution systems are regulated by federal and territorial legislation, and attendant regulations. Conformance to the regulatory requirements addresses several significant environmental aspects, such as the water licences, which govern the operations of the three hydro generating stations. In addition to the legal requirements, Yukon Energy voluntarily adheres to national industry standards such as the Canada Dam Association Guidelines, and the Canadian Electricity Association's Environmental Commitment and Responsibility Program (ECR).

4.2.1 – Purpose

The purpose of this section is to:

- Outline the process by which the legal and other requirements that are applicable to all environmental aspects are identified and maintained by all departments.

4.2.2 – Responsibilities

- The Director Operations is responsible for applying and obtaining specific certificates of approval, permits and licences in any maintenance project within the department and to ensure the information is current and readily retrievable.
- The Director Resource Planning & CIO is responsible for applying and obtaining specific certificates of approval, permits and licences in any business and resource development project within the department and to ensure the information is current and readily retrievable.
- The Director Technical Services is responsible for applying and obtaining specific certificates of approval, permits and licences in any new capital works or customer service extension project within the department and to ensure the information is current and readily retrievable.
- The Resource Management Engineer is responsible for updating the Ecolog software package and informing the departments of new legislation as it applies to environmental issues and for applying and obtaining specific certificates of approval, permits and licences in any projects impacting our water licences or dam safety guidelines and to ensure the information is current and readily retrievable.

4.2.3 - Identification of legal requirements

The Resource Management Engineer maintains an up-to-date Ecolog database (through bi-monthly revisions of the software information) to keep track of Federal/Territorial changes in environmental legislation. Notification of changes will be communicated to department Directors as required.

Legislative and Regulatory Requirements:

- *Yukon Waters Act:* specifically all water licences that stipulate the terms and operating conditions in utilizing our water resources.
- *Fisheries Act:* potentially affects our activities with respect to fish; no permit in effect, required or requested.
- *Navigable Waters Protection Act:* potentially affects our activities with respect to public navigation and safety.
- *Canadian Environmental Assessment Act:* required when new projects are contemplated.
- *Yukon Environmental and Socio-Economic Assessment Act:* required when new projects are contemplated.
- *Species at Risk Act:* (forthcoming; may affect our activities)
- *Yukon Environmental Protection Act – Air Emissions Regulations, 1998:* No permit required if sulphur content of fuel is less than 1.1 % however Permit #60-010 has been issue to YEC.
- *Yukon Environmental Protection Act – Storage Tank Regulations, 1998:* These regulations govern the installation, operation, alteration, removal, closure and abandonment of storage tanks.
- *Yukon Environmental Protection Act – Special Waste Regulations:* These regulations govern the handling and storage of special wastes. Permit #41-120 has been issued to YEC.
- *Yukon Environmental Protection Act – Ozone Depleting Substance & Other Halocarbons Regulations*
- *Yukon Transportation of Dangerous Goods Act:* this Act deals with the transportation of hazardous materials in the territory.
- *Canada Dam Association Guidelines:* binding, as we are required to report on dam safety monitoring results as condition of water licence.
- *Federal Storage/Export & Release of PCB's Criteria:* criteria surrounding the handling of PCB contaminated equipment

4.2.4 – Identification of other requirements

In addition to meeting its legal requirements, Yukon Energy voluntarily adheres to several internal and external programs as part of its EMS. These include but are not limited to:

- Canadian Electricity Association's ECR program, which tracks the environmental performance of a number of environmental indicators (on a national level) of the generation and transmission activities and is reported on annually.
- Canadian Dam Association Guidelines

References:

- Ecolog System (environmental legislation on CD-ROM)
- EMS-001-H Summary of Licences & Permits
-

4.3 - Environmental Objectives and Targets

Environmental performance is improved by establishing clear objectives and targets that can be tracked by the appropriate Director of the applicable department. For each objective, a management action plan must be developed to support and achieve the targets.

4.3.1 – Purpose

The purpose of this section is to:

- Define the process for developing and reviewing environmental objectives and targets for Yukon Energy consistent with the Environmental Policy BD-011 and the requirements of ISO14001.

4.3.2 – Responsibilities

- The President & CEO is responsible for final approval of environmental objectives; indicator benchmarks and for ensuring sufficient resources are available to achieve the objectives
- The Director Operations is responsible for the identification of objectives and targets for any SEA under their control or influence.
- The Director Technical Services is responsible for the identification of objectives and targets for any SEA under their control or influence.
- The Director Resource Planning & CIO is responsible for the identification of objectives and targets for any SEA under their control or influence.
- Senior management is responsible for setting environmental objectives (KPI's) that are consistent with and enable Yukon Energy to achieve its environmental policy.
- The Resource Management Engineer is responsible for assisting in communicating the environmental objectives, targets and management action plans to facilitate their achievement.

4.3.3 – Definitions

Objective - overall goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable.

Target - detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from an objective and that needs to be set and met in order to achieve those objectives.

Legal/Other Requirements – The ranking of the significant environmental aspects to its associated legal or other environmental compliance risk, or potential liability with non-compliance to legal and other requirements.

Operational Requirements – The ranking of the significant environmental aspects to its associated interaction and importance with operational requirements.

Technology Options – The ranking of significant environmental aspects to pollution prevention technology options.

Views of Interested Parties – The ranking of significant environmental aspects to concerns or recommendations expressed by interested parties, including the general public, employees or others.

4.3.4 – Establishment of objectives and targets

- As identified in 4.3.2, each Director will develop (based on best professional judgement) potential environmental objectives and targets.
- When developing objectives and targets the following shall be taken into account:
  - Environmental Policy BD-011;
  - Significant environmental aspects (SEA's) from EMS-001-G;
  - Legal and other requirements;
  - Technological options;
  - Operational and business requirements;
  - Views of interested parties; and
  - Budget costs/cost savings potential
- Consultation with senior management or others may be sought to perform this activity.
- Information gathered to help establish Objectives and Targets shall be documented on form EMS-001-J, Environmental Objectives and Targets determination and Review.
- Based on the above activity, a determination is made regarding the need to set and approve particular objectives and targets.
- Any environmental objectives and targets that were set will be reviewed annually as part of the Management Review process set out in Section 7.

4.4 – Environmental Management Action Plans

4.4.1 – Purpose

The purpose of this section is to:

- Develop action plans for achieving Yukon Energy's Objectives & Targets.

4.4.2 – Responsibilities

- Each Director is responsible for establishing action plans for any objective and target under their control or influence.
- The Director responsible for the action plan(s) is responsible for communicating the plan(s) to all their employees in order to facilitate achievement.

4.4.3 – Establishment of management action plans

- Each Director will develop action plans for any objective identified in EMS-001-J, Environmental Objectives and Targets Determination and Review
- The following is the minimum being established for each action plan:
  - Which environmental objective and target is being addressed (column 1 of EMS-001-J);
  - The driver(s) for initiating the Objectives and Targets;
  - Overall strategy to address the objective and target;
  - Detailed supporting actions, including short and long term goals;

  - Department with responsibility and any specific personnel/job position (if applicable);
  - Resources involved, including budget, number of FTE and external resources; and
  - Time schedules
- Plans shall be documented on form EMS-001-K, Environmental Action Plans
- The status of achievement of the environmental action plans will be determined on a regular basis by the Director of the department responsible for the plan.
- The Directors are responsible for initiating corrective and preventive action on any non-conformance item associated with the plans.
- Environmental Action Plans and associated objectives and targets will be reviewed annually as part of the Management Review process set out in Section 7.

References:

- EMS-001-G Overview of Activities & Aspects, Objectives & Targets, Operational Controls and Monitoring & Measurements
- EMS-001-J Environmental Objectives and Targets Determination and Review
- EMS-001-K Environmental Action Plans
- Appendix G CEA-ECR Activities That Contribute to The EMS

Section 5

Implementation and Operation

This section describes how structure and responsibility for environmental management is determined within Yukon Energy. An overview of the roles and responsibilities of personnel, as well as a description of the training, communication, document control, operational control procedures and emergency response to facilitate effective environmental management is provided.

5.1 – Structure & Responsibility

Several people and departments play an important role in implementing, establishing and maintaining the EMS at Yukon Energy. Staff must have a clear idea of their responsibilities and those areas for which they are accountable in order to support and implement the EMS. In addition, management must provide the necessary resources to initiate the EMS and to ensure long-term success of the EMS.

5.1.1 – Purpose

The purpose of this section is to:

- Define the roles, responsibilities and authorities of key personnel who are involved in implementing and maintaining the EMS, and;
- Ensure that essential resources are available to maintain the EMS

5.1.2 – Responsibilities

- President & CEO is responsible for:
  - Ensuring the Directors/Managers have direction and the time and resources required to carry out the EMS activities and processes
- Resource Management Engineer is responsible for:
  - Ensuring that the EMS is consistent with ISO 14001 standard
  - Acting as the EMS Coordinator and is responsible for ensuring the EMS requirements are established, implemented and maintained at all relevant levels within the organization
  - Monitoring and reporting on the performance of the EMS to Senior Management, and for recommending improvements to the EMS
  - Ensuring both internal and external environmental audits are carried out within the timeframes identified in the corporate environmental policy.
- Director Operations is responsible for:
  - Determining the necessary time and resources essential to implementing operating and maintenance activities within the EMS framework
  - Ensuring that activities and processes supporting EMS are implemented as required within their area of responsibility.
  - Addressing environmental issues that arise within their area of responsibilities
  - Informing, as appropriate, the President & CEO and Resource Management Engineer of any issues that have been identified relating to the EMS

- Director Technical Services is responsible for:
  - Determining the necessary time and resources essential to implementing capital project and O&M support activities within the EMS framework.
  - Ensuring that activities and processes supporting EMS are implemented as required within their area of responsibility.
  - Addressing environmental issues that arise within their area of responsibilities.
  - informing, as appropriate, the President & CEO and Resource Management Engineer of any issues that have been identified relating to the EMS
- Director Resource Planning & CIO is responsible for:
  - Determining the necessary time and resources essential to implementing planning and water resource activities within the EMS framework.
  - Ensuring that activities and processes supporting EMS are implemented as required within their area of responsibility.
  - Addressing environmental issues that arise within their area of responsibilities.
  - informing, as appropriate, the President & CEO and Resource Management Engineer of any issues that have been identified relating to the EMS

5.1.3 – Structure and responsibilities

To ensure that the elements of the EMS are fully implemented, the President & CEO has designated the Resource Management Engineer to serve as the EMS Coordinator and report on the environmental performance of the system to senior management on a regular basis.

A detailed EMS Structure and Responsibility Matrix can be found in Appendix D, which identifies the key staff involved in supporting the EMS Coordinator to maintain the EMS elements.

References:

- Appendix D Structure & Responsibility Matrix
- Corporate EMS Manual

5.2 – Training, Awareness and Competence

Training and awareness assists employees to gain the appropriate knowledge and skills to perform tasks successfully and potentially prevent environmental mishaps. An effective training program can assist Yukon Energy in achieving its environmental objectives and targets, improving environmental performance, and raising the level of awareness and commitment for “doing the job right”.

5.2.1 – Purpose

The purpose of this section is to:

- Describe how environmental training, awareness and competence requirements are managed to ensure that employees whose activities may significantly affect the environment have the appropriate level of skills and knowledge, and understand the goals of the EMS.

5.2.2 – Responsibilities

- The Resource Management Engineer is responsible for scheduling EMS awareness sessions for employees and contractors as requested.
- Directors/Managers are responsible to ensure any specific job training is identified and carried out accordingly.

5.2.3 - Training program

The training program for the EMS consists of five (5) possible components. These are:

- Orientation/EMS awareness training for operational and technical service employees
- Orientation/EMS awareness training for contractors & suppliers
- Spill response/containment training
- Emergency response training
- Job-specific training

The key components of the awareness training include:

- A review of the environmental policy, including the importance of conforming to it;
- Employees' responsibilities with respect to the EMS (procedures associated with EMS, emergency preparedness and response);
- Discussion of significant environmental aspects and potential impacts of employees activities;
- Environmental benefits of improved performance; and
- Potential consequences of departure from specified operating procedures that could potentially harm the environment.

EMS awareness training for contractors & suppliers will be done as required by the project leader or by the Resource Management Engineer when requested. In accordance with HS-001 Section 9 Contractor Management; contractors/suppliers will be orientated to environmental issues to minimize any impact to the environment that may occur while performing their work in our faculties.

Spill response/containment training will be conducted as required for operational and technical service employees

Emergency response training will be conducted as required for the Mayo, Whitehorse and Aishihik Emergency Preparedness Plans (EPP) prepared by Resource Management Engineer.

The identification of job specific training is the responsibility of each Supervisor/Leadhand. A training matrix (Appendix F) summarizes some job specific training that will be required to ensure that employees understand how to perform their job and prevent potential impacts on the environment. Job specific training may include:

- Significant environmental aspects, objectives and targets associated with specific job tasks;
- Specific roles and responsibilities for job tasks related to environmental issues;
- Specific operational procedures associated with the job tasks;
- Emergency response plan and procedures; and
- Identification of areas where new procedures need to be implemented, or existing procedures need to be revised etc.

5.2.4 - Competence

All employees whose work may potentially result in a significant impact on the environment will be competent to conduct their work. Competence is based on an appropriate level of training, education and work experience evaluated during the hiring process and in the development of job descriptions for various positions throughout the company.

Work experience consists of on-the-job training by competent employees knowledgeable of the impacts associated with the tasks at hand and reviewed as identified in Appendix F.

5.2.5 – Training Records

The training records are tracked by using HR Manager, a software package used within the corporation.

References

- Appendix F Training Matrix
- Mayo/Whitehorse/Aishihik Emergency Preparedness Plans (EPP)
- HS-000-E Incident Reporting & Investigation

5.3 – Communication (internal and external)

Communication is a very important part of the overall effectiveness of the EMS. Employees who are well informed of all components of the EMS and who are included in the process are more likely to be committed to achieving the objectives and targets established by Yukon Energy.

5.3.1 – Purpose

The purpose of this section is to:

- Outline the various means of communicating information to staff, and
- Provide details on the procedure used to handle complaints and inquiries received from interested parties.

5.3.2 – Responsibilities

- The Director Operations is responsible for responding to and documenting external environmental and emergency complaints or inquiries as well as informing senior management of these complaints.
- In the absence of the Director Operations, the Systems Control Centre (SCC) Leadhand/SCC Operator is responsible for documenting external environmental and emergency complaints or inquiries.
- The department directors/managers are responsible for communicating environmental information to staff.

5.3.3 – Internal communication

Internal communication is essential to maintain an awareness of the EMS. Most operational environmental concerns will be discussed during the weekly Monday morning operational meetings. Those issues requiring decisions by senior management will be taken to the weekly senior management meetings for resolution.

5.3.4 – External communication

External communications from interested parties concerning complaints and/or inquiries regarding environmental issues shall be forwarded on to the Director Operations. Environmental complaints shall be logged by SCC and followed up by the Director Operations or designate using the incident reporting/investigation procedure HS-000-E. The department director/manager responsible for their area will normally handle communications.

