City & Borough of Sitka
Electric Department
105 Jarvis Street, Sitka AK. 99835
Telephone: 907-747-4000 Fax: 907-747-3208

BLUE LAKE EXPANSION PROJECT

MONTHLY UPDATE FOR CITY ASSEMBLY

Report No. 16 Month ending March 31, 2014

SCOPE

- 83 ft. dam raise with modified tunnel system and new 15.9 MW powerhouse ($89 million)
- Eight supply contracts for Owner-Furnished equipment and materials ($16 million)

PROJECT HIGHLIGHTS DURING THIS MONTH

- March 1 – Began setting sanitary sewer lift station.
- March 4 – Conducted executive partnering meeting in Sitka.
- March 5 – Completed sluice gate and trash rack repair at Blue Lake Dam.
- March 11 – Schmolk began the powerhouse mechanical rough-in.
- March 12 – Barnard made final concrete placemenrt on dam keyway.
- March 14 – Barnard began forming for dam raise blocks M3-M5 (in the old spillway).
- March 15 – Completed final alignment of BLU unit 5 turbine spiral case and grouted in place.
- March 16 – Scaled intake portal to begin intake portal excavation.
- March 20 – Southeast Earthmovers began the powerhouse afterbay excavation.
- March 21 – Removed final forms from gatehouse. Concrete for this structure is complete.
- March 25 – The energy dissipater for the penstock drain was completed.
- March 27 – Placed BLU unit 5 turbine draft tube.
- March 28 – Staged penstock segments at powerhouse.
- March 29 – Completed final alignment of BLU-5 sole plates and epoxy grouted the anchor bolts.
- March 30 – Completed Intake structure rock excavation.
- March 31 – Barnard completed two monolith block placements on the dam spillway.
- March – Southeast Earthmovers completed excavation for penstock segment 6.
- March – NAES continued with installation of conduit and cable tray in powerhouse.
- March – NAES installed conduit for lighting and plant services.
- March – ASRC continued framing and building out the control rooms.
- TO DATE – 28 of 53 blocks placed on the Dam Raise, 8 of 9 placements completed on the Left Abutment and Cutoff Wall and 3230 CY of 3350 CY have been placed at the powerhouse. Concrete tests have been better than required by the specification.

COST SUMMARY - updated 3/31/2014

Project Element	Current Contract Total or Projected Amount	Payments	
		Paid this Month	Paid to Date*
Supply Contracts			
Contract 1 - Turbine Generator Equipment	$11,573,707	$227,391	$10,588,489
Contract 2 - Switchgear	$647,672	$0	$584,488
Contract 2A/2B - SS/Raw Water Switchgear	$300,000	$0	$208,547
Contract 3 - Gates and Hoist	$780,185	$0	$703,376
Contract 4 - Penstock	$836,315	$0	$795,778
Contract 5 - 69 kV Transformers	$603,406	$0	$543,130
Contract 6 - Bridge Crane Equipment	$270,518	$0	$245,246
Contract 7 - Steel Building	$1,139,321	$0	$1,084,397
Contract 8, Debris Management**	$2,258,714	$0	$1,412
Contract 9, General Construction	$93,417,851	$1,704,617	$57,057,893
Temporary Filtration**	$1,651,424	$980	$235,277
Diesel Fuel	$1,260,000	$0	$0
Remaining Project Costs		$0	$0
License Amendment	$1,400,000	$9,159	$1,214,144
Engineering	$9,498,393	$36,607	$11,840,972
Construction Management	$8,076,201	$254,448	$5,123,816
City Performed Work	$1,495,000	$32,685	$1,810,719
Incentive Payment	$1,600,000	$0	$0
Cost of Bond Issuance/Reserve Account	$3,500,000	$0	$0
TOTALS	**$140,308,707**	**$2,265,885**	**$92,037,681**
ESTIMATED TOTAL PROJECT COST	**$145,256,725**		

*Paid to Date includes unpaid retainage

COST CHANGES THIS MONTH

- We issued Contract 9, Change Order No. 8 for $2.1 million. This change order included the changes to the conduit and cable schedule and installation of the temporaty water filteration plant.
- Assembly approval was received to issue Notice of Award to ASRC for Contract 8 (Reservoir Debris Management) which increased the project cost.
- A series of major change items for Contract 9 are in progress as follows:
    - The change work directive to repair the trashrack and sluice gate valve at the dam has been completed. We are negociating the final price.
    - A change work directive was issued to provide a dam release pipe at the dam. The pipe is on site and will be installed in the new dam in April.

  We do not expect these change items to impact the overall project schedule.

