NORTHWEST TERRITORIES POWER CORPORATION

Empowering Communities

CONCEPTUAL ABANDONMENT AND RESTORATION PLAN

JACKFISH LAKE
GENERATING FACILITY, NWT
PLANT #120
YELLOWKNIFE, NORTHWEST TERRITORIES

February 2019

DOCUMENT MAINTENANCE AND CONTROL

The Director, Health, Safety & Environment is responsible for the distribution, maintenance and updating of the Abandonment and Restoration Plan. This Plan will be reviewed annually and updated as required, taking into account changes in the law, environmental factors, NTPC policies, and Jackfish Lake Generating Facility characteristics. Changes in phone numbers, names of individuals, etc. that do not affect the intent of the Plan are to be made as required. Additional copies can be provided by the Director, Health, Safety & Environment.

DOCUMENT HISTORY				
Revision #	**Revised Section(s)**	**Description of Revision**	**Prepared by**	**Issue Date**
1	All	Prepared for 2019 Water Licence application	NTPC	Feb. 2019

TABLE OF CONTENTS

SECTION **PAGE**

1 INTRODUCTION

1.1 BACKGROUND

This Conceptual Abandonment and Restoration Plan (CARP) provides a general abandonment and restoration plan for the Jackfish Lake Generating Facility (Jackfish Facility), owned and operated by the Northwest Territories Power Corporation (NTPC). Jackfish Facility is an important component of the Yellowknife Power System which is the sole supplier of electricity to the communities of Yellowknife, Behchokǫ̀, N'Dilǫ, and Dettah. The site is located within the City of Yellowknife Municipal boundary. The legal description of the site is Lot: 1054 Block: Q85J/8 Plan: 2696).

1.2 SCOPE

The CARP provides information on the steps and procedures that will be taken to close and abandon the Jackfish Facility should:

- NTPC no longer require the facility, nor wish to maintain it on care and maintenance; and
- no other organization agrees to assume responsibility for operation of the diesel power facility.

Should NTPC no longer require power generation from or undertake any operations at the Jackfish Facility and transfer of other NTPC assets were not contemplated (i.e. the Corporation were not sold to another organization), the most likely scenario would be for some other organization to assume operating and maintenance responsibilities for the Jackfish Facility. Should NTPC be sold to another organization, application would be made by the purchaser to amend the Water Licence to the name of the new owners.

The Jackfish Facility has been providing diesel generated electricity since 1969 and was the primary source of power for Yellowknife until 1996, when the Snare Cascades Hydro Plant was constructed. Presently, the Jackfish Facility operates as a standby plant for instances when demand of the served communities (Yellowknife, N'Dilǫ, Dettah and Behchokǫ̀) exceeds capacity of the Snare and Bluefish hydroelectric facilities, during planned maintenance shutdowns and unplanned outages of the hydroelectric facilities. The Additionally, NTPC operational control for other NTPC facilities and the substation serving Yellowknife and Dettah is based at the Jackfish Facility. The Jackfish Station has been developed based on The NWT Public Utilities Board recommendation that there is installed diesel generating backup power capable of providing power to the communities in the event of a failure of the L199 transmission line from the Snare Hydro System. As such, it is unlikely that the Jackfish Facility will be closed, and the plans contained in this report are conceptual only.

1.3 JACKFISH FACILITY LOCATION

The Jackfish Facility is located within Yellowknife city limits on Jackfish Lake (also known as Stock Lake). The Jackfish Facility is constructed in a former quarry and includes the following:

- three diesel generating plants, containing a total of
  - twelve generators
  - ten raw water pumps
  - four raw water intakes in Jackfish Lake
  - three cooling water discharges in Jackfish Lake
  - substation
  - diesel fuel stockpile
  - miscellaneous buildings and other appurtenances.

1.4 JACKFISH FACILICTY OPERATIONS OVERVIEW

The Jackfish Facility is a standby plant for the Yellowknife System. Hydroelectric power, while expensive in capital, is very economic to operate compared to diesel generation. Diesel generating units at the Jackfish Facility are therefore only utilized when there is instantaneous loss of electrical supply from the primary hydroelectric sources, when there is a shortage of capacity, during planned maintenance shutdows, or when there is diminished hydroelectric capacity due to low water levels.