5.3.5 – Communication of SEA's

During a MRC meeting in February 2004, the committee discussed the need to make Yukon Energy's SEA's available to the public. The committee decided not to make the list of consolidated SEA's available to external interested parties.

References:

- HS-000-E Incident Investigation reporting procedure

5.4 - Document Control

Document control is one of the most important elements of an EMS. Control of documents that are relevant and critical to the EMS promote environmental awareness of what is required to achieve an effective EMS and helps enable the evaluation of the system.

5.4.1- Purpose

The purpose of this section is to:

- Outline how EMS documents are handled during creation, revision and distribution, including removal of obsolete documents.

5.4.2 – Responsibilities

- The Originator of any document that is relative and critical to the EMS is responsible for creating/maintaining these documents and to ensure there is approval by their Director/Manager before being submitted to the EMS Committee/Management Review Committee.
- As indicated in Appendix B for EMS related documents.

5.4.3 – Document control process

Controlled documents relevant and critical to the EMS are as follows:

- Environmental Policy BD-011, EMS-000, EMS-001-A, EMS-001-B, EMS-001-C, EMS-001-D, EMS-001-E, EMS-001-F, EMS-001-G, EMS-001-H, EMS-001-I, EMS-001-J, EMS-001-K, Emergency Preparedness Plans and Site Spill Contingency Plans.

The responsibility for ensuring the controlled documents remain current is indicated in Appendix B. Any revisions to them will be submitted to the EMS Committee/Management Review Committee. Revised pages/sections will be distributed as per Section 1.4 of the EMS Manual and the obsolete pages/sections will be removed and replaced with the current version.

The Resource Management Engineer is responsible for issuing revisions to those indicated in Section 1.4. To ensure the revisions are incorporated into the EMS, the obsolete documents must be returned to the Resource Management Engineer.

There are other uncontrolled documents that help support the functioning of Yukon Energy's EMS. These include:

- Policies/Procedures/Best Practices
- Manuals
- In-Plant-Procedures/Operational Controls
- Job Instructions
- Others

In-plant-procedures and operational control documents will be established as required by the Leadhand Mechanical Maintenance. The Director Operations is responsible for final approval of these documents.

References:

- Appendix B List of EMS related documents
- Controlled documents can be found in network folder \\zeus\shared\Health, Safety and Environment\Environment\EMS\

5.5 - Operational Control

All operational/maintenance activities associated with the SEA's must be managed in accordance with the policy (BD-011), the objectives and targets, and legal requirements. Procedures stipulating operating/maintenance criteria are maintained to assist employees in performing their tasks.

5.5.1 – Purpose

The purpose of this section is to:

- Describe how operational control procedures and maintenance procedures are identified and documented for each SEA (EMS-001-G).

5.5.2 – Responsibilities

- The Director Operations or designate is responsible to review all operational guidelines, procedures and best practices identified in Appendix C.
- Project managers/leaders are responsible to ensure the safe work planning process includes environmental risk assessment to projects and implemented by employees and contractors.
- Supervisors are responsible to ensure the safe work planning process includes environmental risk assessment to ongoing activities for employees and contractors.

5.5.3 - Operational control process

- Operational control/in-plant procedures and maintenance procedures may be established to manage the activities identified in Appendix C and EMS-001-G. These procedures may include specific tasks regarding the operation and maintenance of plant systems or equipment.
- The Director Operations is to ensure that the operational controls identified in EMS-001-G are sufficient to manage all operations/maintenance activities that may have an impact on the environment.
- Any operational/maintenance procedure required to manage these activities will be documented and communicated to all affected employees.

5.5.4 - Operational control on contractors/suppliers

All contractors working on site are required to:

- Meet with the designated site contact or project leader.
- Attend an orientation/training session consistent with Appendix F-Training Matrix.

Awareness of the EMS will be made during the orientation/training session. Project leaders are to ensure any contractor performing work that could have a significant impact on the environment, shall be given additional instruction as stipulated in “HS-001 Contractor Management – Section 9.00”.

Specific requirements (e.g. regulations, procedures, guidelines) to suppliers and contractors may also be included in contracts to ensure that the Yukon Energy’s operational controls are followed.

Suppliers delivering diesel fuel and lubricants to our facilities must have a policy/procedure for “spill reporting/containment” and be able to demonstrate knowledge of this procedure to the Director Operations or designate.

As for design and engineering projects, Technical Services department to work closely with the Resource Management Engineer to ensure that the EMS requirements are met.

Similarly for planning and water resource projects the Business Development & Resource Planning department is to work closely with the Resource Management Engineer.

References:

- EMS-001-G Overview of Activities and Aspects, Objectives & Targets, Operational Controls and Monitoring & Measurements

- HS-001 Contractor Management – Section 9.00

5.6 - Emergency Preparedness and Response

The potential for major accidents/incidents caused by the operation and maintenance of our facilities requires a systematic approach to avoid and respond to emergencies. To that extent, Yukon Energy has developed Emergency Preparedness Plans for the Mayo, Whitehorse and Aishihik hydro sites, as well as Site Spill Contingency Plan, Reporting Procedures & Hazardous Materials Location Manuals for all of our generating plants.

5.6.1 – Purpose

The purpose of this section is to:

- Describe how to respond to accidents/incidents and emergency situations and to prevent associated impacts.

5.6.2 – Responsibilities

- The Resource Management Engineer is responsible for:
  - Reviewing and coordinating testing of the emergency preparedness plans
  - Monitoring and ensuring follow-up on corrective action items identified from any environmental incident investigation
  - Generating and updating the Mayo, Whitehorse and Aishihik hydro facilities Emergency Preparedness Plans.
- The Director Operations and/or SCC Leadhand are responsible for:
  - Approving all emergency response procedures
  - Schedule/plan simulated emergencies
  - Follow-up with a review of the exercise to ensure any areas of weakness are identified and corrected within the plan
- The Leadhand Mechanical Maintenance is responsible for:
  - Generating and updating the Site Spill Contingency Plan, Reporting Procedures & Hazardous Materials Location Manuals for all of the generating plants.
- Employees are responsible for:
  - Ensuring they report any accident/incident or emergency situation in a timely manner
  - Taking corrective action as identified in the "Site Spill Contingency Plan, Reporting Procedures & Hazardous Materials Location Manuals" to mitigate the condition as quickly as possible

5.6.3 – Emergency Response Plans

The Incident Reporting & Investigation Procedure, HS-000-E, lays out Yukon Energy's procedures for any reportable incident. Every incident is investigated to determine the root cause of the incident and any corrective actions that can be taken to avoid/prevent a re-occurrence of the incident.

As well the Site Spill Contingency Plan, Reporting Procedures & Hazardous Materials Location Manuals lay out mitigation steps to be taken for environmental releases at each of our generating plants.

Controlled copies of the hydro Emergency Preparedness Plans (EPP's) are found in:

- Resource Management Engineer (Master Copy)
- The SCC Control Room
- Mayo Hydro Plant
- Aishihik Hydro Plant

Controlled copies of the Site Spill Contingency Plan, Reporting Procedures & Hazardous Materials Location Manuals are found in:

- The SCC Control Room
- Whitehorse Corporate – Manager Operations, Health/Safety & Security
- Each plant as required

References:

- HS-000-E Incident Reporting & Investigation Procedures
- Whitehorse, Mayo and Aishihik Emergency Preparedness Plans
- Site Spill Contingency Plan, Reporting Procedures & Hazardous Materials Location Manuals

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Section 6

Checking and Corrective Action

The implementation of the EMS must be monitored for effectiveness and progress as per section 4.5 of the ISO 14001 standard. This section outlines the process to monitor, measure, track and record the key components of the operations and activities that can affect the environmental objectives and targets. It also outlines the process for handling and investigating non-conformance, taking action to mitigate any impacts and for initiating and completing corrective and preventive action.

6.1 - Monitoring and measurement

Monitoring and measuring Yukon Energy's operations and activities enable employees to track environmental performance and evaluate performance on meeting environmental objectives, targets and regulatory compliance.

6.1.1 – Purpose

The purpose of this section is to:

- Identify the means by which Yukon Energy monitors and measures its SEA's, environmental objectives, targets and regulatory compliance.

6.1.2 – Responsibilities

- The Resource Management Engineer is responsible for conducting periodic compliance audits.
- Each Director/Manager as identified in EMS-001-K is responsible for assessing the performance on meeting their identified objectives and targets (KPI's and other targets).
- The Director Operations is responsible to ensure all monitoring and measurement equipment has a preventive maintenance procedure to ensure equipment calibration remains accurate.

6.1.3 Monitoring and measurement of SEA's

The SEA's of Yukon Energy's facilities are monitored and measured as reported in EMS-001-G. Monitoring and measurement of the SEA's is conducted with the use of "HS-000-E, Incident Investigation & Reporting" procedure that has been established. This procedure allows the JHS&SC to review each environmental incident to ensure that corrective actions are applied and communicated in order to prevent similar incidents from re-occurring.

6.1.4 Monitoring and measurement equipment calibration

The Director Operations or designate is to ensure:

- There is a preventive maintenance program in place to ensure scheduling of equipment calibration and maintenance;
- That all calibration and maintenance of equipment is assigned to a specific individual and/or department;

- That the individual and/or department have a process for ensuring calibration and maintenance schedules are developed and maintained; and
- The procedure will:
  - Identify and document the measurements that will be performed, and specify the allowable range;
  - Identify the time, place and persons performing the measurements;
  - Ensure corrective actions are in place if the measurement is found to be in excess of allowable parameters; and
  - Ensure procedures/work instructions for calibration and routine maintenance of environmental equipment are adequately documented.

The Resource Management Engineer is to ensure:

- The data provided by Environment Canada via their water level recording instruments remains accurate and that Environment Canada provide documentation of yearly equipment calibration results as confirmation
- The data provided by Operations from the pizometer and weir flow readings remains accurate and that a procedure will:
  - Identify and document the measurements that will be performed, and specify the allowable range;
  - Identify the time, place and persons performing the measurements;
  - Ensure corrective actions are in place if the measurement is found to be in excess of allowable parameters; and
  - Ensure procedures/work instructions for calibration and routine maintenance of environmental equipment are adequately documented.

6.1.5 Monitoring objectives and targets

Progress information as established in Section – 4.4, Environmental Action Plans (EMS-001-K), will be reviewed by the MRC in accordance with Section 7. As well, the Directors/Managers will periodically report the status of any environmental objective and target to both senior management as well as the Board of Directors (BoD) when requested.

At present Key Environmental Performance Indicators (KPI's) are reported quarterly to senior management and the BoD. In addition, an annual KPI report containing corporate environmental measurements and other performance measurements is also written and filed with the utilities financial regulator, the Yukon Utilities Board.

6.1.6 Compliance with legislation and regulations

To ensure compliance with relevant environmental legislation (federal & territorial), the Resource Management Engineer will conduct period audits of its facilities as required (EMS-001-I). The results of the compliance audits will be provided to the MRC and senior management.

The Resource Management Engineer files annual reports to the Yukon Territorial Water Board as required by the Whitehorse, Aishihik and Mayo water licences. Additional regulatory reporting is also done with respect to dam safety and fish management as part of these water licences.

Yukon Energy has initiated a 5-year external audit cycle of the EMS program, with 2002 being the first year. The audit results will be shared with the Board of Directors, and senior management.

References:

- EMS-001-K Environmental Action Plans
- Quarterly KPI's
- GN-006 Minutes of environmental meetings
- EMS-001-I Compliance audits
- EMS-001-E Incident Investigation & Reporting

6.2 - Non-conformance and Corrective and Preventive Action

Non-conformance issues within the EMS will be identified during the year by the EMS Coordinator and brought forward to the MRC for resolution.

6.2.1 – Purpose

The purpose of this section is to:

- Identify the process involved in handling and investigating non-conformance issues.

6.2.2 – Responsibilities

- The Resource Management Engineer is responsible for reviewing the incident investigation report of any environmental non-conformance issue to ensure that corrective and preventive actions are implemented and is responsible for generating an incident investigation report indicating corrective and preventive actions if a deficiency arises within the prescribed water management system.
- All employees are responsible for generating an incident report when an environmental incident of non-conformance occurs.
- The supervisor of the employee reporting the incident is responsible for generating an incident investigation report indicating corrective and preventive actions.
-

6.2.3 – Non-conformance process

Corrective and preventive action is required to address issues raised by the EMS (EMS audit findings, compliance audit findings, management reviews, objectives and targets not met, procedures not followed), and any other programs that indicate the EMS is not functioning properly (spills, complaints, and water licence non-compliance).

Upon noticing any non-conformance issue, the Director/Manager of the affected department takes immediate action to correct the non-conformance and ensures that an incident report is filled out and followed up with corrective and preventive action items identified in the incident investigation procedure.

References:

- HS-000-E Incident Reporting & Investigation Procedure.
- Annual reports on water licence compliance to the Yukon Territorial Water Board.

6.3 – Records

All environmental records must be managed in a proper manner to provide a permanent record of Yukon Energy's efforts to comply with environmental legislation and to demonstrate actions taken to manage environmental impacts.

6.3.1 – Purpose

The purpose is this section is to:

- Identify the means of filing, retaining and maintaining all relevant EMS records.

6.3.2 – Responsibilities

- Director Operations is responsible to ensure records are kept for the calibration and preventive maintenance on environmental monitoring equipment i.e. water levels, weir flows etc as well as records for all environmental incidents, whether communicated internally or externally.
- Resource Management Engineer is responsible for any records relating to EMS audits and for all records relating to the management of our water licences and water storage.
- Manager Operations, Health & Safety is responsible for any training records relating to the EMS i.e. TDG, WHMIS, EMS Awareness, etc.
- Leadhand, Systems Control is responsible for all month end records relating to maintaining compliance with water storage and down-river flows in accordance to our water licences.
- The Administration Assistant is responsible for reviewing the records management procedure.
- All employees are responsible for conforming to the details outlined in the records management procedure when a record is generated by an activity.

6.3.3 – Records management process

All environmental records required to prove regulatory compliance are to be filed in the corporate filing system. This system is located in the corporate headquarters for Yukon Energy. The records shall be filed using the corporate file numbering system.

The Administration Assistant maintains the records management procedure and the Records Index Book. The Records Index Book contains a list of the station's files, file numbers and retention time. It is the responsibility of each employee to ensure that all EMS related records are properly filed.

References:

-

6.4 - EMS Audit

An EMS audit is essential to evaluate the overall environmental performance and effectiveness of the EMS and is being audited against the criteria established in ISO 14001.

6.4.1 – Purpose

The purpose of this section is to:

- Describe the process by which the EMS is periodically reviewed in order to ensure that it has been properly implemented and maintained.

6.4.2 – Responsibilities

- The Resource Management Engineer is responsible for planning and scheduling Yukon Energy's EMS audit and attending meetings, reviewing audit findings and developing a corrective action plan.