CONSTRUCTION SCHEDULE MILESTONES: PLANNED/ACTUAL

Construction Start	11-20-2012 / 12-03-2012	Sub. Comp. BLU #5	10-24-2014/
Drainage Tunnel Comp.	07-01-2013 / 05-05-2013	Sub. Comp. FVU	11-12-2014/
Tunnel ex. complete	08-19-2013 / 07-24-2013	Sub. Comp. BLU#4	11-22-2014/
Ready for Generation Outage	08-24-2014/	Substantial Completion	02-01-2015/

NOTES ON PROJECT SCHEDULE

- The most recent look-ahead schedule submitted by Barnard shows the following work to be performed in April:
    - Finish new intake structure excavation – April 2
    - Start intake structure concrete – April 3
    - Begin penstock installation – April 7
    - Continue turbine generator installation in Unit 3, 4 ,5
    - Continue buildout of Powerhouse interior
    - Continue placing monolith blocks on Dam
    - Begin gate guide installation in gate shaft
    - Begin diving and inspection of existing bulkhead gate. This work is a major preparation for the generation outage. – April 9
- All of the Owner furnished materials and equipment are now on site. The inlet valve for the Fish Valve turbine has now been delivered.
- The CM team and Electric Department continue working on the City-performed work tasks to ensure these activities are completed on time. Preliminary testing of automation equipment (SCADA) has been done. Bruce Belley has installed control panels in the switchyard building and will continue wiring them in.
- Barnard, McMillen and CBS meet each Friday to coordinate generation outage planning.

OTHER ITEMS OF INTEREST

- On March 22 the lake level was 301'. The City was unable to achieve the lake level of 298' as required by the contract work window. But, Barnard was able to work on the intake structure excavation as the water dropped. We reached the lake target level of el. 298 ft on March 28.
- The contractor has not regained the scheduled float available for the dam raise work and we continue to have two critical path timelines on the Project: the dam raise; and the turbine installation.
- Barnard requested a change in the milestone 4 for the dam construction due to the dam spilling until January 29. The City agreed to extend the dam construction milestone 4 by 42 days. This will not affect substantial completion or project cost.
- FERC and our Board of Consultants were consulted and then approved the extention of milestome 4 and the installation of the new midlevel outlet in block 4.
- The sealing of the turbine generation anchor bolt pockets in the floor of the new powerhouse has been problematic. The pockets must be sealed from groundwater to permit the epoxy grout to cure properly.
- The failed rock anchors in the turbine pits have been replaced.

PROJECT RISK PROFILE
A discussion of the major risk areas follows below. As a general rule risks are measured as follows:

LOW: Probability of less than 10%, or mitigation cost less than $1 million.
MODERATE: Probability of more than 30%, or mitigation cost up to $5 million.
HIGH: Probability of more than 60%, or mitigation cost likely more than $5 million.

The City's project team believes the following risk areas will dominate the potential for increases in overall Project cost. We also believe these areas pose the greatest risk for schedule delays.

Construction Schedule: In Barnard's most recent (April 1, 2014) schedule, the critical start of the 2014 Generation Outage is shown starting on August 21, 2014, three days ahead of schedule. However, we now have two critical schedule paths, for the dam raise and the turbine installation work related to the Generation outage.
CURRENT RISK: MODERATE

Weather and Lake Levels: Now that we have achieved the intake work window elevation we have decreased the water wasting at Blue Lake.There is ample water in both lakes and there is likely zero need for added diesel generation in the spring and early summer of 2014.
CURRENT RISK: LOW

Temporary Water Filtration Plant: During the August through September 2014 outage of the Blue Lake tunnel, the City will get its drinking water from a temporary water supply. This temporary system remains to be installed at Indian River. This system must be in place and fully operational prior to the Generation Outage. Any delay in the filtration plant beyond August 23, 2014, will delay the hydro expansion Project. Barnard will be providing the filtration project as a change order to Contract 9. The filtration project is being managed by McMillen LLC and CH2M Hill has completed the final design. The City Water Department will operate the plant with assistance from CH2MHILL and the supplier.
CURRENT RISK: MODERATE [*The current status of the filtration system design and planned construction is described in Appendix 2. If the filtration system is constructed as planned, we will be on track for the Expansion Project.*]

Sluice Gate Valve Repair and Relocation: The sluice gate valve and trash rack at the dam has been repaired to permit operation of the dam release valve prior to and during the generation outage. The decision was made to install a new dam release pipe in the new section of dam that may be used to replace the existing release equipment.
CURRENT RISK: LOW

Other: This is a broad combination of bad things that might happen such as: earthquakes; construction site accidents; floods; extreme winter weather; fire; labor unrest; etc. We expect that many of these risks would be covered by insurance at least in part.
CURRENT RISK: LOW

PROJECT PHOTO RECORD THIS MONTH

Photos are taken of each work area each month from a fixed location to document construction progress by work area. Relevant photos of the project for this month are provided on the following pages.

