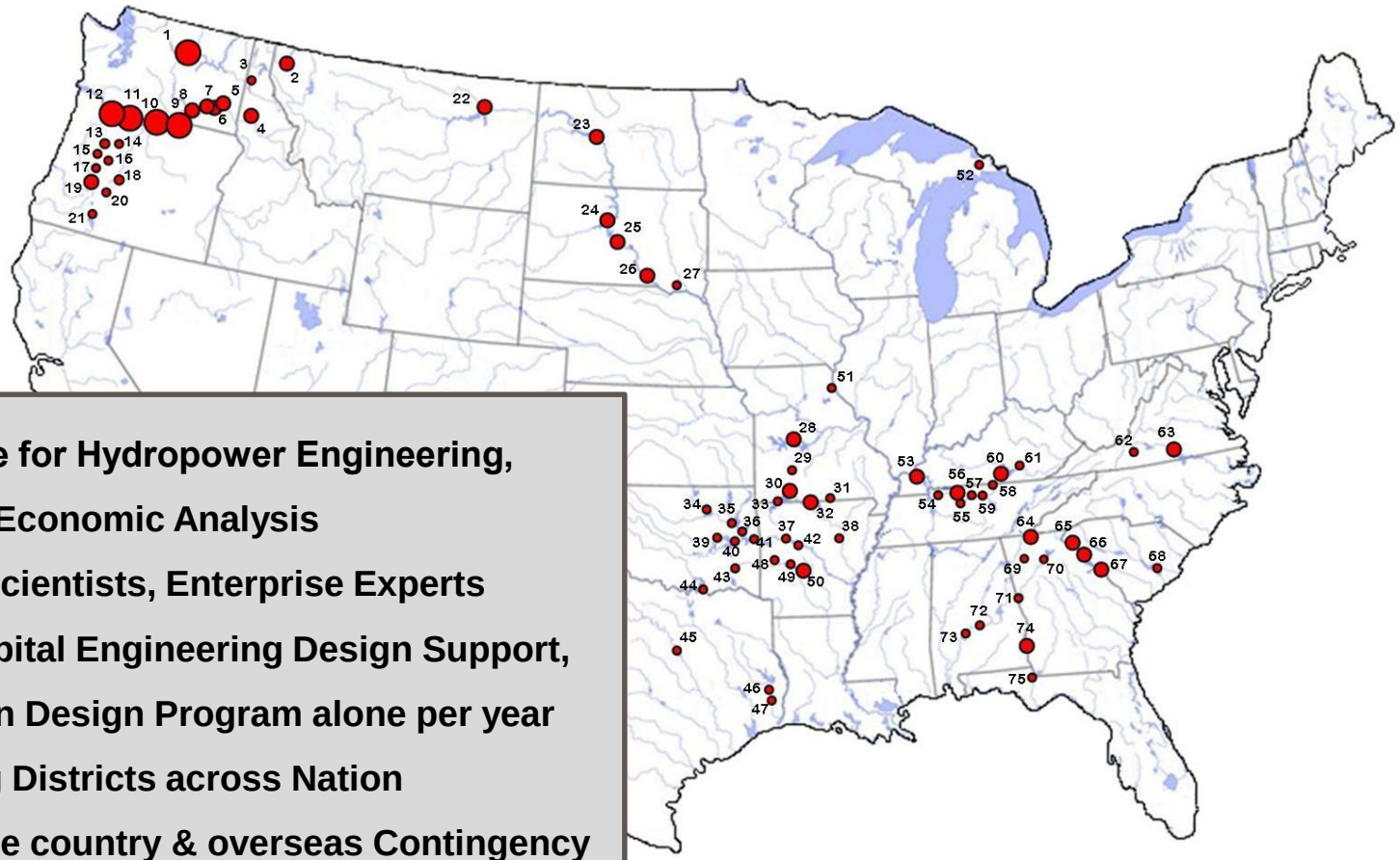
HDC OVERVIEW AND SUPPORT UPDATE

Southeastern Federal Power Alliance
17 April 2018
Steven Miles, P.E., PMP – Director
Kallan Mrozek, P.E. – Product Coordinator

US Army Corps of Engineers ®

The Corps' Hydroelectric Design Center

Portland, Oregon



- **Corps' Center of Expertise for Hydropower Engineering, Design, and Planning & Economic Analysis**
- **Over 191 Engineers and Scientists, Enterprise Experts**
- **Responsible for Large Capital Engineering Design Support, $35M-$40M in Design Program alone per year**
- **16 Hydropower producing Districts across Nation**
- **75 Power plants across the country & overseas Contingency**
- **Mechanical, Electrical, Structural, Computer Engineers Computer Scientists, Economists, Mathematicians**