6.4.3 - Audit process

YEC shall endeavour to complete internal audits as per EMS-001-I as well, every five (5) years have an external audit performed in order to ensure that the EMS has been properly implemented, maintained and is consistent with the ISO 14001 requirements.

The EMS Coordinator, together with senior management, is responsible for ensuring that corrective actions are developed to resolve any deficiencies identified during the audits.

The following is the general process used to conduct EMS audits to determine if the plant's EMS conforms to the elements outlined in the ISO 14001 standard (for further details refer to the EMS audit protocol).

Stage	Responsibility	Description
1	Resource Management Engineer	Plan as per EMS-001-I Yukon Energy's internal audits. Select external auditor(s) to audit the elements of the EMS. Auditors must be qualified in accordance with the principles outlined in ISO 14012. Schedule opening/closing meetings with senior management.
2	EMS auditor(s)	Record audit findings. Present audit findings to senior management at closing meeting.
3	EMS audit leader	Prepare EMS audit report. Send a copy to EMS Coordinator and President & CEO.
4	Resource Management Engineer	Review audit findings and develop action plan for the findings. Send a copy of action plan to senior management
5	Resource Management Engineer	File copy of EMS audit report and action plan. Follow-up with senior management on the status of the action plan.

6	Resource Management Engineer	Considers the environmental importance of the activity concerned and the previous audit results when determining the frequency of the EMS audits. At a minimum, elements of the EMS may be audited yearly.

References:

- EMS 001-I Corporate EMS & SEA Audit Schedule

Section 7

Management Review

All elements developed in the planning, implementation and checking and corrective action sections must be reviewed to comply with section 4.6 of the ISO 14001 standard. This section provides an overview of the process in place to evaluate the effectiveness, adequacy and suitability of the environmental management system.

7.1 - Purpose

The purpose of this section is to:

- Describe the process by which the EMS is reviewed by senior management to ensure that the EMS is suitable, adequate, and effective.

7.2 - Responsibilities

The Management Review Committee is to review and make recommendations to the overall effectiveness of the EMS relative to the objectives and targets. NOTE: The Management Review Committee shall consist of at least the Director Technical Services, Director Operations, Director Resource Planning & CIO, Resource Management Engineer and Manager Operations, Health & Safety.

- Senior management is responsible for ensuring that recommendations made by the Management Review Committee are acted upon.

7.3 - Management Review process

The Management Review process shall take place as follows:

Step	Description
1	The ***EMS Coordinator*** forwards the following information in advance of the scheduled meeting to each member: • List of outstanding action items from the previous meeting • Suggested changes, if any, to the Environmental Policy • Changes to the list of environmental activities and aspects • Summary of changes to legal and other requirements made since the last meeting and potential future legislation that may affect the region • Summary of EMS performance relative to the previous year's objectives and targets • Status of environmental training • Suggested changes, if any, to the EMS Manual • Summary of EMS audit results and outstanding corrective actions • Summary of any significant environmental events and public complaints and inquiries • Status on the implementation and maintenance of the Emergency Response Plan, including drill/test results • Suitability of resources

Step	Description
2	The ***Management Review Committee*** reviews and assesses the information provided by the EMS Coordinator for, at a minimum, the following: • Is the list of activities, aspects and impacts up-to-date? • Were action plan(s) implemented to address audit findings? • Was Yukon Energy successful in achieving its objectives and targets? • Are the objectives and targets appropriate? • Is the Emergency Response Plan appropriate and effective? • Are all environmental procedures up-to-date? • Is the EMS Manual up-to-date?
3	The ***EMS Coordinator*** records the minutes and sends a copy to file with the Administration Assistant.
4	The ***Administration Assistant*** files the Management Review minutes of meeting and retains them for a period of at least 5 years.

References

- GN-006 Minutes of Environmental meetings.

Appendix A

ISO 14001 Standard (1996)

NOTE: The ISO 14001 Standard is only included in the controlled hardcopy version of the EMS Manual and not in the electronic copy.

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Appendix B

Summary of EMS Related Documents

Document Number	Document Title	Responsibility	Controlled?	Review Cycle
BD-011	YEC Environmental Policy	President & CEO	Yes	3 years
	Appendix C – Guidelines, Procedures and Best Practices	Director Operations	No	Yearly
	Public complaints	Admin Assistants	No	Yearly
	Emergency Response & Fire Prevention Plan	Director Operations	No	Yearly
GN-006	Minutes of Environmental Meetings (Management Review Committee (MRC) & EMS Committee (EMSC))	Admin Assistant	No	As required
EMS-000	Environmental Management System (EMS) Manual	Resource Management Engineer	Yes	Yearly
EMS-001-A	Environmental Activities, Products & Services	EMS Committee	Yes	Yearly
EMS-001-B	Environmental Aspects	EMS Committee	Yes	Yearly
EMS-001-C	Environmental Aspects Categories	EMS Committee	Yes	Yearly
EMS-001-D	Environmental Impacts & Stakeholder Concerns	EMS Committee	Yes	Yearly
EMS-001-E	Significant Environmental Aspect Listing	EMS Committee	Yes	Yearly
EMS-001-F	Aspect Ranking Criteria	EMS Committee	Yes	Yearly
EMS-001-G	Overview of Activities & Aspects, Objectives & Targets, Operational Controls & Monitoring & Measurements	EMS Committee	Yes	Yearly
EMS-001-H	Summary of Licences & Permits	Admin Assistant	No	As required
EMS-001-I	Corporate EMS & SEA Audit Schedule	Resource Management Engineer	Yes	Yearly
EMS-001-J	Environmental Objectives & Targets Determination & Review	MRC	Yes	Yearly
EMS-001-K	Environmental Action Plans	MRC	Yes	Yearly
	Environmental Compliance Audit Report	Resource Management Engineer	Yes	As required

Document Number	Document Title	Responsibility	Controlled?	Review Cycle
HR Manager	Training Records	Resource Management Engineer	No	Yearly
EPP	Mayo, Whitehorse & Aishihik Emergency Preparedness Plans	Resource Management Engineer	Yes	Yearly
	Daily Plant Check Reports	Leadhand, Mechanical Maintenanace	No	Yearly
	SCC Daily Log – Water Management Licence Compliance	Leadhand, Systems Control	No	Yearly
	Site Spill Contingency Plans	Leadhand, Mechanical Maintenanace	Yes	Yearly
HS-000-E	Incident Reporting & Investigation (Spill Response)	Resource Management Engineer	Yes	As required
HS-001	Contractor Management – Section 9.00	President & CEO	Yes	3 years
	CEA – Environmental Commitment & Responsibility Program (ECR)	Resource Management Engineer	Yes	Yearly
	Monthly & annual water licence compliance reports	Resource Management Engineer	No	Monthly/ Yearly
	Ecolog's bi-monthly legislated federal/territorial updates	Resource Management Engineer	No	Bi-monthly

Appendix C

GUIDELINES/PROCEDURES/PRACTICES

C.1 HYDRO GENERATION GUIDELINES/PROCEDURES

Examples of guidelines to which YEC subscribes are:

- *Canadian Electricity Association (CEA) - the Environmental Commitment and Responsibility Program (ECR):* annual reporting on a range of environmental indicators is a requirement of CEA membership.
- *CEA Fish and Fish Habitat Practices*: a document that outlines electricity industry practices during hydroelectric operations and maintenance.
- *Membership in CanWEA*: the Canadian Wind Energy Association responsible for promoting and developing wind energy in Canada.

C.1.1 Whitehorse Rapids Generating Stations

Whitehorse Rapids includes the Whitehorse Rapids Generation Stations, the Lewes Dam (which regulates the flow of water from Marsh Lake) and associated infrastructure. It does not include the fish ways at Lewes and Whitehorse that are addressed separately. The Whitehorse Rapids generating stations consist of two separate plants. One contains Whitehorse hydro units WH1/WH2/WH3 while the other contains Whitehorse hydro WH4.

Risks and Procedures For Whitehorse Rapids

1) Emissions to Air: Not relevant

2) Releases to Water:
WH-1 & WH-2
These two units share a common sump, and drain into a gravity operated oil-water separator, which captures the oil and discharges clean water into the river. All hydro plant oil is Terresso 46, manufactured by Esso, which is common mineral based oil with few additives.

Steps taken to mitigate an oil release:

- Absorbent materials and containers on sump floor
- Daily plant checks
- Low level alarms on oil pots
- Spill response trailer on-site
- Future oil detection alarm in sump
- Operations trained in spill response
- Spill response manual on-site
- Oil drums contained and bermed
- Ability to string a boom line quickly across tailrace

WH-3 & WH-4
Neither of these two units have an oil separator, therefore the first line of defence of an oil spill is mopping out the oil with absorbent materials in the sumps.

Steps taken to mitigate an oil release:

- Absorbent materials and containers on sump floor
- Daily plant checks
- Low level alarms on oil pots
- Spill response trailer on-site
- Future oil detection alarm in sump
- Operations trained in spill response
- Spill response manual on-site
- Oil drums contained and bermed
- Ability to string a boom line quickly across tailrace

Whitehorse Hydro Plants-General:

- WH-1/WH-2/WH-3 boiler room is a self contained room
- WH-1/WH-2/WH-3 black start is in a self contained room
- WH-1/WH-2/WH-3 fire pump fuel tank is sealed, bermed and alarmed
- WH-4 Black start fuel tank is self contained
- Use of heat closing fuel valves

3) Waste Management:

- Disposal of waste oil used in plant (stored in containers on site, removed by a 3rd party where it is burned as heating fuel)
- Disposal of solid waste, i.e. absorbent material, etc., is collected and eventually removed to the local landfill site.

4) Contamination of Land: Not relevant

5) Use of Raw Materials and Natural Resources:

- Use of water governed by the Water Licence

6) Other local environmental and community issues:

- Potential fish habitat dewatering as a result of reduced downstream flows in case of outage or emergency
  - Mitigated with emergency generation at spillway to ensure releases of the minimum amount of water as part of the water licence requirements
- Potential destruction of fish in Unit 4 tailrace channel
  - Mitigated with yearly operational procedures to install fish screens as part of the water licence requirements
- Potential destruction of fish spawning beds downstream from the plant
  - Mitigated by following the Whitehorse Spill Contingency Plan
- Potential flooding of low-lying areas of Whitehorse in event of ice jams (winter)
  - Mitigated by a standard operating procedure developed by SCC operations

- Water level management in lakes upstream; specifically Schwatka and Marsh Lake (within the minimum and maximum levels stipulated in licence) – low risk
  - Mitigated by a standard operating procedure developed by SCC operations
- Boater safety on Schwatka Lake and in river channel downstream of Whitehorse and Lewes dams
  - Low probability; high consequence; letter from Coast Guard suggest a safety boom be installed
- Thin ice risk to recreational users on Schwatka Lake
  - Low probability; high consequence?
- Potential downstream flooding and erosion/scouring due to unforeseen release of water during emergency situation
  - Low risk; mitigated by a standard operating procedure developed by SCC operations

7) Existing Practices and Procedures:

- Spill Response Plan Reporting Procedures and Hazardous Materials Locations (specific to Whitehorse hydro and diesel plants)
- Procedure to clean up small spills and prevent oil being pumped into the river
- Incident Reporting Procedures (addresses environmental release of any substance)
- Lake level management at Marsh Lake (procedures to control lake levels within licence max and min. levels)
- Lake level management procedure at Schwatka Lake, including notification procedure in event of draw down greater than 0.3 m
- Ice monitoring and management procedure
- Procedure for annual installation of fish screens at Unit 4 tailrace channel
- Emergency Preparedness Plan (deals with procedures in the event of imminent failure of dam, including contingency plan in event of prolonged outages)
- Public Safety near structures – public awareness program

C.1.2 Aishihik Hydro

Aishihik Generating Station includes the control structures at Aishihik and Canyon lakes, the power canal, and all associated infrastructure.

Risks and Procedures For Aishihik

1) Emissions to Air: Not relevant

2) Releases to Water:

The Aishihik plant has a history as a clean plant with very little contamination of the Aishihik River. There is no oil separator on site, but this is a manned plant that is closely watched.

Steps that are taken to mitigate an oil release are:

- Sump checked twice a day
- Absorbent materials and container on sump floor
- Low level alarms on all oil pots
- Spill containment kit on-site
- Future oil detection alarm installed in sump

- Open drums are bermed
- Operations trained in spill response
- Spill response manual on-site
- Black start fuel tank is self contained
- Use of heat closing fuel valves

3) Waste Management:
- Disposal of waste oil used in plant (stored in containers on site, hauled into Whitehorse)
- Disposal of solid waste, i.e. absorbent material, etc., is collected and eventually removed to Whitehorse landfill site.
- Sewage disposal on site via septic system which is cleaned annually

4) Contamination of Land: Not relevant

5) Use of Raw Materials and Natural Resources:
- Use of water governed by the Water Licence

6) Other local environmental and community issues:
- These have been documented in the 9 Volume EIA – prepared in support of the licence renewal application, and in accordance with the requirements of CEAA, and the Yukon Waters Act.

7) Existing Practices and Procedures:
Water management and monitoring, including:
- Procedures to manage lake levels at Canyon Lake and Aishihik Lake within the licence maximum and minimum lake elevations.
- Procedures for managing high water levels at Aishihik Lake to minimize risk of shoreline erosion;
- Water management practices at Canyon Lake that minimize lake level fluctuations throughout most of the year;
- Adjustment of flow over Otter Falls within the schedule of minimum flow requirements stipulated in the licence
- Procedure for the operation and maintenance of fish way
- Fish management practices may be required in the future as detailed in the FA authorization.
- Spill Response Plan Reporting Procedures
- Incident Reporting and Investigation Procedures
- Navigational Safety and Public Awareness

C.1.3 Mayo Hydro Facility

Mayo hydro includes the Mayo Hydro Generation Station, the Mayo Lake dam and control structure, the Wareham Lake dam and control structure and associated infrastructure.

Risks and Procedures For Mayo

1) Emissions to air: Not relevant

2) Releases to water:
There is no oil-water separator at Mayo hydro plant. Some unit cooling water flows into the sump; but the volume being pumped from the sump is very minimal.

Steps taken to mitigate an oil release are:

- Sump checked twice a day (this is a small sump that has absorbent in it at all times)
- Absorbent materials and container on sump floor
- Low level alarms on all oil pots
- Spill containment kit on-site
- Future oil detection alarm installed in sump
- Open drums are bermed
- Operations trained in spill response
- Spill response manual on-site

3) Waste management:

- Disposal of waste oil used in plant (stored in containers on site, hauled into Whitehorse)
- Disposal of solid waste, i.e. absorbent material, etc., is collected and eventually removed to Mayo landfill site.
- Sewage disposal at the powerhouse into a septic system

4) Contamination to land: Not relevant

5) Use of raw materials and natural resources:

- Use of water governed by the water licence

6) Other local environmental or community issues:

- Salmon habitat restoration in the area
- Tree salvage from Wareham reservoir
- Potential flooding in Mayo in emergency situation
- Shoreline erosion at Mayo Lake
- Check community meeting notes

7) Existing Practices and Procedures:

- Spill Response Plan Reporting Procedures
- Incident Reporting and Investigation Procedures
- Water Management, as per the water licence requirements
- Emergency Preparedness Plan for Mayo
- Ice monitoring and management
- Navigational Safety and Public Awareness
- Site Security and Surveillance Practices – this is potentially a greater issue at Mayo than at any of the other hydro facilities

C.2 DIESEL GENERATION GUIDELINES/PROCEDURES

A list of individual diesel units operated and maintained by YEC is included in Appendix E. The environmental aspects of operating these units are similar for all. We have included the pertinent facts about each plant as required.

