April 2022

TECHINCAL MEMORANDUM

DATE April 2022

TO Mackenzie Valley Land and Water Board

FROM

Taltson Overhaul Scope Summary for Regulatory Submission

The Taltson Major Overhaul scope consists of replacing the major electrical and mechanical rotating components of the generating unit. These components will be installed into the existing powerhouse and water conveyance system that exists at the Taltson facility.

Major items for replacement include the following:

- Generator stator
- Generator rotor
- Generator and turbine shafts
- Francis turbine – This item has been designed for potential future uprating as has been described in other submissions
- Wicket gates, head cover, bottom ring and operating mechanism
- PLC and Controls Upgrade
- Excitation system

The Major Overhaul also includes the refurbishment of existing embedded metal surfaces such as the spiral case, discharge ring and draft tube cone. The unit is planned to be dewatered from Mid-April until Mid-October. Starting in Late September the unit will undergo a testing and commissioning process which will necessitate many starts and stops of the unit. The project schedule is included in Appendix A.

Annotated drawings included in Appendix B show schematically what is being replaced by new equipment and what is being refurbished as part of the overhaul project:

- HY109-NCP-20460 - POWERHOUSE PLANS AND SECTIONS - Annotated
- 538-U1-100-DRW-01 RevB Francis Turbine Assembly – Annotated
- 538-U1-500-DRW-03_RevB GENERATOR SECTION DRAWING - Annotated

The Major Overhaul does not include any in water works and all required scope items will be completed in the dry upon dewatering the unit as per standard operating procedure. Due to the nature of the work, there is no need for cofferdams or other in-water mitigations.

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Appendix A- Project Schedule

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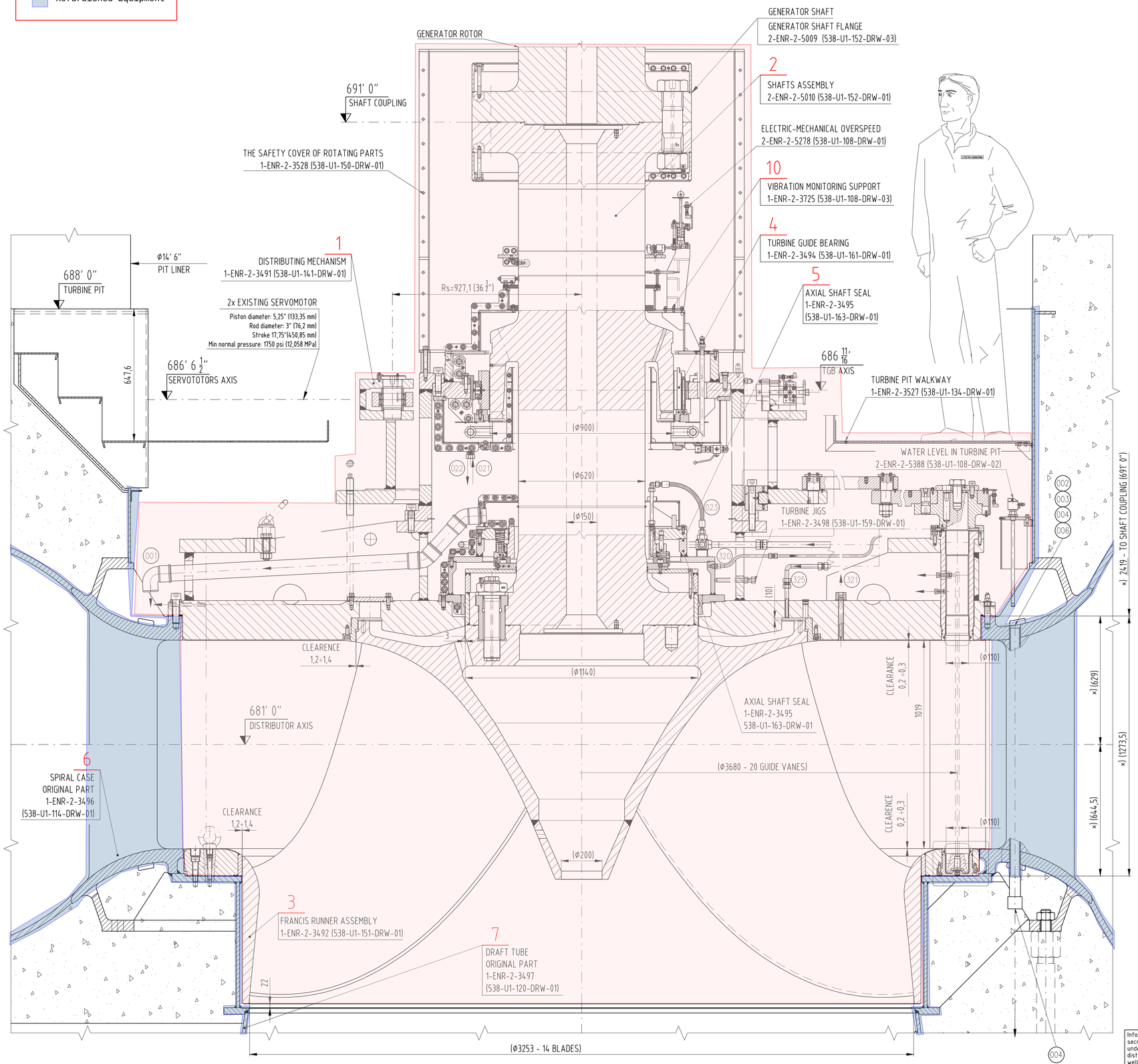
Appendix B- Design Drawings