The Jackfish Facility was developed so the total installed diesel generating capacity is capable of providing power to the communities in the event of a failure of the L199 transmission line from the Snare Hydro System. The diesel generating capacity was sequentially increased until the construction of the 4300 kw Snare Cascades Hydro Plant in 1996.

The Jackfish Facility is comprised of three plants. The K-plant built in 1969 and extended in 1988 contains two Mirrlees KV-16 gen-sets rated at 5000 kW each and only one is in service at this time. The EMD Plant built in 1974 and extended in 1988 contains four EMD's (Electro-Motive Division of GM); two E-series gen-sets rated at 2500 kW each and two F-series gen-sets rated at 2850 kW each. The CAT Plant built in 1993 contains two Caterpillar 3612 gen-sets rated at 2700 kW.

The Plant Operator does a visual inspection of the entire facility at least once a day. This includes a walk around of each unit, a check of sumps, raw water pumps, tank farm and modules. When Diesel Units are being operated the duties increase to observing and recording generating data, temperatures and pressures on the units and auxiliary equipment.

1.5 GOVERNING LEGISLATION

The Jackfish Facility water licence is issued under the authority of the Mackenzie Valley Land and Water Board. As part of the license, a conceptual abandonment and restoration plan is required.

2 CLOSURE PLAN

The Jackfish Facility has been providing power since 1969 and contains important infrastructure for the power supply of Yellowknife. NTPC does not anticipate closure of the Jackfish Facility. As such, this Plan is conceptual.

2.1 OVERVIEW

For permanent closure, the general procedures that will be followed will be to excavate and remove raw water intake and discharge infrastructure and remove buildings, generation equipment, fuel stockpiles and powerlines. Disturbed areas would be graded to allow positive draining and minimize ponding of water.

This CARP addresses the existing infrastructure at the Jackfish Facility. Should that infrastructure change, the CARP will be updated to reflect those changes. The approach will be to remove all structures with minimal environmental disturbance and to stabilize the area.

Considering the Jackfish Facility is within city limits, the natural state of the Facility following closure will be one that is safe for the public and preserves the aquatic environment of Jackfish Lake.

2.2 RAW WATER INTAKES AND DISCHARGES

Once the powerhouses are closed, there will no longer be a need to withdraw water from Jackfish Lake. Structures and pipelines connecting the powerhouses to Jackfish Lake will be excavated and removed. Any work within Jackfish Lake will require mitigation to reduce sediment release and disturbance to the lake bottom. In-water work will require screening by the Department of Fisheries and Oceans.

2.3 GENERATORS AND OUT BUILDINGS

Electrical generation equipment in the generating plants will be disassembled and removed once the Jackfish Facility permanently ceases operation. The transformers will be removed and reused or sold. All buildings will be dismantled to foundation level and foundations broken up and covered with soil.

The fuel farm at the Jackfish Facility consists of bulk storage tanks located within a berm. At closure, the remaining fuel in the tanks will be pumped out and disposed off-site. The empty tanks will be decommissioned and removed from site. Soil within the fuel farm area will be sampled for petroleum hydrocarbons, and any contaminated soils would be managed according to the Environmental Guidelines for Contaminated Site Remediation (GNWT 2003).

All chemical stores will be removed from the site and disposed of according to the Jackfish Facility Hazardous Waste Management Plan and the Guideline for the General Management of Hazardous Waste in the NWT (GNWT 1998). Inert waste will be landfilled in Yellowknife.

2.4 POWER LINES

The conductors and structures will be removed for disposal or re-use.

2.5 ENVIRONMENTAL MONITORING

An environmental monitor, empowered to stop work if required, will oversee dismantling of the Jackfish Facility. If during deconstruction any contaminants of concern are noted, site is to be remediated following the guidelines detailed in GNWT (2003).

There are eighteen groundwater wells within the Jackfish Facility, which will continue to be monitored for hydrocarbons for 2 years after closure, with quality assessments consistent with CCME (1996).

3 REFERENCES

CCME (Canadian Council of Ministers of the Environment. 1996. Canadian Water Quality Guidelines for the Protection of Aquatic Life for benzene, toluene and ethylbenzene.

GNWT (Government of the Northwest Territories). 1998. Guideline for the General Management of Hazardous Waste in the NWT.

GNWT. 2003. Environmental Guidelines for Contaminated Site Remediation.