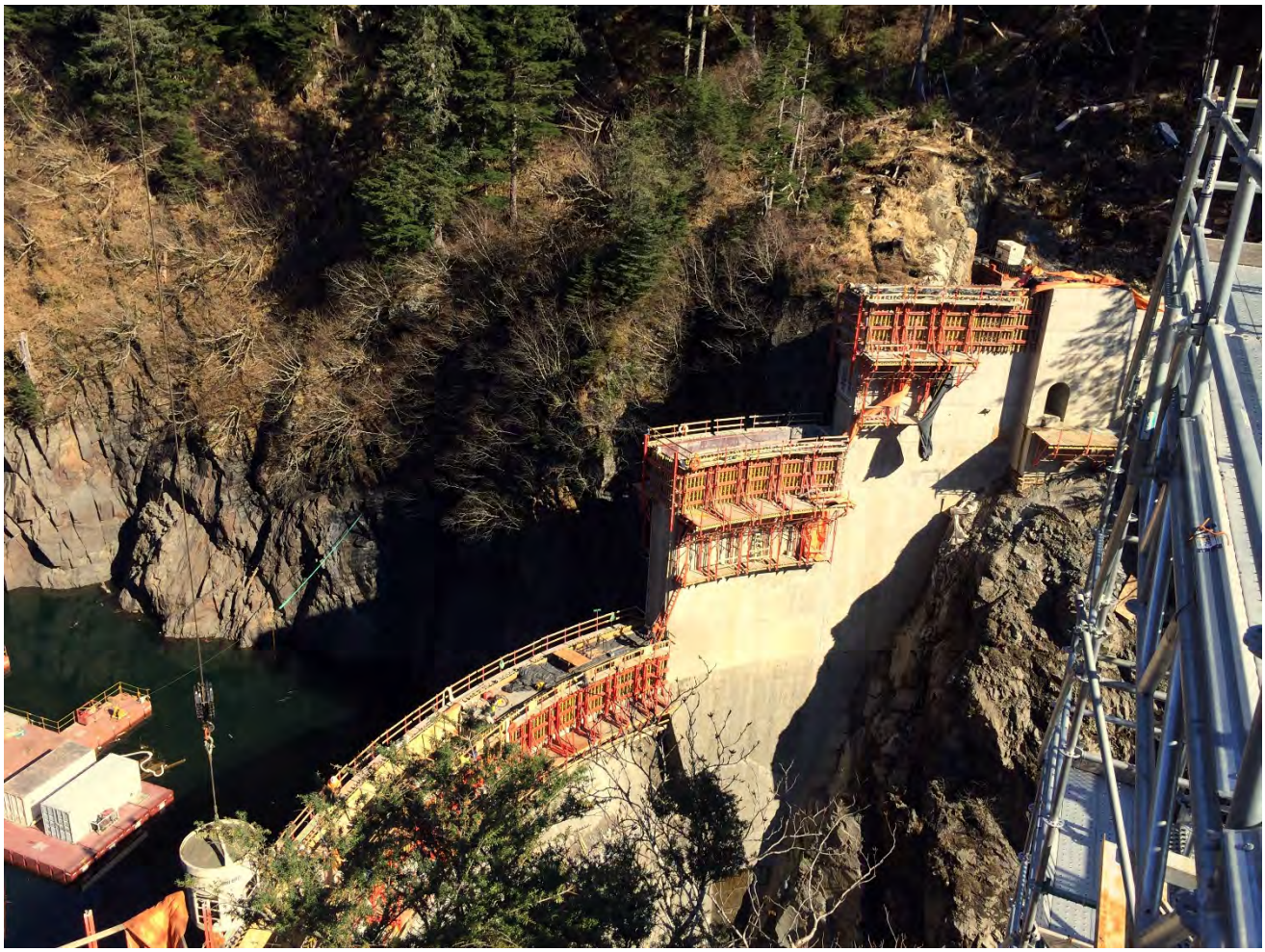


Figure 1. Dam and Left Abutment Area, Barnard made final concrete placemenrt on dam keyway and began forming for dam raise blocks M3-M5 (in the old spillway).

Figure 2. Drainage Tunnel and Scour Wall, A change work directive was issued to provide a dam release pipe in the dam extension above the existing spillway. The pipe is on site and will be installed in the new dam in April.

Figure 3. Intake Portal and Right Abutment, Barnard scaled intake portal to completed intake portal excavation.

Figure 4. Gate House Location, Removed final forms from gatehouse. Concrete for this structure is complete.

Figure 5. Dam Staging area, a new smaller 150 ton Liebherr crane was set up to assist with the dam raise.