C.2.1 Whitehorse Diesel Plant

Whitehorse diesel includes the seven units – WD1 thru WD7 – located at the Whitehorse hydro site and all associated infrastructure.

Risks and Procedures For Whitehorse Diesel Plant

1) Emissions to air:
Emissions are not presently monitored. The fuel used in the generators (P25 energy content) contains less than 1.1% sulphur, and as such, emissions are not required to be monitored in accordance with the Air Emissions Regulations, Yukon Environment Act. These regulations also make reference to opacity of emissions not exceeding 40% where the emissions are not regulated by a permit. In any case, 6 out of 7 diesel units are 2 generations old (30 to 40 years) and would be unlikely to pass fuel efficiency/emission standards of today. As these units are retired and replaced, modern units will presumably meet current emission and fuel efficiency standards. The key point is that YEC is trying to minimize use of diesel in favour of renewable sources of energy such as hydro and wind. Yukon Energy does monitor Green House Gas Emissions from its diesel facilities indirectly using a conversion factor for the fuel type and engine efficiency.

2) Releases to water:
Presently, there is a lot of fuel stored on site with no secondary containment provided. The 6 old diesel units hold about 15,000 litres of diesel fuel. None have secondary containment. Four diesel units run with a glycol cooling system (about 2,000 litres).
There is a common sump in the diesel plant except for WD-7, which flows into the oil-water separator that is used by WH-1 and WH-2.
WD-7 has a sump, which is alarmed and self-contained.

Steps taken to mitigate an oil or fuel release are:

- Sump is checked and cleaned weekly when plant is not operational, and daily when diesels are running
- Absorbent materials and container on generation floor
- Plant cleaned weekly
- Spill containment kit on-site
- Open drums are bermed except for the drums that are tied to the units. (cat and emd's)
- Operations trained in spill response
- Spill response manual on-site
- All diesel fuel overflow lines use a common header which returns back to the main tank
- Main fuel tank is bermed
- Minimal oil drums storage in plant. We rely on suppliers to store oil.
- Open grating in plant so you can see any leakage into sump

- Daily plant checks

3) Waste management:
- All used oil/varsol is stored on site, and is periodically removed by a local firm (North of 60 Petroleum). They burn it for heating fuel. There are no PCB's stored on site. Disposal of used glycol is by recycling through Finning.
- Employees are certified by internal TDG training to transport these materials (oil; waste oil, etc). North of 60 Petroleum delivers fuel and removes waste oil from the Whitehorse plant. Waste oil from Faro, Aishihik and Mayo is transported to Whitehorse for disposal.
- Disposal of solid waste, i.e. absorbent material, etc., is collected and eventually removed to the local landfill site.

4) Contamination to land:
- Similar as release to water
- Accidental spill of oil outside building handled with spill contingency plan
- Procedures for digging out and removing contaminated soils

5) Use of raw materials and natural resources:
- Oil

6) Other local environmental or community issues:
- Use of non-renewable energy resource
- Greenhouse gas emissions
- Increased noise
- Increase in air-borne particulates
- Rising cost of fuel
- Age of generators/replacement issues

7) Existing Practices and Procedures:
- Spill Response Plan Reporting Procedures
- Containment Boom installation procedures
- Incident Reporting and Investigation Procedures
- Identification of Location of Hazardous Materials
- Noise Reduction – installed new mufflers in Whitehorse Diesel
- Site Security and Surveillance Practices
- Evaluation of Feedback from Previous Incidents (see JHS&S Committee notes.)
- Reduction of greenhouse gas and particulates into air – minimize use of diesel generation
- Public Awareness

C.2.2 Dawson City Diesel Plant

Dawson diesel includes the five units – DD-1 thru DD-5 & modular unit YM-1 – located at the Dawson City diesel site and all associated infrastructure.

Risks and Procedures For Dawson City Diesel Plant

1) Emissions to air:
Similar to Whitehorse diesel plant emissions.

2) Releases to water:
Steps taken to mitigate an oil or fuel release are:

- Sump is now self-contained, and is checked weekly
- Absorbent materials and container on generation floor
- Plant cleaned daily
- Spill containment kit on-site
- Open drums are bermed
- Operations trained in spill response
- Spill response manual on-site
- All diesel fuel return lines use a common header which go to an alarmed day tank
- Main fuel tank is bermed
- Minimal oil drums storage in plant. We rely on suppliers to store oil.
- Daily plant checks
- Alarmed fuel day tanks
- Future oil detection alarm in sump

3) Waste management:

- Presently, all used oil is stored on site, and is periodically removed by a local firm (Northern Superior for Dawson, and North Of 60 for Whitehorse). They burn it for heating fuel. There is no PCB's stored on site. Disposal of used glycol is by recycling through Finning.
- Disposal of solid waste, i.e. absorbent material, etc., is collected and eventually removed to Dawson landfill site.

4) Contamination to land:

- Similar as release to water
- Accidental spill of oil outside building handled with spill contingency plan
- Procedures for digging out and removing contaminated soils

5) Use of raw materials and natural resources:

- Oil

6) Other local environmental or community issues: Similar to Whitehorse

7) Existing Practices and Procedures: Similar to Whitehorse

C.2.3 Mayo Diesel Plant (standby)

Mayo diesel plant consists of two modular units – MD-1 & MD-2 – as well as three units that have been removed from service (to be disposed of). These units are used to supply standby power to the town of Mayo in the event the Mayo hydro plant is down.

Risks and Procedures For Mayo Diesel Plant

1) Emissions to air: Similar to Whitehorse diesel plant emissions.

2) Releases to water: Not relevant

3) Waste management:
- Disposal of waste oil used in plant (stored in containers on site, hauled into Whitehorse)
- Disposal of solid waste, i.e. absorbent material, etc., is collected and eventually removed to Mayo landfill site.

4) Contamination to land:
Steps taken to mitigate an oil or fuel release are:
- Absorbent material in cold storage shed
- Plants cleaned weekly
- Spill containment kit within five kilometres
- Operations trained in spill response
- Spill response manual on-site
- Main fuel tank is bermed
- Minimal oil drums storage in plant. We rely on suppliers to store oil.
- Plant checks twice a week
- Alarmed fuel day tanks

5) Use of raw materials and natural resources:
- Oil

6) Other local environmental or community issues: Similar to Whitehorse

7) Existing Practices and Procedures: Similar to Whitehorse

C.2.4 Faro Diesel Plant (standby)

Faro diesel consists of several buildings and two modular units – FD-3 & FD-5 – with FD-7 located in its own building. FD-1, which is a decommissioned unit up for sale is also located in its own, building. FD-2 & FD-5 have been relocated to Mayo and FD-6 has been relocated as our mobile unit – YM-1 and presently sits in Dawson.

Risks and Procedures For Faro Diesel Plant

1) Emissions to air: Similar to Whitehorse diesel plant emissions.

2) Releases to water: Not relevant
3) Waste management:
- Disposal of waste oil used in plant (stored in containers on site, hauled into Whitehorse)
- Disposal of solid waste, i.e. absorbent material, etc., is collected and eventually removed to Faro landfill site.

4) Contamination to land:

Steps taken to mitigate an oil or fuel release are:

- Absorbent material in Mirrlees building (FD-1)
- Plants cleaned weekly
- Spill containment kit on-site
- Operations trained in spill response
- Spill response manual on-site
- Decommissioned 1,000,000l fuel tank
- Commissioned new 110,000l, bermed fuel tank
- Minimal oil drums storage in plant. We rely on suppliers to store oil.
- Plant checks daily

5) Use of raw materials and natural resources:

- Oil

6) Other local environmental or community issues: Similar to Whitehorse

7) Existing Practices and Procedures: Similar to Whitehorse

C.3 ALTERNATE ENERGY GUIDELINES/PROCEDURES

C.3.1 Whitehorse Wind

The Whitehorse wind site is located on Haeckel Hill at an elevation of 1430 metres. The site presently consists of two wind turbine units. The first to be installed in 1993 is a Bonus-150kW generating unit. The second unit installed in 2000 is a Vestas-660kW generating unit. YEC also have a number of wind monitoring towers throughout the Yukon to gather wind data to assess the viability of additional wind power sources in the Yukon.

Permits required:

- Development permit issued by the City which allows up to 5 turbines in the area
- Environmental impact assessment (EIA) performed in 1992. Issues were effects of noise and visibility factors on native species of wildlife. Five-year bird study found no issues with bird strikes.

Risks and Procedures For Whitehorse Wind

1) Emissions to Air: Not relevant

2) Releases to Water: Not relevant

3) Waste Management:

- Disposal of waste oil during maintenance activities is removed from site.
- Disposal of solid waste, i.e. absorbent material, etc., is removed from site.

4) Contamination of Land: not relevant

5) Use of Raw Materials and Natural Resources:

- Use of wind

6) Other local environmental and community issues:

-

7) Existing Practices and Procedures:

- Procedures for semi-annual maintenance
- Site security and attempts to minimize vandalism
- Public Safety near structures – signage to warn of potential hazards

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Transmission & Distribution Systems

C.4 Standard Construction & Maintenance Best Practices

C.4.1 Centre Line Survey

1) Objectives

Centre line clearing is undertaken during the pre-construction phase of transmission and/or distribution lines. Clearing is normally contained within one (1) metre width, thus the amount of vegetation that is removed is limited. Any vegetation cut down is normally left near the centre line.

Permits are not required unless the width of clearing is >1.5m and the total area cleared exceeds 4ha.

2) Access

Existing accesses shall be identified prior to centre-line-survey clearing. Existing accesses include any highway, road, or trail that has been approved for use by permit.

- In areas where the right-of-way borders, or is partly within a highway right-of-way, clearing within the highway right-of-way will be carried out in accordance with Government of Yukon Dept. of Highways "*Permit for Work within the Right-of-Way*" issued pursuant to the Highways Act. Such a permit contains conditions respecting safety precautions, damage repair, traffic restrictions, burning and disposal of slash, access roads, campsites, and inspection by Road Foreman.
- In all other areas, a Land Use Permit (LUP) is required in accordance with federal/territorial *"Territorial Land Use Regulations"*. Resource Management Officers (RMO's) are responsible to ensure the terms and conditions of the LUP are adhered to.
- Where trails are used for access, these will be clearly identified and flagged in the field prior to clearing.
- New accesses required for clearing will be clearly identified in the field, and will be constructed/reclaimed in accordance with appropriate permits.

3) Methods & Equipment

- Use existing accesses wherever possible
- Hand held equipment only
- Removal of all debris and garbage from the area
- No fording of streams or open water with equipment – access using conventional road/trail access to reach either side of water body
- Cease operations if uncover heritage resources and notify the closest RMO or YTG land use inspector

4) Schedule

Preference is to schedule this activity with snow cover in place so that risk of fire is minimal and damage to soil/vegetation is minimal. Also working on frozen ground when possible minimizes disturbance of ice-rich ground (permafrost).

C.4.2 Right-Of-Way Brushing

1) Objectives

The clearing and brushing of forest and brush vegetation is required for the construction of a transmission line. Power line rights-of-way are cleared initially to allow the power line to be installed, and are kept clear of vegetation so that trees and shrubs do not come in contact with the power line. The key objectives during this phase of construction are:

- Minimize disturbance of vegetation and ground surface outside of the permitted areas
- Minimize risk of wildfires
- All work carried out adjacent to watercourses to be done in accordance with Department of Fisheries and Oceans (DFO) requirements
- Employ appropriate safety measures to prevent hazard to workers and the public

2) Access

Existing accesses shall be identified prior to right-of-way clearing. Existing accesses include any highway, road, or trail that has been approved for use by permit.

- In areas where the right-of-way borders, or is partly within a highway right-of-way, clearing within the highway right-of-way will be carried out in accordance with Government of Yukon Dept. of Highways "*Permit for Work within the Right-of-Way*" issued pursuant to the Highways Act. Such a permit contains conditions respecting safety precautions, damage repair, traffic restrictions, burning and disposal of slash, access roads, campsites, and inspection by Road Foreman.
- In all other areas, a Land Use Permit (LUP) is required in accordance with federal/territorial *"Territorial Land Use Regulations"*. Resource Management Officers (RMO's) are responsible to ensure the terms and conditions of the LUP are adhered to.
- Where trails are used for access, these will be clearly identified and flagged in the field prior to clearing.
- New accesses required for clearing will be clearly identified in the field, and will be constructed/reclaimed in accordance with appropriate permits.

3) Methods & Equipment

In areas that are not underlain by ice-rich soils the clearing is typically done with large size bulldozers equipped with brush rakes, hydro-axes, feller-bunchers and chainsaws. Trees that are not salvaged are piled and burned.

4) Schedule

To the extent possible, right-of-way clearing will be carried out in late fall or winter. Scheduling clearing activities during the winter accomplishes several objectives;

- Minimizes the risk of forest fires
- When the ground is frozen, soil compaction and disturbance of ground cover is minimized
- This period is outside the nesting period for birds (April-July), thus avoiding any direct disturbance of active nests, and/or disturbance of nesting birds in adjacent forest/shrub habitats.

5) Removal of Danger Trees

Danger trees are defined as:

- Defective, or

- Likely to hit, damage or come in contact with or within the flashover distance of any portion of the transmission/distribution system. See Section C.4.3 - Figure 1

Danger trees includes any tree that poses a threat to public safety and/or system integrity if it should fall directly onto the power line or pass within the flashover distance. Danger trees are often removed from priority rights-of-way where system integrity is a key concern, and/or the threat of initiating wildfire is high. Danger trees can be located beyond the limits of the licenced right-of-way.

Management of danger trees is as follows:

- There will be a tree management zone identified adjacent to the cleared right-of-way. This zone is defined as including any tree that, upon falling, could potentially reach the flashover distance of transmission/distribution lines, within a 10-year time period.
- Any danger trees that are within this zone shall be removed to minimize the risk of damage to the transmission/distribution lines, and the risk of a fire.
- The limits of clearing will be clearly flagged in the field prior to clearing and obtaining the appropriate permits.

6) Third-Party Land Interests

In the event that the right-of-way crosses privately owned lands including First Nation Settlement Lands, prior approvals, such as registered easements, will be obtained from the landowner/First Nation. Landowners/First Nations will be contacted prior to clearing of the right-of-way.