8– Ice Harbor (WA)
9– McNary (OR/WA)
10– John Day (OR/WA)
11– The Dalles (OR/WA)
19– Lookout Point (OR)
20– Hills Creek (OR)
21– Lost Creek (OR)
22– Fort Peck (MT)
23– Garrison (ND)
31– Norfork (AR)
32– Bull Shoals (AR)
33– Beaver (AR)
34– Keystone (OK)
43– Broken Bow (OK)
44– Denison (TX)
45– Whitney (TX)
46– Sam Rayburn (TX)
47– R.D. Willis/Town Bluff (TX)
MVD:
48– Narrows (AR)
49– Blakely Mountain (AR)
50– DeGray (AR)
51– Clarence Cannon (MO)
LRD:
52– Saint Mary's Falls (MI)
53– Barkley (KY)
54– Cheatham (TN)
55– J. Percy Priest (TN)
56– Old Hickory (TN)
57– Cordell Hull (TN)
58– Dale Hollow (TN)
59– Center Hill (TN)
60– Wolf Creek (KY)
61– Laurel (KY)
SAD:
62– Philpott (VA)
63– John H. Kerr (VA)
64– Carters (GA)
65– Hartwell (SC/GA)
66– Richard B. Russell (SC/GA)
67– J. Strom Thurmond (SC/GA)
68– St. Stephens (SC)
69– Allatoona (GA)
70– Buford (GA)
71– West Point (AL/GA)
72– Jones Bluff (AL)
73– Millers Ferry (AL)
74– Walter F. George (AL/GA)
75– Jim Woodruff (FL)

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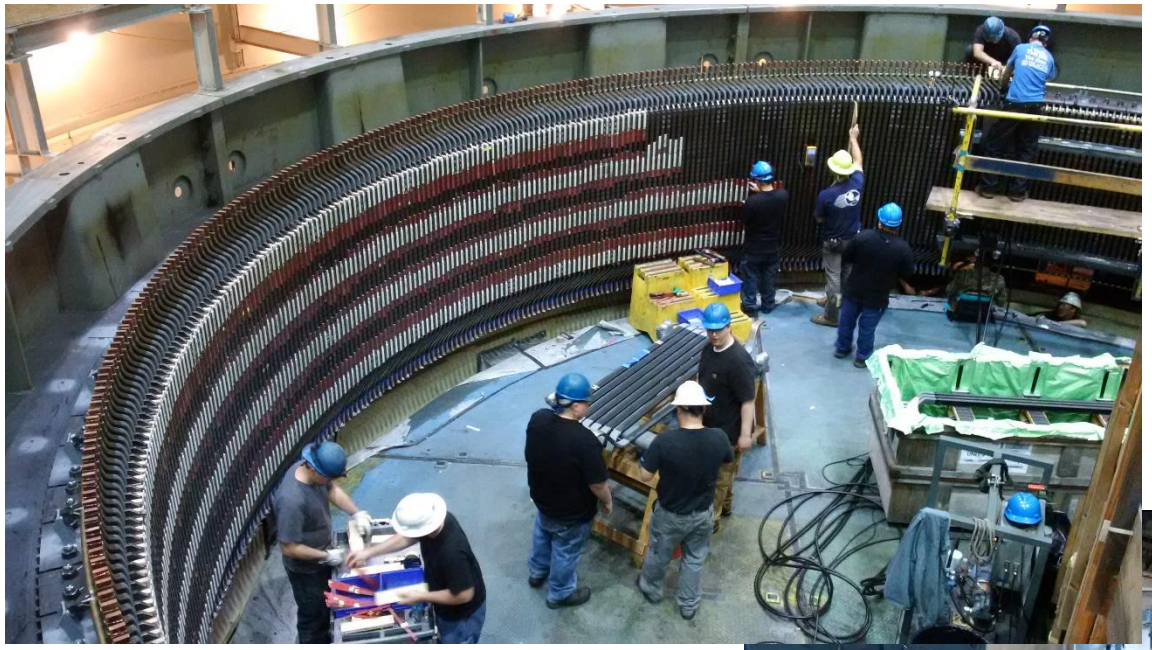

HDC

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THE HDC TEAM

Steve Miles - Director

Richard Nelson - Deputy Director

Brian Shenk

Hydropower Analysis Center

Largest Cyber Engineering Unit in USACE
Over 41 Computer Engineers & Computer Scientists
Designing Cyber ICS & SCADA Solutions