Figure 6. Lower Portal Area, Staged penstock segments at powerhouse. Southeast Earthmovers completed excavation for penstock segment 6.

Figure 7. Powerhouse Site, Southeast Earthmovers began the powerhouse afterbay excavation.

Figure 8. Lower Project Site, No change this month.

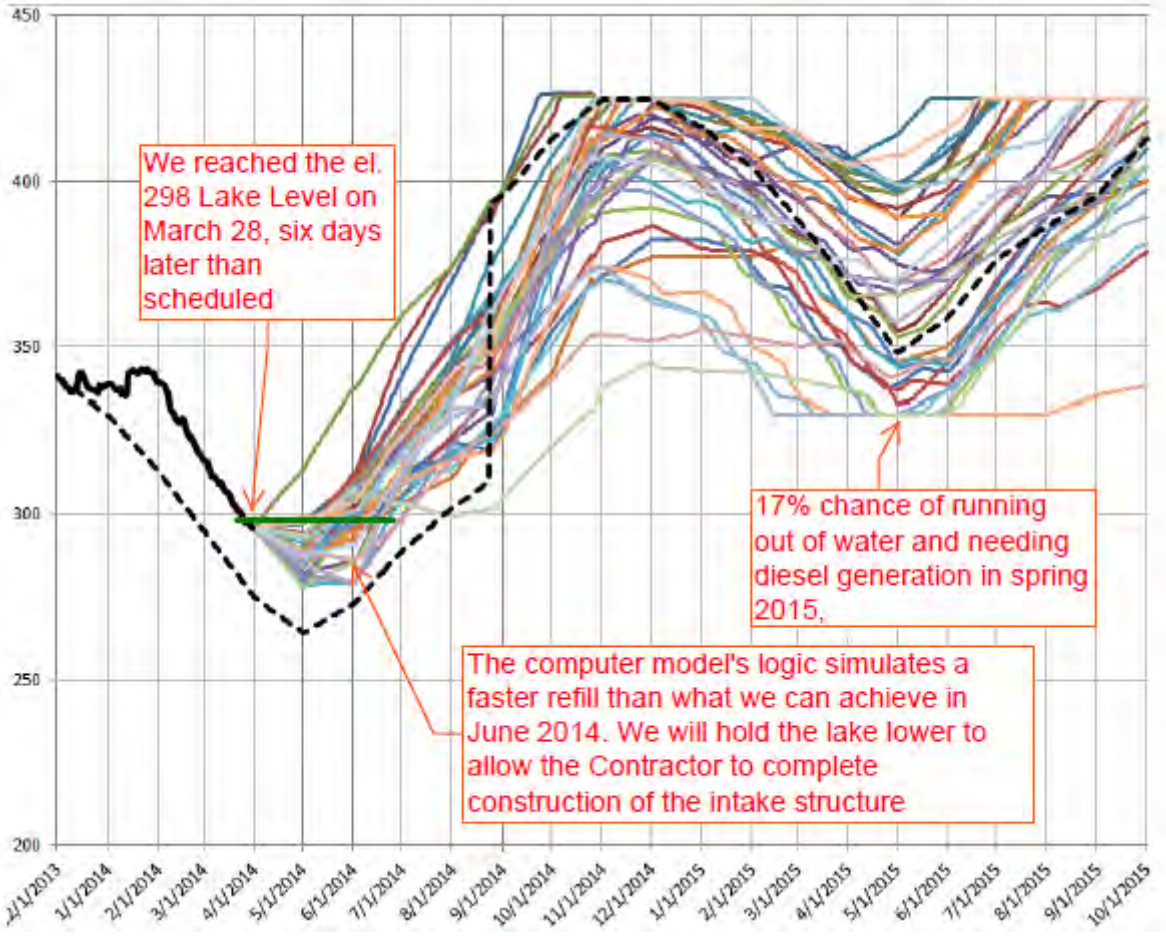
Figure 9. Powerhouse Interior, Schmolk began the powerhouse mechanical rough-in. Completed final alignment of BLU unit 5 turbine spiral case and grouted in place. Placed BLU unit 5 turbine draft tube. Completed final alignment of BLU-5 sole plates and epoxy grouted the anchor bolts. NAES continued with installation of conduit and cable tray in powerhouse and installed conduit for lighting and plant services. ASRC continued framing and builing out the control room.

Lake Level Forecast

Case 20. Start April 1, 2014. Multi-year simulation using 36 year hydrologic record. 117,000 MWH system load until August 26, 2014. Water wasting was stopped on March 28, 2014 when the Blue Lake water level reached el. 298 (six days later than the work window stated in the City's contract with Barnard). PMFU operation is currently continuing until the lake gets down to at least el. 293, to allow a cushion for the lake level, in case we have rain in early April.