7) Timber Salvage on Crown Lands

- All salvageable timber will be identified by a forest officer and be limbed and decked for disposal according to their direction.
- Salvageable timber shall be stacked only in designated areas within the right-of-way and removal should be done to minimize interference with construction activities and operations.
- Timber not suitable for milling will be limbed and piled for use as firewood
- All remaining debris shall be piled and burned within the right-of-way, in accordance with the terms and conditions of any *"Timber Permit"* issued pursuant to the *"Territorial Lands Act – Yukon Timber Regulations"*.
- In general, burning of debris shall be done during the late fall or winter to minimize fire hazard, and slash piles shall be of a size to ensure controlled burning occurs.

8) Timber Salvage on Settlement Lands

Timber salvage on First Nations lands will be in accordance with the terms and conditions as set out by the First Nations Lands Department or as agreed upon as part of a Project and Benefits Agreement.

C.4.3 Water Bodies, Wetlands & Stream Crossings

Riparian zone vegetation benefits adjacent watercourses by providing sources of large woody debris, bank stability, a source of nutrients, temperature control, and acts as a contaminant filter. As such, riparian vegetation is included within the Fisheries Act as fish habitat. It is an offence to alter, disrupt, or destroy fish habitat without authorization as per "*Fisheries Act, Section 35, 1-2*".

1) Objective

To preserve the environmental integrity of the watercourse or wetland crossed by the transmission line and/or any associated right-of-way access. This will, in turn, minimize the risk of damage to fish and fish habitat.

2) Regulatory Approvals

All required approvals would be obtained from the Department of Fisheries and Oceans (DFO) prior to commencement of clearing. (A single regulatory approval under the Fisheries Act for any given transmission line project is desirable and achievable through the development of approved work practices. These practices would be developed and agreed to by both DFO and YEC, and could encompass both line construction and maintenance activities).

3) Methods & Equipment

Equipment fording through watercourses will not occur unless approvals have been obtained from DFO, therefore direct impacts to water-bodies and wetlands should not occur. Potential effects on water-bodies and wetlands are associated primarily with the removal of vegetation from/disturbance of stream resulting in erosion and sedimentation, and the potential release of hazardous material into watercourses.

- The limits of the 30m clearing adjacent to/crossing of the water course shall be clearly flagged prior to clearing
- Buffers of shrub and low-growing vegetation will be left undisturbed, thereby minimizing potential impact to riparian habitat and stream sedimentation.
- Removal of vegetation within 30m of watercourses will be done using hand methods only. These methods include use of chainsaws, and pruning the tops of taller trees
- No trees or vegetation shall be deposited in the water body.
- Any mulching of debris must be performed outside the riparian zone.
- Access to water crossings will be from either side of the stream/river, via an established road crossing.

4) Erosion & Sediment Control

Sediment entering a watercourse can have adverse effects on water quality, which in turn has a potential effect on fish and fish habitat. The *Fisheries Act* requires that fish and fish habitat be protected from destruction and the introduction of deleterious substances. Excessive sediment is well recognized as a deleterious substance to fish and their habitat, Measures aimed at preventing erosion, and thus potential sedimentation, are much more effective than measures aimed at controlling erosion once it occurs.

During brushing of the right-of-way, the following erosion control measures will be employed:

- Vegetation that is integral to fish habitat and/or bank stability (i.e. the plant's roots form part of the stream bank) should not be removed.
- Minimize the ground disturbance within 30m of a watercourse. Ground cover should be left intact, and only those trees and shrubs that will interfere with the power line will be topped/pruned.
- Any topsoil removed from the right-of-way will be stockpiled within the right-of-way, but outside the riparian vegetation zone.
- Sediment control barriers will surround stockpiled topsoil.

C.4.4 Permafrost

Maintenance of the surface conditions is a primary concern when working in ice-rich permafrost areas. Thermal balance provided by vegetation has a direct influence on the stability of the surface. It is widely recognized that permafrost thaw occurs after a forest fire because the surface vegetation has been at least partially removed, thus allowing more heat to penetrate the ground. Removal of trees along a right-of-way will reduce the amount of shade over the ground, a significant factor at these latitudes. Disturbance of the surface cover may result in increased heat transfer into the soil during the following summer, followed by increased thawing, subsidence and poor drainage. Once initiated, this cycle is self-perpetuating, and difficult to mitigate. In short, disturbance of vegetation ground cover may result in increased thawing of the underlying soils, excess water and unstable foundations for structures.

1) Objectives

The objective is to identify those areas along the right-of-way that are ice-rich, and to minimize the disturbance of the ground vegetation and leave the other organic material in place as ground insulation. Detailed terrain mapping will be completed during the planning phase of the transmission line projects, to identify permafrost areas and ice-rich organic soils.

2) Methods & Equipment

The following methods will be employed in areas of ice-rich permafrost:

- To the extent possible, all clearing activity shall be carried out during the winter when the ground is frozen and snow provides additional ground insulation.
- If clearing is carried out on non-frozen ground conditions, the work shall be done by hand clearing methods only.
- In areas underlain by ice-rich soils, the *Yukon Highway Standard for Minimal Disturbance Clearing* shall be adopted. This specification requires that all woody material and surface debris be cut to within 30 cm of the ground surface.
- Only equipment that does not remove the organic ground surface shall be used.
- Existing under-story vegetation shall be maintained in areas where trees are removed to minimize ground disturbance and control erosion. Trees and brush that has a mature height of less than 3 m and conifers less than 2 m high shall not be felled.
- No burning shall occur on permafrost areas. Non-salvageable vegetation shall be left to decay naturally.
- If the ground vegetation is disturbed, the damaged surface will be immediately replaced with wood chips/mulch to provide insulation of the soil surface.

3) Monitoring

Sensitive permafrost areas will be inspected on the ground in early spring (after snowmelt) and again in August (when thaw depth is at its maximum) to observe any changes in ground conditions, ponding etc. along the cleared right-of-way. Any necessary remedial actions will be taken as early in the season as possible to prevent the initiation of permafrost degradation.

C.4.5 Heritage Resources

1) Objectives

Linear development projects such as transmission lines have the potential to affect heritage and archaeological resources during line construction and maintenance. It is important, therefore, to

identify the location of heritage resources along the new transmission line rights-of-way prior to construction, and to incorporate measures into the final design of the project that will avoid, or minimize any adverse effects on these resources. The objective, therefore, is to identify all heritage resources along the right-of-way and associated access trails, and to adopt measures that will avoid disruption of these resources during line construction and long-term maintenance.

2) Heritage Resources Assessment and Management Plan

A Heritage Resource Assessment will be carried out as part of the initial environmental assessment of a new transmission line project. This will identify areas of known heritage sites and note areas of highest potential for heritage resources. This information will be used to identify a preferred route for the transmission line. Following the centreline survey, a detailed heritage assessment along the right-of-way will be performed. Areas of concern will be identified, and the results of this heritage resource assessment will be incorporated into a Heritage Resources Management Plan. During the final design stage of the project, every effort will be made to avoid conflicts with identified heritage sites.

Where necessary, sites will be properly flagged in the field, and any new sites that may be identified during construction will also be flagged. Construction activity in proximity to any new site will cease until the Lands Inspector indicates that work can resume in the area.

C.4.6 Construction Work Sites/Camps

1) Objectives

To minimize the environmental effects arising from the establishment of temporary work camps in remote locations.

2) Camp Locations

To the extent practical, the use of remote work camps will be minimized. It is preferred that crews commute from nearby communities to the extent practicable. Where this is not feasible, then temporary camps will be located in abandoned gravel pits or other previously disturbed areas in close proximity to the work site/access roads if at all possible. The specific location of remote campsites will be in accordance with any regulatory approval.

3) Fuel Storage and Delivery

Fuel will be hauled directly to the campsite in approved containment carriers and transferred directly to equipment. In the event that bulk fuel storage tanks are required, double-walled enviro-tanks will be used to contain potential spills. (See: Emergency Response – Spills)

4) Site Clean-up

Work camps will be cleaned-up in accordance with regulatory approvals. All equipment, temporary structures and materials will be removed from the site. All debris and waste will be removed from the site to an appropriate disposal facility.

C.4.7 Emergency Response

As part of any major transmission or distribution line construction project, Yukon Energy will develop an Emergency Response Plan that will address at least the following potential emergency situations:

- Accidental spills
- Storage and Handling of Hazardous Materials
- Sediment Release to Water Courses
- Fire Protection Plan
- Wildfire Response Plan

The standard work practices pertaining to each of these potential emergencies is outlined below.

1) Spill Contingency Plans

The Spill Contingency Plan for Jobsites is an important part of the EMS and must be adhered to. YEC is responsible to ensure all contractors are trained and briefed on spill reporting procedures. All contractors shall comply with any Land Use Permit (LUP) or Licence of Occupation (LOO) or other applicable permits pertaining to hazardous materials.

2) Storage & Handling of Hazardous Materials

The proper storage and handling of hazardous materials is important in preventing spills or other potential hazardous accidents.

- Hazardous material should be stored in clearly labelled, approved and sealed containers
- Hazardous materials are not to be stored within 100m of a watercourse
- Waste materials including soiled rags, sorbent pads containing oils, chemicals, liquid fuels, lubricating oils or other potentially toxic and hazardous waste materials should be disposed of at an approved facility
- Fuel storage areas should be regularly inspected and fuel containers monitored for unexplained losses
- Smoking and lighting of matches and lighters or other ignition sources should not occur in fuel cache areas
- Fuelling of trucks and other machinery should not occur within 100m of a watercourse
- Fuel drums should have a catch basin beneath them
- All stationary petroleum and allied petroleum tanks shall be marked with identification
- An inventory of hazardous materials is to be maintained by the project leader

3) Sediment Release to Water Courses

Sediment can reach a watercourse if sediment controls are not in place, not installed properly, or have been damaged. Sediment is known as deleterious substance to fish. Upon release of sediment into a watercourse the following steps should be taken immediately:

- Department of Fisheries & Oceans (DFO) or local Fisheries Officer should be notified immediately
- The source of the spill should be blocked or diverted away from the watercourse
- A record of volume and source of the spill should be estimated for file records

- If the watercourse contains flowing water at the time of sediment release, the flow of the water should be slowed by installing permeable barrier(s) such as rip-rap or straw bales downstream of the spill location. This will allow the sediment to settle out and minimize the amount of sediment transfer downstream. Sediment release into large and fast flowing watercourses may be difficult to contain.
- If the watercourse does not contain flowing water at the time of sediment release, sediments should be removed without disrupting the streambed.
- Determine to which point downstream the sediment reached and determine if the release has the potential to cause harmful effects to water quality and fish habitat
- Erosion and sediment control measures for the area should be reassessed and in turn installed, reinforced, repaired, or replaced to ensure that the potential for future sediment release is minimized.

4) Fire Protection Plan

- All chainsaw operators shall carry 1 fire extinguisher Type ABC containing a dry chemical powder-type of not less than 1lb
- All equipment shall be equipped with not less than a 5lb Type ABC fire extinguisher
- All operations shall be equipped with a fire toolbox containing a set of:
  - Water back tanks (1 per chainsaw operator)
  - Shovels
  - Axes
  - Hose
  - One water pump
- All operations shall have a means of communications
- All equipment and chainsaws shall be provided with a spark arrester or approved spark arresting device.
- All operations shall take the following precautions:
  - Storing fuel products – gasoline, fuel oil, grease and other highly flammable materials in areas cleared of debris with an 8m cleared radius
  - Welding – flammable debris and vegetation must be removed from within a minimum of 3m radius – provision of a shovel and a 5 gallon standard backpack filled with water and a hand pump
  - Campfires not permitted during fire season between May-September. Campfires only permitted in an emergency for food and warmth
  - Stovepipes for wood burning stoves shall be equipped with roof-jacks and serviceable spark arrester of mesh with openings no larger than 5/8”
  - Smoking – care shall be given while smoking not to start a fire. Matches and butts shall be thoroughly extinguished

5) Fire Fighting Plan

In the event a forest fire occurs or a burn becomes out of control the following procedure shall be followed:

- Try to extinguish a fire or spark before it becomes uncontrollable by using an extinguisher, dirt, snow, shovels, or a piece of heavy equipment
- Contact the project leader or SCC to report the incident or fire
- The project leader or SCC shall contact the Fire Centre at 1-800-798-3473

- All sites shall lend their resources to assist the fire extinguishing operation
- Upon leaving the fire zone, alert other personnel and evacuate the area
- Each site shall have an evacuation plan. The plan shall outline best evacuation paths to take to the highway, meeting place and a designated person to perform an employee count

6) Burning

Burning between April 1st and September 30th will require:

- Burning permit
- Fire plan
- Fire toolbox
- 24hr watch on fire
- 200 gallon water tank with pump

Burning between September 30th and April 1st will require:

- Notification of burn to the nearest Forestry Officer
- Fire plan
- Fire toolbox
- Watch on fire

All burn areas shall be inspected in the spring
Tires, used oil or gasoline shall not be used for starting or maintaining a burn
In the event of a burn becoming uncontrollable, equipment will be redirected to the fire

7) Checklist of Emergency Equipment Required on Site

A checklist of equipment that is required on-site to appropriately respond to the above emergencies is required. It will be the responsibility of the project leader to ensure that the appropriate equipment is on-site and readily accessible at all times during any brushing and clearing stages

C.4.8 Right-Of-Way Maintenance (Vegetation Control)

1) Objectives

Contact of vegetation with high voltage power lines can have serious consequences. When a branch or tree contacts or comes close to a high voltage line, the electrical current can arc across from the line to the tree, resulting in:

- Power outages
- Fire
- Fallen energized lines and/or trees that create a serious public safety hazard.

The management of vegetation in and adjacent to YEC's rights-of-way is done to ensure public safety and safeguard the reliability of the system. Yukon Energy manages vegetation along two types of power line corridors that have similar, but not identical vegetation management requirements. These are:

Transmission Line Corridors:

Transmission lines move high voltage electricity (69kV – 138kV) between generation stations and substations, or between substations. The rights-of-way for transmission corridors are up to 60.96m wide and at least 40m are maintained, usually located on crown land and in some cases parallel to the major highways. The standard for maintaining vegetation along transmission corridors is determined by assessing the limits of approach (the distance a person, machine, or conductive material can safety approach energized conductors). Limits of approach to energized lines are regulated by the *"Alberta Electrical & Communication Utility Code (AECUC)*. Danger trees are visually identified and usually removed by hand.