Steven Ernst

ACCS

Jordan Fink

Electrical Branch

James Calnon

Mechanical / Structural Br

Michael Posovich

Product Coordination Branch

41

Cyber Engineers Scientists

Product Development

Product Application

Senior ACCS Expert

62

Electrical Engineers

Protection Systems

Control Systems

Generation Equipment

Senior Electrical Technical Experts

61

Mechanical Engineers

Mechanical Systems

Structural

Engineering Support

Senior Mechanical Technical Experts

Product Coordinators

Budget Section

Largest Concentration of Electrical Engineers in USACE
Designing Electrical Hydropower Systems

Largest Concentration of Mechanical Engineers in USACE
Designing Mechanical Hydropower Systems

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HDC OVERVIEW

HDC

- **PRIMARY FOCUS IS ON OPERATIONS** Close partnership with District staff & plant personnel

- **GROWING PROGRAM** in FY18 & FY19, $35-40M
  - Over 400 Products and Services in pipeline
  - National Program: $450M, Support for 16 Districts/ 5 MSCs
  - 18 Major Rehabs On-Going, 15 to Start in next 10 years

- **HDC TEAM** 181 in Portland, 8 in Fwd Office Mobile AL, 1 in Kalamazoo, MI (home), 1 in USACE Hqtrs Wash DC, 1 in LRD Hqtrs Cincinnati, OH

- **OVERSEAS** Factory/foundries inspections, world-wide travel for QA
  - Austria, Brazil, Poland, Italy, Canada, Israel, Mexico, S. Korea

- **INTERAGENCY** GDACS Deployment to BoR/DOI Grand Coulee (2009-2017), ECD 2020, $75M program Strengthening and expanding our capabilities in remoting technologies and cyber security

- **HYDROPOWER ANALYSIS CENTER** Provides critical HP Analytics (HMI, Benchmarking, Reallocation, Uprate Studies) Predominately Economists / Mathematicians

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TRENDS IN FEDERAL HYDROPOWER

- Strong and consistent reinvestment across all four PMA's
- More emphasis and investment in project planning and asset management
- Increased attention to cyber security and controls
- PMA's and utility associations are desiring more flexibility with plant operations

Table 6-1: Oahe Gantt Chart

ID	Project Title	Program Amount	FY17 Q1	FY17 Q2	FY17 Q3	FY17 Q4	FY18 Q1	FY18 Q2	FY18 Q3	FY18 Q4	FY19 Q1	FY19 Q2	FY19 Q3	FY19 Q4	FY20 Q1	FY20 Q2	FY20 Q3	FY20 Q4	FY21 Q1	FY21 Q2	FY21 Q3	FY21 Q4
449302/526	Generator rewind design	$83,334	CMP																			
399795/510	Tailrace deck transformer oil containment	$1,125,000	C	CMP																		
456035/573	Repair thrust bearing cooler	$300,000	C	C	C	CMP																
18-1178	Penstock dewatering piping in shale drain tunnel	$170,000	C	C	C	C	CMP															
144043/ 475 & 382	Upgrade 115 and 230 kV switchyard and autotransformer replacement	$10,000,000	C	C	C	C	C	C	CMP													
TBD	Replace programmable logic controllers	TBD		D	A	A	D	A	A	CMP												
18-1177	Replace intake motor controls	$650,000	D	D	D	A	A	C	C	C	CMP											
399796/509	Replace generator exciters	$5,566,667	A		C		C		C		C	CMP										
18-1195	Replace monorail bridge crane	$1,000,000	D	D		A	A		C	C	C	CMP										
456034/570	Generator step-up transformer bushing	$1,200,000	A				C		C		C		C	CMP								
456400/571	Bridge crane rehab	$5,500,000	D		A	A	C	C	C	C	C	C	C	C	CMP							
406266/518	Install digital governor retrofits	$3,933,334	D	D	A	A			C	C	C		C	C	C	CMP						
18-1091	Replace outdoor station service switchgear	$1,200,000			D	D	D	A	A	A	C	C	C	C	C	C	CMP					
18-1197	Rehab tailrace bulkhead	$1,800,000											D	D	D	D	A	A	C	C	C	C
TBD	Upgrade CO2 fire suppression	$360,000											D	D	D	D	A	A	C	C	C	C

Gantt Chart Legend

D	Design	Q1	1st Quarter of Fiscal Year (Oct, Nov, Dec)
A	Advertise/ Award	Q2	2nd Quarter of Fiscal Year (Jan, Feb, Mar)
C	Construction	Q3	3rd Quarter of Fiscal Year (Apr, May, Jun)
CMP	Complete	Q4	4th Quarter of Fiscal Year (Jul, Aug, Sep)