In each of these 36 simulations, D4 diesel is run 10 hours each day during the Generation Outage at an average output of 3 MW. This totals 1,634 MWH of diesel at a cost of $735,000.

Blue Lake water level simulation.

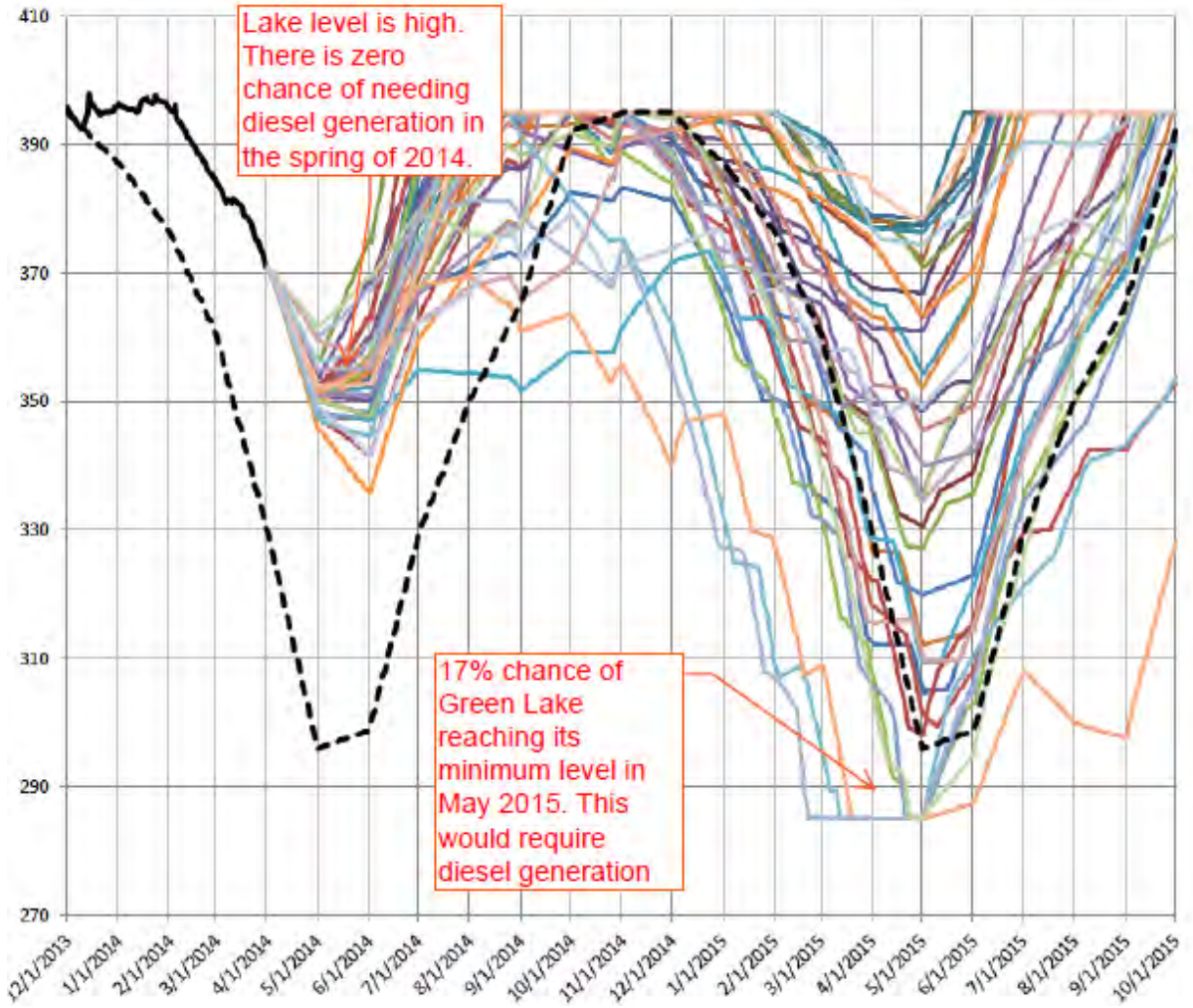


Total diesel generation predicted by this simulation:

Period	Dates	MWH of diesel	Cost at $0.45 per kWH
Spring 2014	-	0	$0
Generation Outage	Aug 26 – Oct 26, 2014	1,634[(1)]	$735,000
Spring 2015	Mar 30 – June 16, 2015	1395 (ave)	$628,000 (ave)

(1) Assumes approx 30 MWH per day for daily peaks, scheduled manually in model

Green Lake water level simulation.