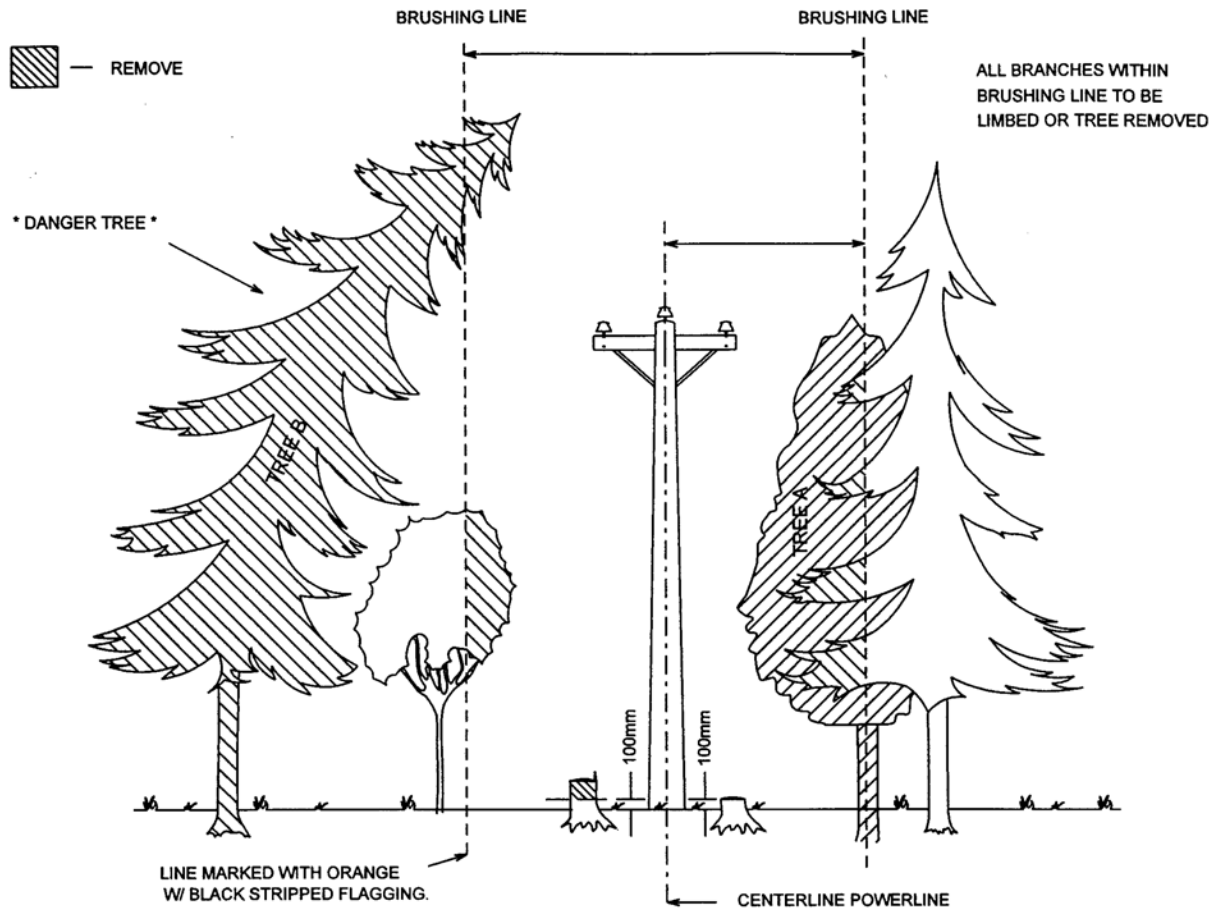
Clearance to Transmission Lines 69kV – 138kV	
Overhead clearance	No vegetation overhang is permitted
Centreline clearance	• 16m - 20m from centreline

Distribution Corridors:

Distribution corridors are narrower (10m to 30m wide) and contain relatively low voltage (2.4kV to 25kV) circuits that normally run adjacent to or within road rights-of-way. Distribution lines distribute electricity to customers. Vegetation management along distribution corridors is done to a standard that ensures that vegetation does not contact the circuit. This standard usually dictates that there is a minimum clearance between trees and the conductors, even if it means removing or pruning trees growing outside the right-of-way.

Clearance to Distribution Lines 2.4kV – 25kV	
Overhead clearance	No vegetation overhang is permitted
Centreline clearance	• 7.5m from centreline on 3 Ø primary • 4m from centreline on 1 Ø primary • 1.5m from centreline on secondary

Figure 1



Important

1. All trees, limbs, deadfall and brush to be removed between brushing lines indicated with orange w/ black stripped flagging
2. Limbing must be completed to top of tree at brushing line or the tree removed
3. All stumps to be cut flush or as close as possible to the ground, not to exceed 100mm from ground level
4. All trees leaning toward the brushed right-of-way are considered “Danger Trees” and must be removed
5. All dead or rotting trees adjacent to the right-of-way must be removed
6. All flagging done on-site indicates absolute minimum brush removal. The right-of-way is to be cleared of all vegetation and obstacles that are incompatible with the operation of an electrical system

2) Access

Existing accesses shall be identified prior to right-of-way maintenance. Existing accesses include any highway, road, or trail that has been approved for use by permit.

- In areas where the right-of-way borders, or is partly within a highway right-of-way, access will be carried out in accordance with Government of Yukon Dept. of Highways "*Permit for Work within the Right-of-Way*" issued pursuant to the Highways Act. Such a permit contains conditions respecting safety precautions, damage repair, traffic restrictions, burning and disposal of slash, access roads, campsites, and inspection by Road Foreman.
- In all other areas, a Land Use Permit (LUP) is required in accordance with federal/territorial *"Territorial Land Use Regulations"*. Resource Management Officers (RMO's) are responsible to ensure the terms and conditions of the LUP are adhered to.
- Where trails are used for access, these will be clearly identified and flagged in the field prior to maintenance.
- New accesses required for maintenance will be clearly identified in the field, and will be constructed/reclaimed in accordance with appropriate permits.

3) Methods & Equipment

Transmission Lines:

The principle methods of vegetation maintenance are tree removal (slashing), tree topping/pruning, and hydro axe mowing. Herbicides are not used to manage vegetation along the rights-of-way.

Slashing is the removal by hand of vegetation that will eventually grow into the power lines. It is a common method involving tools such as chainsaws, circular brush saws, or other hand-held equipment. In some areas, hand slashed trees that are over 10cm diameter are limbed and stacked. Smaller trees are felled and left to decay naturally. Burning is not normally permitted.

In occupied areas, trees are normally chipped and the chips left to decay.

Pruning involves the removal of tree branches away from the lines and is done by contractors that are trained to work close to high voltage lines.

Mowing cuts vegetation with heavy-duty rotary or flail cutters. A tractor or front-end loader is equipped with the cutter and driven over the ROW to cut target species. The mulch is left on the right-of-way.

Distribution Lines:

Vegetation management along distribution lines is done primarily by pruning/tree topping, and some tree removal in residential areas. Mowing is done in rural areas.

Removal of Danger Trees:

Danger trees will only be removed by a qualified arborist or qualified workers in compliance with *"Section 4-Division H"* of the AECUC book. During brushing activities, danger trees are identified by Yukon Energy in accordance with Section 4.2 (5) and Section C.4.8 – Figure 1

4) Riparian Areas

The objective in managing riparian vegetation is to maintain as much existing shrub and tree vegetation within the riparian zone as possible. In many situations, removal of target vegetation allows desirable plants and under-story vegetation to thrive. Riparian vegetation is included within the Fisheries Act as fish habitat. It is an offence to alter, disrupt or destroy fish habitat without authorization as per "*Fisheries Act, Section 35, 1-2*". The riparian zone is defined as the area within

30m of a watercourse. Removal of vegetation within the riparian zone is limited to tree topping/pruning using hand held equipment. Any vegetation that is removed is not allowed to enter the watercourse. Any mulching is done outside the riparian zone to ensure that debris does not enter the watercourse, and to ensure that the stream bank vegetation and soils are undisturbed. See Section C.4.4 (3).

5) Maintenance Schedule

The maintenance schedule is based on an annual air survey to determine the areas of concern. In general brushing is done not more than once every seven (7) years. Normally brushing is carried out in early/late fall, outside the nesting period for birds (April-July), thus avoiding any direct disturbance of active nests, and/or disturbance of nesting birds in adjacent forest/shrub habitats.

6) Heritage Site Identification and Avoidance

For all planned brushing activities, known heritage sites will be identified prior to the activity being performed. Where necessary, sites will be properly flagged in the field, and any new sites that may be identified during maintenance will also be flagged. Maintenance activity in proximity to any new site will cease until a Lands Inspector indicates that work can resume in the area.

C.4.9 Line Maintenance (Transmission & Distribution)

1) Objectives

To minimize any potential environmental effects arising from line maintenance activities.

2) Access

Existing accesses shall be identified prior to planned maintenance activities. Existing accesses include any highway, road, or trail that has been approved for use by permit.

- In areas where the right-of-way borders, or is partly within a highway right-of-way, access will be carried out in accordance with Government of Yukon Dept. of Highways "*Permit for Work within the Right-of-Way*" issued pursuant to the Highways Act. Such a permit contains conditions respecting safety precautions, damage repair, traffic restrictions, burning and disposal of slash, access roads, campsites, and inspection by Road Foreman.
- In all other areas, a Land Use Permit (LUP) is required in accordance with federal/territorial *"Territorial Land Use Regulations"*. Resource Management Officers (RMO's) are responsible to ensure the terms and conditions of the LUP are adhered to.
- Where trails are used for access, these will be clearly identified and flagged in the field prior to maintenance.
- New accesses required for maintenance will be clearly identified in the field, and will be constructed/reclaimed in accordance with appropriate permits.

3) Methods & Equipment

Equipment Travel

Equipment travel and access to the transmission/distribution lines in permafrost sensitive terrain will be made on a site-specific basis in an effort to minimize environmental impact. Methods will depend on specific site conditions, weather conditions, and depth of snow and access availability. Communication with RMO's will be important in determining the method of least impact.

Rubber tired vehicles will be used under the appropriate conditions (e.g. hard packed snow), and as authorized by the RMO's.

On terrain not affected by permafrost sensitive terrain, equipment travel within the right-of-way will be from structure to structure along a common trail. Travel outside of this trail will be minimized. Travel as such will be so as not to alter the natural drainage patterns in the area.

Pole Structures
To minimize ground disturbance, diggers and augers will be used to dig holes for replacement poles. A backhoe will only be used when ground conditions prevent augering to the appropriate depth.

In areas not affected by permafrost sensitive terrain, a pole trailer will be used to transport replacement poles on the right-of-way. In some instances the poles may be dragged to their appropriate area.

On permafrost sensitive terrain, poles may be transported by rubber tired under the appropriate conditions (e.g. hard packed snow, frozen conditions, etc.) and as authorized by the RMO's. Poles shall not be dragged.

For permafrost sensitive terrain, sawdust and/or wood chips or other acceptable material will be placed around the base of the pole for additional insulation of the ground.

Other Measures

- Remedial measures shall be developed on a site-specific basis if rutting or gouging occurs due to equipment travel. This may include temporary suspension of overland travel.
- No litter of any kind shall occur.
- All worksites should be maintained in a tidy condition, free from the accumulation of waste products, debris and litter so wildlife are not attracted.
- Refuelling of equipment should occur on hardened surfaces, where possible, and care taken to avoid spillage. Equipment used for maintenance should be in good working order, devoid of any leaks.

4) Pole/Cross-arm Treatment

Purchasing
Poles/cross-arms shall be treated to the applicable CSA industry standards or other utility standards that are consistent with or more stringent than CSA standards.

Storage Facilities
Poles/Cross-arms shall be stored at our present warehouse or other storage facilities. Storage areas shall be established in such a manner as to prevent risk of any offsite movement of treatment products and/or residuals that may leach off.

Sensitive Environment Sites
Consideration will be given for using alternatives to treated wood products in areas that may be sensitive in terms of the environment and human health, such as areas in close proximity to potable water supplies and aquatic resources. Alternatives can include wood treated with preservatives that do

not contain Canadian Environmental Protection Act (CEPA) toxic substances or products made with alternate materials (e.g. composites, concrete, or steel).

5) Pole/Cross-arm Replacement/Disposal

Salvaged material will be reused/recycled where practicable. A record of treated wood taken out of service is required to ensure any means of disposal will consider the environmental impacts.

Whenever the transfer of possession of treated wood occurs, every reasonable effort to include an advisory for the subsequent user that details:

- That the wood has been treated with a wood preservative; and
- Any suggested practices relating to its possible future handling and use including (but not limited to):
  - Not using treated wood in residential interiors;
  - Not using treated wood where the preservative may become a component of food or animal feed (e.g. structures for storing silage or food) or bedding;
  - Not using treated wood where it may come in contact with potable water sources;
  - Not burning treated wood; and
  - Not using treated wood in applications where structural integrity is important (unless certified by a qualified professional).

6) Public Safety

As a standard, guards will be installed on all guys. Guy guards that are missing will be replaced during regular maintenance.

7) Transformer Replacements/Disposal

Transformers will only be replaced by other transformers that have had their insulating oil tested and certified that it contains no PCB's in excess of 10ppm.

Transformers with more than 10ppm of PCB's will be considered as hazardous waste and disposed of through the *"YTG-Hazardous Waste Disposal Program"* on a yearly basis.

All other transformers will have their insulating oil drained for filtering and reuse/recycling. The remaining carcass will be recycled as scrap metal.

8) PCB Testing

All transmission and distribution equipment containing insulating oils will be tested for PCB's and recorded. PCB readings in excess of 10ppm will be either removed from service for disposal and/or flushed till readings are no longer in excess of 10ppm.

9) Field Spill Response

When removal/replacement of transformers is required, any environmental release in the field shall be reported in compliance with the *"Job Site Spill Contingency Plan Reporting Procedures"*. At least one on-site vehicle will contain a *"Spill Response Kit"* as indicated in the procedure.

C.4.10 SUBSTATIONS

The standard work practices/procedures pertaining to substation activities is outlined below.

1) Containment
   Where feasible, large transformers that are situated in substations near areas that are environmentally sensitive such as areas in close proximity to potable water supplies and aquatic resources, secondary containment will be considered.

2) Vegetation Control (within fenced perimeter and outside)
   For the majority of the time, pulling by hand and/or use of a powered weed-wacker can accomplish vegetation control. Use of herbicides will be limited to contracted services by a qualified company.

3) Public Safety
   Substation fencing shall conform to the standards set out in the Alberta Electrical and Communication Utility Code (AECUC) book.

4) Transformer Replacements/Disposal
   Similar to C.4.9 (4)

5) PCB Testing
   Similar to C.4.9 (5)

6) Spill Response
   Similar to C.4.9 (6)

C.4.11 OVERALL GUIDELINES

This table summarizes some of the potential impacts and mitigation measures outlined in Section C.4. Note that the table is a summary only. Understanding and adherence to the mitigation measures outlined are the employees' responsibility.