MEMORANDUM OF UNDERSTANDING

Between the
Hydroelectric Design Center, U.S. Army
Corps of Engineers

and the

Mobile District, Savannah District and
Wilmington District of the
South Atlantic Division, U.S.
Army Corps of Engineers

1. OBJECTIVE:

The purpose of this Memorandum of Understanding (MOU) is to establish a cooperative relationship between the Hydroelectric Design Center (HDC) and the Mobile District, Savannah District and Wilmington District in the South Atlantic Division (SAD and the Districts) regarding Generic Data Acquisition and Control System (GDACS) Design, Installation and Long Term Maintenance (LTM). The MOU defines the general terms upon which HDC and SAD and The Districts will cooperate.

The objective of this MOU is to provide for the long term support and maintenance of GDACS at the 13 plants in the South Atlantic Division.

2. STATEMENT OF PRINCIPLE:

We agree to work together in an open and trusting relationship in accordance with the HDC/SAD Partnering Agreement.

We agree to work as partners, ethically and progressively, delivering tangible and measurable benefits to both partners.

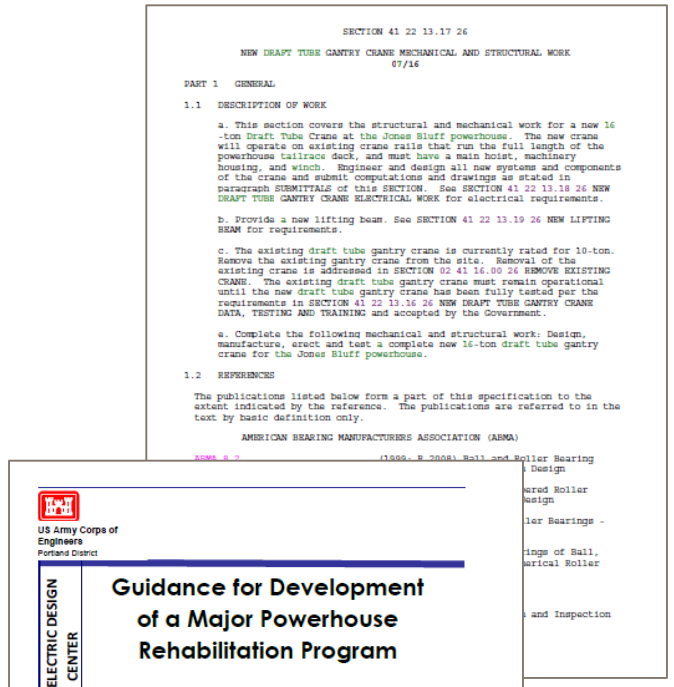
We agree to be open regarding risks inherent in any project, communicate the risk levels for various options, and jointly determine acceptable levels of risk and trade-offs in cost, time, and level of detail.

3. BACKGROUND:

Bonneville Power Administration (BPA) and U.S. Army Corps of Engineers (USACE) worked to develop GDACS which is a modular DACS system that has been installed in

WHAT WE ARE DOING TO INCREASE EFFICIENCY

- **Developing planning guides –** Major Powerhouse Rehab Program guide published Sept 2017, others under consideration.
- **Producing improved guide specifications**– Technical approach, sharing with industry for feedback and comment.
- **Improving HMI –** Condition assessment tool to help with master planning.
- **Detailed scoping phase –** Site visit, scoping meeting, and SSB development prior to starting designs has made the design process run smoother.
- **Enhanced district partnering –** Building relationships to better understand future requirements.
- **Increased A-E capacity –** Two new national HDC contracts, $10M, out of Omaha District.
- **SSB efficiency process –** Faster turnaround locking in schedule and budget commitments.



SECTION 41 22 13.17 26

NEW DRAFT TUBE GANTRY CRANE MECHANICAL AND STRUCTURAL WORK
07/16

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

a. This section covers the structural and mechanical work for a new 16 -ton Draft Tube Crane at the Jones Bluff powerhouse. The new crane will operate on existing crane rails that run the full length of the powerhouse tailrace deck, and must have a main hoist, machinery housing, and winch. Engineer and design all new systems and components of the crane and submit computations and drawings as stated in paragraph SUBMITTALS of this SECTION. See SECTION 41 22 13.18 26 NEW DRAFT TUBE GANTRY CRANE ELECTRICAL WORK for electrical requirements.

b. Provide a new lifting beam. See SECTION 41 22 13.19 26 NEW LIFTING BEAM for requirements.

c. The existing draft tube gantry crane is currently rated for 10-ton. Remove the existing gantry crane from the site. Removal of the existing crane is addressed in SECTION 02 41 16.00 26 REMOVE EXISTING CRANE. The existing draft tube gantry crane must remain operational until the new draft tube gantry crane has been fully tested per the requirements in SECTION 41 22 13.16 26 NEW DRAFT TUBE GANTRY CRANE DATA, TESTING AND TRAINING and accepted by the Government.

e. Complete the following mechanical and structural work: Design, manufacture, erect and test a complete new 16-ton draft tube gantry crane for the Jones Bluff powerhouse.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent indicated by the reference. The publications are referred to in the text by basic definition only.

