HOWARD A. HANSON DAM
Update for Elected Officials
18 March 2010

Seattle District
US Army Corps of Engineers
Agenda

- What we have accomplished to date
- What we are doing now to complete the study to get into the FY12 + budget
- What we could do immediately with FY10-11 funding (additional grouting)
- Summer testing
Current Situation

- There are significant issues at HAHD that create a very compelling sense of urgency in terms of consequences:
  - During January 2009 high pool, the dam showed signs of internal erosion and high rates of seepage
  - To keep HAHD from incurring a substantial risk of failure, the reservoir must not exceed elevation 1170 for more than 24 hours
  - Recently constructed grout curtain provides 54% capacity
  - Pool testing is planned. Testing period, timing and elevation must be managed to use available spring flows, comply with ESA/NEPA restrictions and the uncertainty of grout performance
  - The public is currently exposed to a 1:25 chance of flooding due to overtopped levees as a result of reduced capacity at HAHD (normal protection 1:140)
  - A 1:50 flood event could result in $3.77 billion damages to valley communities.

- HAHD has been incorporated into the Corps’ Dam Safety Program
2009 Interim Measures Completed

- Nationally-known experts convened - $303,000
- Right abutment exploratory drilling and additional instrumentation - $1,457,000
- Seepage barrier - ARRA-funded
  - 475 feet long, 100 to 160 feet deep, and 20 feet thick
  - $12,470,000 spent
  - Construction completed February 2010
- Drainage Tunnel improvements - ARRA-funded
  - Two vertical drains and 13 horizontal drains
  - $955,000 spent
  - Construction completed November 2009
- 3-D groundwater model developed to evaluate interim measures effectiveness at various pool elevations
- Inundation maps completed and distributed to local EM entities
  - Table top exercises conducted with Local Community EM
- Aggressive public outreach and information sessions on going: 88 events and counting
- 2009 conservation pool monitoring and dye testing - $1,500,000
- Provided Hescos®, Supersaks®, ring dikes and sandbags to local communities.
Study Plan-Conceptual Project  (Notional Schedule)

Assumes:
- Design start on completion of analysis of alternatives, but prior to final approval.
- Curtain wall is selected alternative (steps 3-7)
- ASA(CW) approval of concurrent study/design

Key Points:
- Study yields best engineering solution
- Immediate action—Additional Grouting; dependent on funding
  - Flood risk reduction depends on availability of funding—day for day
- Contract Award/Construction = notional based on optimal funding
- At least 5 flood seasons until completion

FY10  FY11  FY12  FY13  FY14  FY15  FY16

1. STUDY
2A. Preliminary Design
2B. Final Design
3. Acquisition (Phase 1)
4. Acquisition (Phase 2/3)
5. Phase 1 Construction: Build road, remove hillside, demolish admin building – (9 mo)
6. Phase 2 Construction: Secant pile wall and grouting (10 mo)
7. Phase 3 Construction: Concrete cut off wall (24 mo)
8. IRRM Grouting: Requires ~$44M for construction

REBUILD STRONG®
HOWARD A. HANSON DAM

Proposed 2010 IRRM Grout Curtain
Extend another 650 ft
Deepen along 2009 curtain
(average depth of 200 feet along entire length)

2009 Interim Grout Curtain
(475 ft long; average depth of 150 feet)

Proposed Sheet Pile Wall
(65 ft long, average depth of 90 feet)

Rock Septum

Additional Water Storage Project
• Remaining to complete: $270 Million (Downstream fish passage)
• Basis is 65% design for Fish Passage Facility
• In 2008 dollars

Green River

Eagle Gorge Reservoir

Dam Embankment

Right Abutment
Howard A. Hanson Dam Seepage Pathways

- Short path through upper aquifer
- Long path through upper aquifer
- Path through bedrock septum
- Path through lower aquifer
Howard A. Hanson Dam
2009 Grouting Program

- Short path through upper aquifer
- Path through bedrock septum
Howard A. Hanson Dam
Proposed Additional Grouting

- Short path through upper aquifer
- Long path through upper aquifer
- Path through bedrock septum
- Path through lower aquifer
Additional Interim Risk Reduction Measure Grouting Proposed

- Two Row grout curtain
  - Costs $44 million to construct
  - Adds 650 feet length to 2009 curtain to reduce flows around the end
  - Grouting down to lower aquifer necessary to reduce flows in lower aquifer

- Risks Addressed
  - Long path seepage through the upper aquifer as indicated by 2009 dye tests conducted at elevation 1167 conservation pool
  - Seepage through the lower aquifer
  - Seepage through short path gap between the grout curtain and the dam embankment

- Possible Timeline for Design and Construction (construction dependent on funding)
  - 6 months from completed design to the completion of first row of grout
  - Two rows complete in 10 months
Benefits of Additional Grouting

- Grout Curtains (GC) have demonstrated history of good performance
- Downstream flooding risk is significantly reduced with GC for limited duration
- Dam is well instrumented—facilitates active monitoring and response actions
  - Additional data (monitoring current GC performance) is not necessary to conclude extended GC is prudent investment
  - More data from summer testing will assist quantification of GC benefit
Summer Conservation Test Plan

- Objective is to determine water transit times and paths through abutment
- Will give us some idea of effectiveness of grout curtain
- Monitor dye passing through aquifer and into tunnel drains using charcoal packs
- Evaluate piezometers and flow rates from drains
- Environmental Assessment will begin public review period this week
- Plan to conserve water as with normal water operations.
Public Outreach

- Dams Sector Exercise Series – Green River Valley
- Joint effort between HQUSACE, DHS, FEMA and regional Partners
- Series of workshops designed to prepare communities and align Federal resources to respond in case of emergency
- Will continue public outreach plan this summer and fall as required to keep the flood preparation message current
- 31 March, Media Round Table, HQUSACE will present Howard A. Hanson Dam DSAC 1 Engineering Risk and Reliability Analysis – Independent External Peer Review.
Path Forward - Summary

- **Interim Solution—Extended GC**
  - Test Success of Initial Grouting in Spring
  - Secure Funding for Additional Grouting--$44M

- **Permanent Solution**
  - Complete Alternatives Study
  - Cost sharing analysis
  - Initiate Design on Selected Permanent Solution
  - Develop Detailed (risk-based) Design and Construction Cost and Schedule
  - Develop Acquisition Plan
  - Request Funding for Construction

- Continue Periodic Member updates and public outreach