New Equipment
Refurbished Equipment



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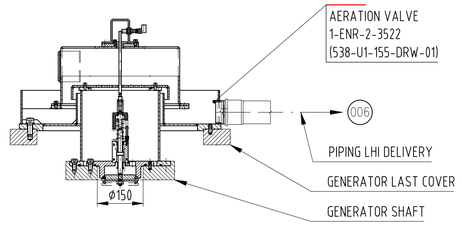
HPP TALTSON

CANADA

H_{MAX} = 29,6 m n = 150 rpm
Q_{MAX} = 88 m^3/s n_R = 300 rpm
P_{MAX} = 22 000 kW

GENERATOR SHAFT END



PIPING LEGEND:

- 001 AXIAL SHAFT DEWATERING
- 002 HYDROCYCLONE DRAINAGE
- 003 LEAKAGE WATER FROM GUIDE VANES
- 004 STAY RING DRAINAGE
- 005 PENSTOCK (SPIRAL CASE) DISCHARGING
- 006 AERATION VALVE DRAINAGE
- 021 COOLING WATER GUIDE BEARING INLET
- 022 COOLING WATER GUIDE BEARING OUTLET
- 023 COOLING WATER TO SHAFT SEAL
- 211 DRAFT TUBE CONE AIR ADMISSION PIPING - ORIGINAL PART (BLINDED)
- 320 PRESSURE MEASUREMENT BEFORE SHAFT SEAL
- 321 PRESSURE MEASUREMENT IN VANELESS SPACE
- 322 DRAFT TUBE CONE PRESSURE AND VACUM MEASUREMENT
- 323 PRESSURE MEASUREMENT IN SPIRAL CASE INLET
- 324 PRESSURE MEASUREMENT IN SPIRAL CASE SEGMENT
- 325 PRESSURE MEASUREMENT ABOUT RUNNER (HEAD COVER - RUNNER CROWN)

PAINTING SPECIFICATION: 4-ENR-2-12379 (538-U1-100-TR-06)
OPERATING MANUAL: 4-ENR-2-12377 (538-U1-100-MAN-01)
UNIT ASSEMBLY DRW. No. 1-ENR-2-3490 (538-U1-000-DRW-01)
TURBINE JIGS DRW. No.: 1-ENR-2-3498 (538-U1-159-DRW-01)
TURBINE P&i DIAGRAM DRW. No. 1-PVT-5146 (538-U1-100-DRW-02)
SYNCHRONOUS GENERATOR (INDAR) DRW. No. H-5166010-3D014 (538-U1-500-DRW-03)

ORIGINAL

Index	Date	Description	Signature
a1	27.04.2021	Rotor cover shown.	A. PETŘÍČEK
a0	14.01.2021	Piping legend updated. List of references updated.	A. PETŘÍČEK

LITOSTROJ POWER Litostroj Hydro Inc.

LITOSTROJ ENGINEERING

Projekt / Project: TALTSON GS OVERHAUL
Client / Customer: NTPC

Materiál / Material:
Semiprodukt:
Hmotnost / Mass: 72 862 kg
Standard:
TDC:
ACCURACY ISO 2768-mH TOLERANCING ISO 8015
PROJECTION

Conception / Design	A. PETŘÍČEK		11/2019
Verifiè / Checked	J. MACEK		11/2019
Kgèovaè / Approved	L. ŠTEGNER		11/2019
	Name / Name	Signature	Date

Titre / Title: FRANCIS TURBINE ASSEMBLY

Index: a1

Department / Department: LE
Èíselo / Scale: 1:10
No Commande Client / Customer Order No.:
No. Interne / Internal No.: 1-ENR-2-3489a1
Format du Dessin / Drawing Format: A1
No. Dessin / Drawing No.: 538-U1-100-DRW-01
Page: 1
Pages: 1