NOTE TO ASSEMBLY MEMBERS:
The computer model's code is over-estimating how quick we can refill Blue Lake in June 2014. This shows up in the above charts as the Blue Lake water level rising above elevation 298 before June 25, 2014. We cannot allow the lake to rise above el. 298 before the new tunnel intake structure is complete. The Contractor's required milestone date for the intake structure completion is June 4, 2014. For these lake level management purposes, we estimate the intake structure will be complete by June 15, 2014.

To make the model create an accurate prediction of Blue Lake levels between now and June would require a re-write of the model code, which we will not undertake. We believe the lake level can be managed adequately over the next 60 days, without changing the computer model.

So, overall, the model is now over-predicting how much water we can store in Blue Lake this fall. The estimates of lake levels in the spring of 2015 are therefore over-estimated. So we may have something like a 20% chance of reaching minimum lake levels in May 2015, as opposed to the 17% described above. This inconsistency in the model results will go away, as we move into June and the lake level restriction is passed.

Appendix 1 to Monthly Update for City Assembly

March 31, 2014

Summary of Temporary Filtration Project Status

Alternative Water Source Investigation Filtration (Blue Lake Project):
Barnard will be providing the Temporary Water Filtration Plant at Indian River as a Change Order to Contract 9.

The Assembly approved additional funding for this work February 18. The total change order amount for Phase I & II is $3,106,790.00.

Barnard has be making submittals on the equipment.

Barnard signed an agreement with Pall on the lease of the filter units.

- CH2MHill completed the final design and will be assisting with startup.
- McMillen will perform the construction management.
- The City will provide plant operation with possible assistance from the supplier.

The completion of this work is now in the critical path.

ADEC permitting is scheduled to be completed in March 2014, construction of the piping and pumping completed in April 2014 and final installation of the filter units in June 2014 for operation in July 2014.

Barnard has moblized and begun ground work at the Indian River facility.

Summary of Titan 130 Diesel Turbine Project Status

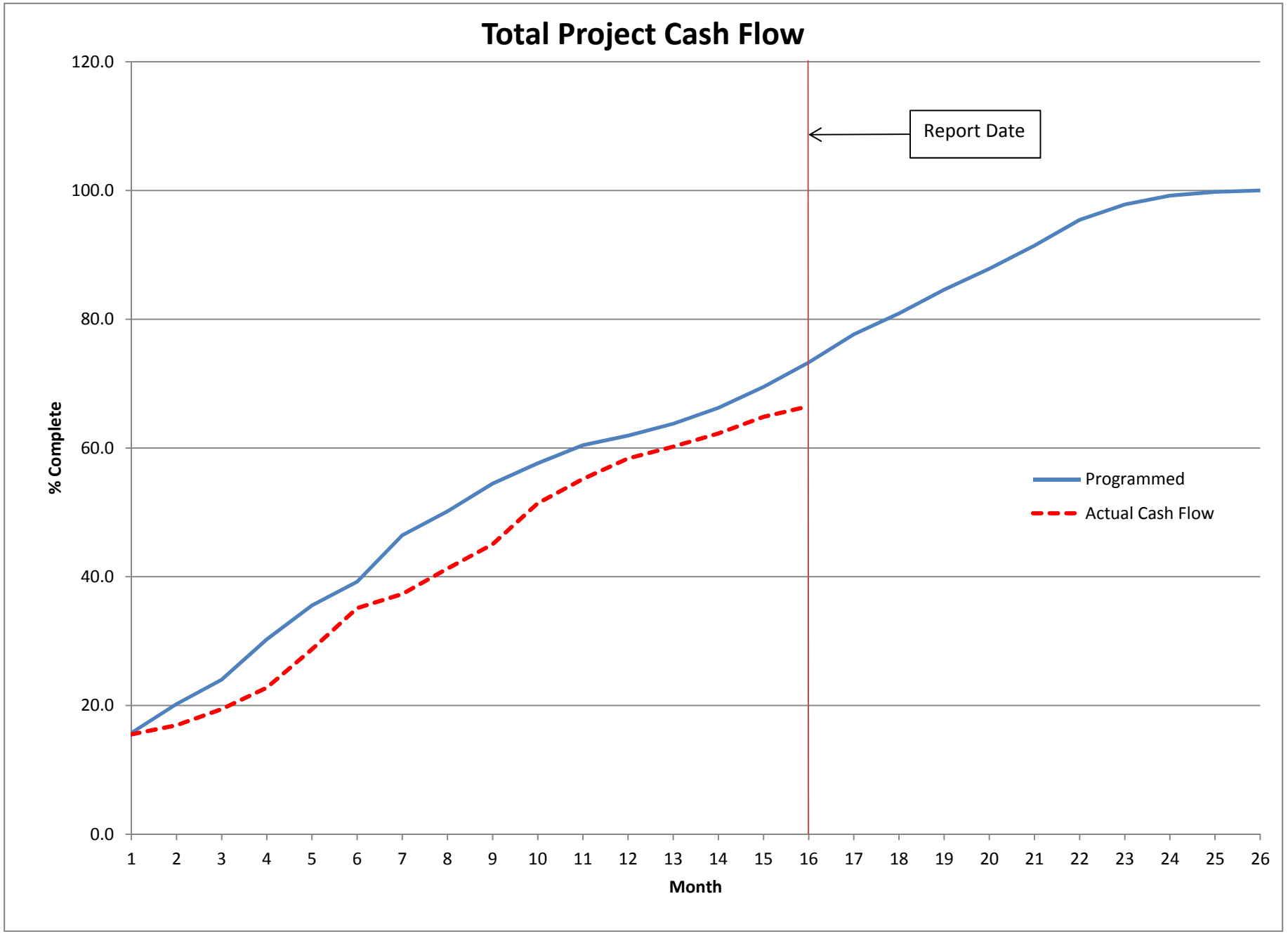
1. Turbine air inlet filter, exhaust stack and turbine generator installed. The Titan turbine-generator is coupled and pre-aligned, ready for overhead air system installation, interconnects and final alignment.