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)

US Army Corps of Engineers
Portland District

HYDROELECTRIC DESIGN CENTER

PREPARED BY

Guidance for Development of a Major Powerhouse Rehabilitation Program

Prepared By:

US Army Corps of Engineers
Hydroelectric Design Center

September 2017

DESIGNS & STUDIES – MOBILE DISTRICT

FY18 SUPPORT

District	Project	Next Milestone	Date
SAM	Intake Emergency Closure Gate Refurbishment WF George, Allatoona, Buford, West Point	30% P&S	11 May 18
SAM	Switchgear Installation P&S Millers Ferry	90% P&S	31 Aug 18
SAM	Switchgear Installation P&S Jones Bluff	90% P&S	14 May 18
SAM	U1 Switchgear Supply and Install P&S West Point	90% P&S	14 May 18
SAM	GDACS Design and Install Allatoona	U2 Commissioning Complete	11 May 18
SAM	Turbine Rehab Study West Point	Preliminary Analysis	Q3 FY18 (pending receipt of data)
SAM	Turbine Rehab Study Allatoona	Preliminary Analysis	Q4 FY18 (pending receipt of data)
SAM	Generator Fire Suppression Replacement Jones Bluff	Site Visit	5 Jun 18

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DESIGNS & STUDIES – SAVANNAH DISTRICT

FY18 SUPPORT AND NEW STARTS IN FY18 Q4

District	Project	Next Milestone	Date
SAS	Remote Operations GDACS, Controls, Relays Design and Install Savannah District Wide	Start Phase 2 Commissioning	TBD Q2 FY19 is a target
SAS	Draft Tube Crane Replacement P&S RB Russell	Kickoff and Site Visit	Q4 FY18
SAS	Bridge Crane Rehab or Replacement P&S RB Russell	Kickoff and Site Visit	Q4 FY18
SAS	Transformer Fire Suppression P&S Hartwell	Kickoff and Site Visit	Q4 FY18
SAS	Arcflash Analysis and Update RB Russell	Kickoff and Site Visit	Q4 FY18 or Q1 FY19

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DESIGNS & STUDIES – WILMINGTON DISTRICT

FY18 SUPPORT

District	Project	Next Milestone	Date
SAW	480V Motor Control Centers Replacement JH Kerr	Final P&S	13 Apr 18
SAW	Generator Rewind and Turbine Replacement Philpott	Draft Updated Uprate Study	7 May 18
SAW	Draft Tube Bulkheads Philpott	60% P&S	15 Jun 18
SAW	Switchyard Bus Assessment for Power Line Upgrade JH Kerr	Draft Study	On Hold
SAW	GDACS Design and Install JH Kerr and Philpott	Kickoff	TBD

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EDC AND OTHER SUPPORT

FY18 SUPPORT

District	Project
SAM	Carters - Unit Rewind
SAM	Carters - Reversing Switches
SAM	Jones Bluff – Draft Tube Crane Replacement
SAM	Allatoona – Exciters Replacement
SAM	Allatoona - Digital Governors Retrofit
SAM	Allatoona – Testing and Commissioning Support
SAM	Jones Bluff – Digital Governor Retrofit
SAM	West Point - Digital Governor Retrofit
SAM	Millers Ferry- Digital Governor Retrofit
SAM	J. Woodruff– Digital Governor Retrofit
SAM	Millers Ferry – Main Unit Transformers Replacement
SAM	West Point – Main Unit Transformers Replacement

District	Project
SAS	Thurmond – Line Relay Install
SAS	Thurmond – MCC and Switchgear Install
SAS	Thurmond – Thrust Bearing Repair
SAS	Thurmond – Turbine Oil Replacement
SAS	Russell – Static Frequency Converter Breakers
SAS	Hartwell – Vibration Repairs and Testing
SAW	Philpott – Penstock Door Replacement
SAW	JH Kerr – SS Penstock Rivet Repair

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"Leaders in Hydropower Engineering"

HDC

Questions & Comments?

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