XAYABURI HPP – DESIGN CHANGES
CONTENT

1. Project key data

2. Spillway

3. Navigation Lock

4. Intermediate Block

5. Powerhouse

6. Fish passing facilities

Pöyry Energy Ltd.

Knut Sierotzki
Hydro Power & Renewable
knut.sierotzki@poyry.com
1. PROJECT KEY DATA

First stage construction

- **Spillway**
  - 7 surface spillway bays & 4 low level outlets
  - PMF: 47'500 m³/s
- **Navigation Lock**
  - Two chambers, total length 320m (w/o guide walls), 12m width
- 1'000 ton vessels
- **Intermediate Block**
  - 530m long, 120m wide
  - Two pumping stations
1. PROJECT KEY DATA

Second stage construction

- Powerhouse
  - 7 EGAT + 1 EdL vertical Kaplan units: 1285 MW
  - Discharge: 5’140 m³/s
  - Rated head:
- Fish passing facilities
  - Auxiliary Powerhouse
    - 2 x 4 MW
    - 2 x 20 m³/s
  - PS1: 160 m³/s
  - PS2: 120 m³/s
  - Fish ladder: 265m

Xayaburi HPP
3D animation by XPCL
2. SPILLWAY

Status Oct. 2015
2. SPILLWAY

Outline Design
• Width 235m
• 10 surface spillway bays

Modified Outline Design
• Width 231m
• 7 surface spillway bays
• 4 low level outlets
2. SPILLWAY

Modified Outline Design

Surface Spillway

Low level outlet
3. NAVIGATION LOCK

Status Oct. 2015
3. NAVIGATION LOCK

Outline Design
• Length main structure & guide walls: 470m + 260m

Modified Outline Design
• Length main structure & guide walls: 405m + 300m
• Attraction flow system for fish passing during construction
• Modifications guide walls
3. NAVIGATION LOCK

Modified Outline Design

u/s guide wall

Fish attraction
4. INTERMEDIATE BLOCK

4. INTERMEDIATE BLOCK

Outline Design
- Length: 610 m
- d/s foundation el. 225.0 m asl
- d/s block el. 273.0

Modified Outline Design
- Length: 530 m
- d/s foundation el. 235.0 m asl
- d/s block el. 255-265

- Significantly reduced concrete volume
5. POWERHOUSE

Status May 2016
5. POWERHOUSE

Outline Design
- Length 302.0m
- Sand flushing o.

Modified Outline Design
- Length 253.5m
- No sand flushing outlets
- Shorter construction
- Shear walls
- Other improvements and cost reductions
5. POWERHOUSE

Outline Design
- Sand flushing outlets

Modified Outline Design
- Omitting sandflushing outlets leads also to an optimization of the foundation
5. POWERHOUSE

Outline Design
- Sand flushing outlets

Modified Outline Design
- Omitting sandflushing outlets leads to:
  - Less hydromechanical works
  - Shorter PH (perpendicular to flow)
  - Optimized foundation
  - Shorter construction time

Feasible construction schedule
- Significantly reduced cost
6. FISH PASSING FACILITIES

Status Jun 2016
6. FISH PASSING FACILITIES

Fish u/s migration
- Attraction flow fish ladder: left bank auxiliary Powerhouse
- Attraction flow at Powerhouse and IB: PS1 (dry season), gravity water supply (wet season)
- 2 Fish lock
- 1 Fish lift (optional)
6. FISH PASSING FACILITIES

Outline Design
- Lower loop: 180m, 5%
- Fish ladder: 610m, 4.5m

Modified Outline Design
- LBAP: 8MW
- Less water and power production losses
- Fish ladder: 525m, 1.2%
- Upper channel: 110m
- 2 fish lock
- 1 fish lift (optional)

> Probability that the fish u/s migration works has been increased significantly.
6. FISH PASSING FACILITIES

Fish d/s migration
- Attraction flow u/s Powerhouse: PS2 (dry season), fish d/s migration channel (wet season)
- Exit chute
- Fish resting area
- Light openings
6. FISH PASSING FACILITIES

Outline Design – d/s migration
- Straight terminal chute

Modified Outline Design – d/s migration
- S-shaped terminal chute with basins
- Pumping station 2
- Fish resting pool

- Fish will survive the d/s migration
- Fish d/s migration can operate the entire year