Assembly: 1-ENR-2-3490 538-U1-000-DRW-01
Item:
Part list: 1-ENR-2-3489 538-U1-100-DRW-01

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LITOSTROJ ENGINEERING

Litostroj Engineering a.s.,Čapkova 2357/5, 678 01 Blansko,Czech Republic

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ORIGINAL

Stamp / Razítko

Project / Heslo	**HPP TALTSON**	Elaborated by / Vypracoval	A. Petříček	Documentation / Stav dokumentu	**REALIZATION**
Designation / Název	**FRANCIS TURBINE ASSEMBLY**	Checked by / Kontroloval	J. Macek		
		Approved by / Schválil	L. Štégner	Order No. / Zak.č.	5166
Drawing Number / Číslo výkresu	**1-ENR-2-3489a1**	Date / Datum	10/2019	LHI Doc No.	**538-U1-100-DRW-01**
Product / Název zakázky	**UNIT ASSEMBLY**				
Assembly Number / Číslo sestavy	**1-ENR-2-3490** / 538-U1-000-DRW-01				
Total Weight / Hmotnost (kg)	Note / Poznámka				
72 862					

Date / Datum	Index	Change / Změna	Elaborated by/ Vypracoval
14.01.2021	a0	Change on drawing only.	A.Petříček
27.04.2021	a1	Change on drawing only.	A.Petříček

ITEM. / POZ.	DRAWING NUMBER / ČÍSLO VÝKRESU	TITLE / NÁZEV	MATERIAL / MATERIÁL	PCS/ KS	WEIGHT / HMOTNOST (kg)	SEMIPRODUCT / POLOTOVAR	STANDARD / NORMA	TTD / TDP	NOTE / POZNÁMKA	INDEX	OVERALL WEIGHT / CELKOVÁ HMOTNOST (kg)
1	**1-ENR-2-3491** 538-U1-141-DRW-01	**DISTRIBUTING MECHANISM**		1	42 545	GROUP		**4-ENR-2-12381** 538-U1-141-QWP-01			42 545,00
2	**2-ENR-2-5010** 538-U1-152-DRW-01	**SHAFTS ASSEMBLY**		1	8 750	GROUP		**4-ENR-2-12382** 538-U1-152-QWP-01			8 750,00
3	**1-ENR-2-3492** 538-U1-151-DRW-01	**FRANCIS RUNNER ASSEMBLY**		1	17 827	GROUP		**4-ENR-2-12383** 538-U1-151-QWP-01			17 827,00
4	**1-ENR-2-3494** 538-U1-161-DRW-01	**TURBINE GUIDE BEARING**		1	2 191	GROUP		**4-ENR-2-12384** 538-U1-161-QWP-01			2 191,00
5	**1-ENR-2-3495** 538-U1-163-DRW-01	**AXIAL SHAFT SEAL**		1	932	GROUP		**4-ENR-2-12385** 538-U1-163-QWP-01			932,00
6	**1-ENR-2-3496** 538-U1-114-DRW-01	**SPIRAL CASE - ORIGINAL PART**		1	0	GROUP		**4-ENR-2-12386** 538-U1-114-QWP-01			0,00
7	**1-ENR-2-3497** 538-U1-120-DRW-01	**DRAFT TUBE CONE - ORIGINAL PART**		1	10	GROUP		**4-ENR-2-12387** 538-U1-120-QWP-01			10,00
8	**1-ENR-2-3522** 538-U1-155-DRW-01	**AERATION VALVE**		1	90	GROUP		**4-ENR-2-12388** 538-U1-170-QWP-01			90,00
9	**1-ENR-2-3498** 538-U1-159-DRW-01	**TURBINE JIGS**		1	515	GROUP		**4-ENR-2-12389** 538-U1-159-QWP-01			515,00
10	**1-ENR-2-3725** 538-U1-108-DRW-03	**VIBRATION MONITORING SUPPORT**		1	2	GROUP					1,50
.	**4-ENR-2-12393** 538-U1-100-TR-05	**TURBINE SPARE PARTS**		1		GROUP		Included in items 1, 2, 4 and 5.	Weight 1219 kg.		0,00
.	**4-ENR-2-12377** 538-U1-100-MAN-01	**OPERATING MANUAL**									0,00
.	**4-ENR-2-12379** 538-U1-100-TR-06	**PAINTING SYSTEM**									0,00

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.	**1-PVT-5146** 538-U1-100-DRW-02	**TURBINE P&i DIAGRAM**									0,00