Resource / Category	Potential Impacts	Mitigation Measures
Fish and Fish Habitat	• Deleterious material (e.g., sediments, fuels) release to watercourse • Destruction of fish and fish habitat	• Effective erosion and sediment control shall be put in place prior to construction activities, where needed • Storage of hazardous materials is not to occur within 30m of a watercourse • Hauling of hazardous materials across watercourses shall not occur • Contingency plans for deleterious release in watercourses should be understood and followed in the event of a release
	• Disturbance to riparian vegetation, damage to stream beds, stream bank disturbance, destabilization, erosion from: - Fording, - Equipment access / construction in proximity to stream/riverbanks - Construction of ice or snow bridges across watercourses	• Maintain at a minimum a 10m leave strip (no disturbance zone) from the stream bank • Minimize, to the extent possible, access to riparian areas (usually within 30m of streams) • Unless authorized in writing by DFO and the RMO, the banks and beds of streams shall not be disturbed or crossed/forded with equipment • If ice-bridges are required, DFO is to be contacted not less than 10 days prior to proposed start of such activities. The district RMO shall also be contacted
Permafrost	• Impacts on permafrost are related to increased heat transfer into the ground, causing thaw of ice-rich permafrost (sensitive permafrost). This can happen in several ways: - Increasing water depth over frozen ground - Removing vegetation that provides shade - Removing or damaging ground cover vegetation that provides insulation	• Scheduled maintenance during frozen conditions only. Only emergency work is to occur on permafrost sensitive areas during summer months. • Where possible, attempt to auger post holes rather than excavating with a back-hoe • Preserve ground cover. More insulation is provided by the ground cover vegetation, shrubs and trees resulting in less thawing, less water, less soil movement • Replace groundcover insulation layer if the ground cover has been rutted or disturbed. Replacements include wood chips, sawdust, straw, hay) • Maintain a buffer - area within 5m of a pole in permafrost sensitive areas should be treated with as much care as the pole location itself. • Maintain a distance from watercourses. The active layer is deepest and

Resource / Category	Potential Impacts	Mitigation Measures
		most variable under and very near bodies of water. Water warms up the soil considerably and if deep enough, year-round talik will be present. • Monitoring in at least spring and late summer is recommended to identify examine and mitigate for potential impacts to permafrost.
Vegetation	• Ripping, tearing or rutting of wetland (bogs, fens) vegetation by heavy equipment	• Limited equipment travel in wetland areas (i.e. permafrost sensitive areas), unless otherwise authorized by the RMO. Work during frozen conditions.
	• Clearing of vegetation along access routes and damage to adjacent vegetation	• Care should be taken to avoid damage to all vegetation not designated for removal. Clearing limits should be marked prior to operations in a particular area.
	• Disturbance to riparian (i.e., river or stream side) vegetation	• If clearing of vegetation in permafrost sensitive areas or within 30 m of watercourses, wetlands or water-bodies is required, clearing shall be done by hand • Equipment access within the riparian zone (usually within 30 m) should be avoided to the extent possible
	• Sediment release and soil stockpiling in vegetated areas has potential to cause soil compaction and suffocation of root systems	• Erosion and sediment controls should be used appropriately. The need for sediment control should be anticipated prior to construction in a given area. • Re-vegetation may be need in erosion prone areas
	• Compaction of vegetation, roots and soils from heavy equipment	• Unnecessary traffic, dumping, soil stockpiling and storage of materials in or adjacent to vegetated areas shall not occur- avoids unnecessary impact on the root zone of the trees. • To the extent possible, equipment should use a common trail while traversing along the transmission line ROW and use existing access routes, where possible.
Wildlife & Wildlife Habitat	• ***Moose:*** disturbance during spring calving • ***Bears:*** human-bear encounters • ***Waterfowl:*** lines avoid open waters, minimal impact, spring nesting • ***Raptors:*** design spans minimizes impact of electrocution, spring nesting • ***Small Mammals/Furbearers:*** minimal impact	• ***Moose:*** where possible, avoid work during mid May to mid June in areas known for calving • ***Bears:*** proper work & campsite sanitation and garbage disposal and bear safety training • ***Waterfowl:*** avoid nesting season • ***Raptors:*** avoid nesting season • ***Small Mammals/Furbearers:*** no mitigation required
Access Routes	• Erosion and sedimentation at access points due to access construction, and possible culvert installation	• Appropriate and effective erosion and sediment controls shall be put in place prior to construction at a particular access, which will prevent

Resource / Category	Potential Impacts	Mitigation Measures
		sediment release into watercourses, water-bodies, and wetlands • Re-vegetation may be required after construction activities are completed for areas that are susceptible to erosion • The construction of lines, trails and rights-of-way that parallel streams, shall not occur within 30 m of streams except at crossings, unless otherwise authorized in writing by an RMO.
	• Vegetation removal/clearing: - Existing access points - Minor upgrades at existing access points - New accesses • Merchantable timber removal (small amount)	• Clearing shall be minimized to the extent possible • Incidental damage to vegetation not intended for clearing shall be avoided. • Access through tree screens shall be avoided • Merchantable timber along the access routes shall be salvaged according to terms and conditions of any Land Use Permit, and Yukon Timber Regulations
	• Soil compaction at pole storage locations • Disturbance to permafrost sensitive areas (low potential impact)	• Lay-down areas are located in previously disturbed areas, therefore minimal impact. No mitigation required • See permafrost mitigation in this table above
	• Potential for start of forest fires	• Follow forest fire protection plan
	• Potential impact to trap lines, traps, snares	• Avoid covering or destroying traps or snares that may be found along the access routes. • Restore any trails used by trappers or hunters along access routes by slashing any and all trees that may fall across these paths or trails and by removing any other obstructions such as snow piles or debris that may be pushed across the trails.
Traversing Within the Right-Of-Way	• Alteration to the natural drainage patterns in the area due to rutting and gouging	• Travel on the right-of-way will be along a common trail. Minimize travel outside of the trail • Temporary suspension of travel during spring thaw/wet conditions • Filling in any ruts/gouging on completion of work
Historical Resources	• Transmission line route avoids identified historical resources	• If historical resources are identified, work in that area shall cease • The RMO shall be notified immediately
Placer Mining Claims	• Transmission line may conflict with placer mining activities • Greatest concern is alienation of access to portions of placer claims where transmission line being built •	• Cooperation Agreements to be negotiated between YEC and the Placer Miners
Other Lands	• Potential to abut or cross First Nations or other private lands	• Agreements to be negotiated between YEC and First Nations

Resource / Category	Potential Impacts	Mitigation Measures
		• Easements to be negotiated crossing private lands and First Nations lands

C.5 WHITEHORSE FISH HATCHERY

The standard work practices/procedures pertaining to fish hatchery activities is outlined below.

Regulatory Requirements: A water licence (MS94-005) governs the use of water at the Whitehorse Fish Hatchery. Operating conditions outline how the facility is to be operated in order to stay in compliance. Environmental aspect categories pertaining to the hatchery include: direct discharge to water, hazardous materials management, and biohazards. Water flowing through the facility becomes a direct discharge to the Yukon River after leaving the facility. The water licence requires daily, monthly sampling of water quality parameters and annual reporting. In order to remain compliant with the license, there would be no resulting significant impact. Hazardous materials are stored on site, however the usage is in a diluted state and not harmful. (MSDS sheets were requested to be on site for all these chemicals) The last potential impact was the category of biohazard. Biohazard is a release of a non-indigenous species into the Yukon River. It was ranked as follows: (1 x 2) + 3 + 2 + 2 = 9, therefore not significant. There were no significant aspects identified in the operation or maintenance of the hatchery.

The occurrence of a significant emergency situation at the Whitehorse Rapids Fish Hatchery is always a possibility. Various back-up systems are in place to deal with temporary interruptions to power and/or the water delivery; however, an emergency response plan has not been formalized. Specific guidelines should be established so that hatchery staff would be able to proceed with immediate mitigative action that has been approved in advance by all concerned.

The Whitehorse Rapids Fish Hatchery has operated since 1984 without major fish losses due to mechanical failure or disease[1]. Back-up power supply systems have generally been effective in preventing fish losses during power failures. Additional back-up systems for the facility have been installed in recent years and the emergency power distribution system has been upgraded. These improved measures should greatly reduce the likelihood of a major system failure and any subsequent loss of fish.

C.5.1 Emergency Response/Back-up Systems

Power Failure

The facility is equipped with a 62.5 KVW diesel generator, which can supply all the power necessary to operate during a grid failure. The generator system is fitted with a transfer switch, which automatically switches the power supply to the generator during a power failure. As long as fuel is supplied, the generator could operate the facility for an indefinite period of time.

Back-up well

In 1997, a well was drilled in the hatchery compound to serve as a back-up source of water in the event of problems with the main well supply. The back up well provides water of a similar quality and temperature as that of the main well. The back-up well is equipped only with a 5 hp pump, as opposed to the 15 hp pump in the main well; therefore, it can only deliver a portion of the water supplied by the main pump.

[1] *Fish losses occurred during the first year the facility operated, due to chlorine back flush. Water supply was then switched from city water to a new ground water well.*

Oxygen

The hatchery facility is currently being equipped with an automated oxygen delivery system (Point Four®), which is designed to monitor the dissolved oxygen levels in all Chinook tanks, and will supply oxygen to them as required, based on preset levels entered into a computerized controller. The freshwater facility will have available manually controlled oxygen distribution units.

Re-circulation

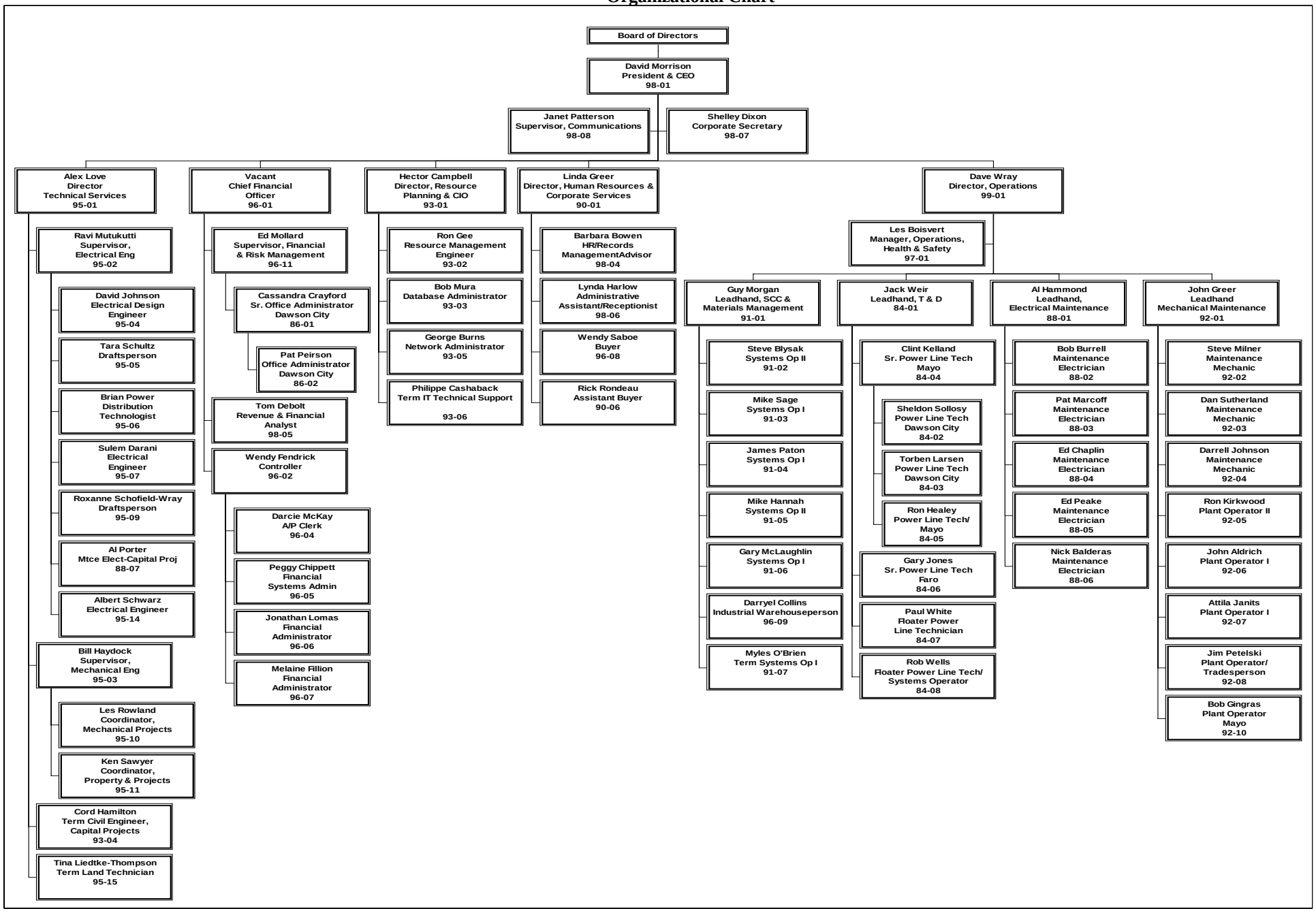
The current hatchery configuration did at one time allow for a temporary re-circulation system; however, this function is no longer available due to the unreliable nature of the old pumps that were used for this. A new re-circulation system has been budgeted, and is expected to be installed sometime late in 2002. The system will be designed in such a way that water can be re-circulated within the Chinook facility, in isolation from the freshwater facility. Re-circulating all the water would result in mixture of the water from the two facilities (Chinook and freshwater), and is not recommended

C.6 FISH LADDERS

Discussion was held to determine if any SEA's are involved in the operation of the Yukon Energy fish ladders. Clause 22 of the Whitehorse water license states "The licensee shall maintain existing fish passage facilities at the Whitehorse Rapids and Lewes Dams and shall ensure that the fish passage facilities at Lewes Dam are open and functioning from April 1 to November 15 of each year." A regulatory requirement pertaining to the ladders exists, therefore operation of the facilities are mandatory.

Other than the regulatory requirement, no significant aspects were arrived at. Categories discussed that did not result in significant rankings were blockages of the fish ladder and breach of the ladder. Blockages along the Whitehorse ladder have taken place and if fish are in jeopardy, they can be netted and driven over the dam. A breach of the ladder was not believed to have the potential of putting the retaining structures in danger.