2. Presently setting pilasters for Electric Equipment Room (EER) and auxiliary skid foundations. Fuel wall section is now in place and site preparation for fuel tank pads, vehicle protection wall and dike is in progress.

3. Awarded contract to EPS for development of fuel supply system to turbine, including water wash for turbine shut down sequence. Turbine requires a treated water source to clean and purge injectors on shutdown.

4. Anticipate factory field reps for the new Generator Step-Up Transformer and new 69kV circuit breakers to be on site for unit commissioning approximately mid-May.

5. On site factory training for the Solar Turbine-Generator scheduled for the week of June 2, 2014.


Total Project Cash Flow
120.0
100.0
80.0
60.0
40.0
20.0
0.0
% Complete
Report Date
Programmed
Actual Cash Flow
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
Month

BLUE LAKE EXPANSION PROJECT MONTHLY CONSTRUCTION REPORT

For Period Ending: MARCH 31, 2013
Prepared by: BARNARD CONSTRUCTION COMPANY, INC.

1. *Progress of work*

Environmental Protection

Barnard continues to install erosion and sediment control measures as required at the dam site, storage yard at Sawmill Cove Industrial Park and powerhouse area as ground disturbing activities continue. BMP maintenance and repair is ongoing as needed throughout the project site.

Gate Shaft Concrete

Barnard completed the final lift concrete curb in the gate shaft in March. This curb will contain the T-rail guides for the fixed wheel gate. T-Rail and gate guide installation is expected to begin in April

Gate House Concrete

Barnard crews have all major concrete placements at the Gatehouse, including the retaining wall. NAES Power Contractors have been installing the required grounding and embedded conduits for each concrete placement. NAES and Schmolk Mechanical will begin installation of the electrical and mechanical equipment in the gatehouse in April.

Intake Structure

Barnard crews started excavation for the new intake structure. The excavation followed the reservoir level down throughout the month of March. We anticipate completing the excavation in early April to begin concrete construction.

Dam Raise

Barnard crews completed placement of the keyway concrete in Monoliths 3 through 5 in mid-March. We also completed two additional monolith block placements at the end of March.

Barnard completed repair work on the Howell Bunger Valve Trashrack and Sluice Gate Valve in early March. The Howell-Bunger has been running through most of March to lower the reservoir level.

Powerhouse

ASRC McGraw has completed the installation of interior framing and has begun installation of doors and windows. ASRC also completed installation of the 3 stairways in the Powerhouse. Schmolk Mechanical continues installation of all powerhouse plumbing and has started installation of the HVAC system, with Air-Handling Units and ductwork.

Southeast Earthmovers continued excavation for the powerhouse afterbay and started excavation for the raw water pump station. Southeast Earthmovers also started powerhouse backfill on the west end of the building. Southeast Earthmovers completed the upper penstock excavation.

NAES Power Contractors has continued to install cable tray and conduit below Elevation 27 in the powerhouse. NAES also installed a significant portion of powerhouse lighting.

They have also completed installation of the conduit (lighting and outlets) runs for the control room, break room and offices and have started pulling wire in these conduits.

NAES has also continued installation of the Turbine-Generator equipment. Work completed in March includes the assembly of the Unit #3 spiral case and top chamber, installation of Unit #5 draft tube (rough set), final alignment and grout of Unit #5 spiral case, and the alignment and grouting of Unit #5 generator sole plates.