Appendix D
Organizational Chart



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Appendix D

Structure & Responsibility Matrix

ISO elements	Breakdown of responsibilities	President & CEO/BoD	EMS Committee/ Management Review Committee	Senior Management	Resource Management Engineer	Director Operations	Director Technical Services	Director, Resource Planning & CIO	Project Leaders	Supervisor's / Leadhand's	Leadhand, Systems Control	Administration Assistant	Employees				
Section 3.0 - Environmental Policy	Changes to policy	X		X													
	Communicate to staff				X												
	Post controlled copies											X					
Section 4.1 - Environmental Aspects	Review / approve procedure		X														
	Ensures the SEA's within their department are considered				X	X	X	X	X	X							
Section 4.2 - Legal and other requirements	Operate within compliance with licence agreements				X	X											
	CEA reporting of ECR program							X									
	Interpreting legislation				X												
Section 4.3 - Environmental objectives, targets and management programs	Review / approve objectives & targets, indicator benchmarks KPI's, resource requirements	X															
	Review / establish objectives & targets			X	X	X	X	X	X								
	Document objectives & targets			X	X	X	X	X	X								
	Track progress of objectives & targets			X	X	X	X	X	X								
	Generate progress report for objectives & targets			X	X	X	X	X	X								
	Establish management programs for achieving objectives and targets			X	X	X	X	X	X								
	Document management programs			X	X	X	X	X	X								
	Approve management programs	X															
Section 5.1 - Structure and responsibility	Responsible for direction and resources	X															
	Ensure essential resources for EMS are identified			X	X	X	X	X	X								

Appendix D

Structure & Responsibility Matrix

ISO elements	Breakdown of responsibilities	President & CEO/BoD	EMS Committee/ Management Review Committee	Senior Management	Resource Management Engineer	Director Operations	Director Technical Services	Director, Resource Planning & CIO	Project Leaders	Supervisor's / Leadhand's	Leadhand, Systems Control	Administration Assistant	Employees				
	EMS co-ordinator				X												
	Maintain EMS structure and responsibility matrix				X												
	Address environmental issues within area of responsibility				X	X	X	X	X	X							
Section 5.2 - Training and Awareness	Schedule environmental awareness				X												
	Identify job specific training			X	X	X	X	X	X	X							
	Orientation				X	X	X	X	X	X							
	Ensure contractors are aware/trained to environmental issues				X	X	X	X	X	X							
Section 5.3 - Communication	Responding to and documenting external complaints					X											
	Review/approve communication procedure	X				X											
	Inform staff				X	X	X	X		X							
Section 5.4 - Document control	Review/approve control method	X										X					
Section 5.5 - Operational control	Review/approve "Operational Control/Maintenance Procedures" section of EMS					X											
	Ensure safe work planning process includes environmental risk assessment				X	X	X	X	X	X							
Section 5.6 - Emergency preparedness plans	Review/co-ordinate testing of emergency response plans & procedures				X	X											
	Approve/review emergency response procedures					X											
	Review/update hydro emergency preparedness plans				X	X		X									
Section 6.1 - Monitoring & measurement	Monitoring/measurement of objective/targets (KPI')			X													

Appendix D

Structure & Responsibility Matrix

ISO elements	Breakdown of responsibilities	President & CEO/BoD	EMS Committee/ Management Review Committee	Senior Management	Resource Management Engineer	Director Operations	Director Technical Services	Director, Resource Planning & CIO	Project Leaders	Supervisor's / Leadhand's	Leadhand, Systems Control	Administration Assistant	Employees				
	Ensure preventive maintenance procedure for calibration of monitoring/measuring equipment				X	X											
	Conduct compliance audits				X												
Section 6.2 - Non-conformance & corrective/preventive actions	Review incident investigation reports of non-compliance	X	X	X													
	Generate incident report for non-compliance			X	X	X	X	X	X	X			X				
	Generate incident investigation				X	X	X	X	X	X							
Section 6.3 - Records	Generate records for EMS activities			X	X	X	X	X	X	X	X		X				
	Calibration/preventive maintenance on environmental monitoring equipment					X											
	Environmental incidents internal/external communications					X											
	Training i.e. TDG, WHMIS, EMS awareness				X												
	EMS audits				X												
	Management of water licences/water storage				X												
	Month-end compliance regarding water storage levels/down-river flows										X						
	Reviewing records management procedure											X					
Section 6.4 - EMS audits	Conduct internal audits				X												
Section 7.0 - Management review	Review and make recommendations to the effectiveness of the EMS relative to the objectives and targets		X														
	Ensures recommendations are acted upon	X		X													
EMS Manual	Review/approve EMS Manual	X		X													
EMS Procedures	Produce procedures to mitigate environmental impact				X	X	X	X	X	X							

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Appendix E

YEC Generation Inventory

Location	Prime Mover Type	Serial #	Name Plate Capacity (kW)	MCR Rating (kW)	RPM	In-Service Date
Aishihik AH1	Hydro	1014	15,600	15,000	720	1975
Aishihik AH2	Hydro	1015	15,600	15,000	720	1975
Mayo MH1	Hydro	696	2,550	2,500	450	1951
Mayo MH2	Hydro	748	2,550	2,500	450	1957
Whitehorse WH1	Hydro	2754	5,800	5,800	300	1958
Whitehorse WH2	Hydro	2753	5,800	5,800	300	1958
Whitehorse WH3	Hydro	1234	8,400	8,400	200	1969
Whitehorse WH4	Hydro	1070	20,000	20,000	150	1984
Total Hydro				**75,000**		
Whitehorse WW1	Wind (Bonus)		150	150		1993
Whitehorse WW2	Wind (Vestas)		660	660		2000
Total Wind				**810**		

Appendix E

YEC Generation Inventory

Location	Prime Mover Type	Serial #	Name Plate Capacity (kW)	MCR Rating (kW)	RPM	In-Service Date
Dawson DD1	Diesel (Cat 3512)	67z00715	800	800	1200	1988
Dawson DD2	Diesel (Cat 3516)	73z00216	1,000	1,000	1200	1987
Dawson DD3	Diesel (Cat 3516TA)	73z00422	1,000	1,000	1200	1990
Dawson DD4	Diesel (Cat D399)	35b1280	700	700	1200	1975
Dawson DD5	Diesel (Cat 3606)	8rb00293	1,500	1,500	900	1996
YM1	Diesel (Cat 3516)		1,400	1,300	1800	1990
Mayo MD1	Diesel (Cat 3516)	73z0307	1,000	1,000	1200	1989
Mayo MD2	Diesel (Cat 3516)	73z0294	1,000	1,000	1200	1989
Faro FD1	Diesel (Mirrlees KV16)	64511	5,150	0	514	Retired 2001
Faro FD3	Diesel (Cat 3516)	73z0247	1,000	1,000	1200	1989
Faro FD5	Diesel (Cat 3516)	25z01988	1,400	1,300	1800	1990
Faro FD7	Diesel (Cat 3612)	9rc0071	3,000	3,000	900	1992
Whitehorse WD1	Diesel (Mirrlees KV12)	63371	3,920	3,920	514	1968
Whitehorse WD2	Diesel (Mirrlees KV16)	63381	5,150	5,000	514	1968
Whitehorse WD3	Diesel (Mirrlees KV16)	64441	5,150	5,000	514	1970
Whitehorse WD4	Diesel (EMD 20c)	74h11151	2,500	2,500	900	1975
Whitehorse WD5	Diesel (EMD 20c)	73j11044	2,500	2,500	900	1975
Whitehorse WD6	Diesel (EMD 20c)	90d11025	2,500	2,700	900	1990
Whitehorse WD7	Diesel (Cat 3612)	9rc0108	3,300	3,300	900	1991
Total Diesel				**38,520**		

Appendix F

Training Matrix

		First Aid	Safety Orientation	Rigging & Hoisting	Audiograms	Incident Investigation (Supervisor's)	TDG (Computer)	WHMIS (Computer)	Confined Space (Part I/II)	Spill Response /Containment	EMS Awareness	Emergency Response	PCB Handling/Storage	*Job Specific re: SEA*		
		3 Years	Start-up/ 2 Years	3 Years	Yearly	2 Years	3 Years	3 Years	3 Years	2 Years	2 Years	2 Years	3 Years			
Name	**Department**															
David Morrison	**P & CEO**		X								X					
Dixon, S																
Patterson, J																
Greer, L	**Director Corp Serv**		X			X		X								
Bowen, B	Admin/Corp		X					X								
Dixon, S	P & CEO		X					X								
Saboe, W	Corp. Serv															
Rondeau, R	Corp. Serv															
Harlow, L	Admin/Corp		X					X								
Campbell, H	**RP&CIO**		X			X		X			X					
Gee, R	BD & RP	X	X			X		X		X	X	X				
Hamilton, C	BD & RP	X	X					X			X	X				
Burns, G	IS		X					X								
Mura, B	IS		X					X								
Vacant	**Finance**		X			X		X			X					
Chippett, P	Finance		X					X								
Collins, D	Finance	X	X	X			X	X		X	X		X			
Crayford, C.	Finance		X					X								
Debolt, T	Finance		X								X					
Fendrick, W	Finance		X					X								
Lomas, J	Finance		X					X								

Appendix F

Training Matrix

Name	Department	First Aid	Safety Orientation	Rigging & Hoisting	Audiograms	Incident Investigation (Supervisor's)	TDG (Computer)	WHMIS (Computer)	Confined Space (Part I/II)	Spill Response /Containment	EMS Awareness	Emergency Response	PCB Handling/Storage	*Job Specific re: SEA*		
		3 Years	Start-up/ 2 Years	3 Years	Yearly	2 Years	3 Years	3 Years	3 Years	2 Years	2 Years	2 Years	3 Years			
Fillion, M	Finance		X					X								
McKay, D	Finance		X					X								
Mollard, Ed	Finance		X					X			X					
Peirson, P	Finance		X					X								
Love, A	**Tech Service**	X	X			X		X	Part I		X					
Darani, S	Tech Service	X	X					X			X					
Haydock, B	Tech Service	X	X	X		X	X	X	Part I/II	X	X	O				
Johnson, D	Tech Service	X	X					X			X					
Mutukutti, R	Tech Services															
Porter, A	Tech Service	X	X					X			X					
Power, B	Tech Service	X	X					X			X					
Rowland, L	Tech Service	X	X	X			X	X	Part I/II	X	X					
Sawyer, K	Tech Service	X	X	O			X	X			X	X				
Schofield-Wray, R	Tech Service	X	X	X				X			X					
Schultz, T	Tech Service	X	X					X			X					
Schwarz, A	Tech Service	X	X					X			X					
Wray, D	**Operations**	X	X	X		X	X	X	Part I	X	X	X	X			
Boisvert, L	**Manager Operations**	X	X	X		X	X	X	Part I	X	X	X	X			
Aldrich, J	Operations	X	X	X	X		X	X		X	X	X				
Balderas, N	Operations	X	X	X	X			X		X	X		X			
Blysak, S	Operations	O	X					X			X	X				
Burrell, B	Operations	X	X	X	X			X		X	X		X			

Appendix F

Training Matrix

Name	Department	First Aid	Safety Orientation	Rigging & Hoisting	Audiograms	Incident Investigation (Supervisor's)	TDG (Computer)	WHMIS (Computer)	Confined Space (Part I/II)	Spill Response /Containment	EMS Awareness	Emergency Response	PCB Handling/Storage	*Job Specific re: SEA*		
		3 Years	Start-up/ 2 Years	3 Years	Yearly	2 Years	3 Years	3 Years	3 Years	2 Years	2 Years	2 Years	3 Years			
Chaplin, E	Operations	X	X	X	X		X	X		X	X		X			
Gingras, B	Operations	X	X	X	X		X	X		X	X	X				
Greer, J	Operations	X	X	X	X	X	X	X	Part I/II	X	X	X	X			
Hammond, A	Operations	X	X	X	X	X	X	X	Part I	X	X	X	X			
Hannah, M	Operations	O	X					X			X	X				
Healey, R	Operations															
Janits, A	Operations	X	X	X	X		X	X		X	X	X				
Johnson, D	Operations	X	X	X	X		X	X	Part I/II	X	X					
Jones, G	Operations	X	X	X			X	X		X	X					
Kelland, C	Operations	X	X	X			X	X		X	X		X			
Kirkwood, R	Operations	X	X	X	X		X	X		X	X	X				
Larsen, T	Operations	X	X	X			X	X		X	X		X			
Marcoff, P	Operations	X	X	X	X			X		X	X		X			
McLaughlin, G	Operations	O	X					X			X	X				
Milner, Steve	Operations	X	X	X	X		X	X	Part I/II	X	X	X				
Morgan, G	Operations	X	X			X		X		X	X	X	X			
O'Brien, M	Operations															
Paton, J	Operations	O	X					X			X	X				
Peake, E	Operations	X	X	X	X		X	X		X	X		X			
Petelski, J	Operations	X	X	X	X		X	X		X	X	X				
Sage, M	Operations															
Sutherland, D	Operations	X	X	X	X		X	X	Part I/II	X	X	X				
Weir, J	Operations	X	X	X		X		X			X		X			
Wells, R	Operations															
White, P	Operations	X	X	X				X			X		X			

Appendix F

Training Matrix

		First Aid	Safety Orientation	Rigging & Hoisting	Audiograms	Incident Investigation (Supervisor's)	TDG (Computer)	WHMIS (Computer)	Confined Space (Part I/II)	Spill Response /Containment	EMS Awareness	Emergency Response	PCB Handling/Storage	*Job Specific re: SEA*		
		3 Years	Start-up/ 2 Years	3 Years	Yearly	2 Years	3 Years	3 Years	3 Years	2 Years	2 Years	2 Years	3 Years			
Name	**Department**															
Contractors & Suppliers	**Owner's Designate**		As Required							As Required	As Required					

Appendix G

CEA - ECR Activities that Contribute to The EMS

Subject (or activity)	Environmental component	Objective	Affected Personnel	Result(s)	ECR Principle	EMS Component	Contact
TRANSMISSION & DISTRIBUTION ACTIVITIES							
Job planning has been instituted for all activities with potential hazards	*Job planning includes listing out all major job steps, determining if there are hazards to the environment, and protecting against the hazard; daily tailboard review*	*Identify potential environmental issues prior to commencing job; identify measures that will help avoid problems; ensure procedures are in place to manage the impact in the event that an environmental incident occurs.*	*Staff and all contractors/trades*	*Manage/mitigate the potential environmental risks and adverse consequences. Making all workers more aware of the environmental consequences of their work.*	*2*	*Implement ation and operation*	*Hector Campbell (867) 393-5331*
HYDROELECTRIC GENERATION ACTIVITIES							
Spill Response and Clean-up	*Spill Response Training and Equipment*	*Minimize environmental contamination in event of spill of petroleum or other hazardous materials*	*Selected field staff and contractors*	*Enhanced awareness of spill potential in day to day operations and maintenance activities; spill response to minimize contamination of water and soil*	*1-4*	*Implement ation and operation*	*Hector Campbell (867) 393-5331*
Incident Reporting	*All spills are treated as incidents and reported and investigated.*	*All environmental releases are treated as significant incidents; objective is to learn from past incidents.*	*All field staff*	*Knowledge is gained from the investigation of past spills and spill data is easily recorded.*	*1-4*	*Checking and corrective action*	*Hector Campbell (867) 393-5331*

Appendix G

Day-to-Day Activities that Contribute to YEC's Environmental Performance

THERMAL GENERATION (e.g., Fossil, Nuclear) ACTIVITIES							
Diesel Preventive Maintenance	*Reduction of waste and improve fuel efficiency.*	*Minimise engine exhaust and emissions to the environment and also helps to improve fuel efficiency.*	*All diesel staff*	*Better engine performance.*	*2*	*Implement ation and operation*	*Hector Campbell (867) 393-5331*
OTHER ACTIVITIES (e.g. Procurement, Services, Strategic planning)							
Staff WHIMIS training	*WHIMIS training increase knowledge of hazardous materials, some of which are detrimental to the environment.*	*Increased awareness of the procedures to handle hazardous materials.*	*All staff*	*Increased knowledge of workplace materials and reduced likelihood of an environmental release.*	*4*	*Planning*	*Hector Campbell (867) 393-5331*

Appendix H

Supplementary Documents

(eg meeting minutes, audits, etc.)