Barnard crews have completed the major concrete placements for energy dissipation chamber. Work items completed in March include, setting the chamber, installing the fixed cone valve, and tensioning the 4 rock anchors. The remaining pipe work and concrete pedestal will be completed in April.

Penstock

At the end of March, Barnard crews began staging penstock pipe at the powerhouse in preparation of installation beginning in early April.

2. *Status of Construction*

Status of Ongoing Major Construction Activities

- Powerhouse Excavation – 95% complete
- Powerhouse Steel Building – 95% Complete
- Powerhouse Roof – 95% complete
- Precast Wall Panels – 95% complete
- Dam Raise –28 of 53 monolith blocks placed.
- Dam Spillway – 0 of 9 placements
- Dam Parapet Walls and Crest Slab – 0 of 15 placements
- Left Abutment Thrust Block and Cutoff Wall – 8 of 9 placements completed.
- Powerhouse Concrete – 3230 CY placed to date.
- Gate Chamber Concrete – 150 CY placed to date.
- Gate House Concrete – 260 cy placed to date.

See Section 1 above for construction work completed in March 2014.

3. *Construction Issues*

Valve Pit Rock Anchor Failure during load testing in Unit #4 Valve Pit. ASRC has completed a non-conformance report.

High winds shut down work on the Blue Lake Dam raise for 10 days in March.

NAES Power Contractors has provided a replacement lead T/G Installer.

4. *Contract Status*

Barnard's key subcontractors for the Blue Lake Project are as follows:

Name	Scope
ASRC McGraw Constructors, LLC	Powerhouse Construction
Southeast Earthmovers, Inc.	Excavation
Blue Lake Tunnelers	Underground Construction
Crux Subsurface	Foundation Grouting, Micropiles, PRW's
O'Neill Surveying and Engineering	Land Survey
Baranof Materials Test Lab	Quality Control
NAES Power Contractors	Turbine-Generator Installation/Electrical

Barnard's key material suppliers for the Blue Lake Project are as follows:

Name	Scope
ASRC McGraw Constructors, LLC	Concrete Supply
Gerdau Reinforcing Steel	Concrete Reinforcing Steel
Haskell Corporation	Misc. Metal Fabrication

5. *Critical Events and Dates*

Please see attached summary progress schedule updated February 28, 2014.

Critical Dates for the Blue Lake Project are as follows:

Milestone	Date	Required Status of Construction
1	07/01/2013	Drainage Tunnel Complete – Completed May 6, 2013
2	08/19/2013	Initial Intake Excavation Complete – Completed July 21, 2013
3	06/04/2014	Intake Structure Complete
4	08/24/2014	Ready for Generation Outage
5	61 days after start of Generation Outage	Substantial Completion of 1st Blue Lake Turbine Generator
6	91 days after start of Generation Outage	Substantial Completion of 2nd Blue Lake Turbine Generator
7	80 days after start of Generation Outage	Substantial Completion of Fish Valve Unit

6. *Reservoir Filling*

Blue Lake Reservoir Level reached EL 298 on March 27, 2014, 5 days behind the required date of March 22, 2014.

7. *Foundations*

Not applicable for this report.

8. *Sources of Major Construction Material*

The City and Borough of Sitka will be providing most of the major construction materials for this project. Please see list below.

Contract No.	Vendor	Scope of Supply
1	Gilbert Gilkes and Gordon, Ltd.	Turbines and Generators
2	Myers	12.47 kV Switchgear
3	Linita Design and Manufacturing	Bulkhead Gate, Fixed Wheel Gate and Hoist
4	T Bailey, Inc.	Penstock and Manifold
5	WEG Electric	69kV Transformers
6	Benchmark Industrial Services	Powerhouse Bridge Crane
7	CHG Building Systems	Powerhouse Building

Materials Received this Period:

Misc. Metals/Rebar - Barnard has been receiving misc. metals and rebar for various project features throughout the month of March

9. *Material Testing and Results*

Concrete testing is ongoing for the dam raise, gate chamber and powerhouse concrete. No issues have been encountered to date.

10. *Instrumentation*

Not applicable for this report.

11. *Photographs*

Figure 1: Dam Raise

Figure 2: Gatehouse Retaining Wall Placement

Figure 3: Intake Structure Excavation

Figure 4: Powerhouse Interior Buildout

Figure 5: Unit #5 Draft Tube Installation

Figure 6: Staging Penstock Pipe

12. *Erosion Control and Other Environmental Issues*

Barnard is continuing to install the required environmental protection measures on the project site ahead of ground disturbing activities. Ongoing maintenance of dewatering system at powerhouse excavation site will be required to maintain water quality in Sawmill Creek.

13. *Other Items of Interest*