DETERMINATION AND FINDING

Columbia River Flood Control Operation
at
Libby Dam

2007 Operating Year

Northwestern Division, U.S. Army Corps of Engineers
January 2007

This decision document identifies the relevant decision factors that I have taken into consideration in making my decision to implement strict VARQ (variable discharge, with Q representing engineering shorthand for discharge) flood control operation at Libby Dam in Montana in Water Year 2007.

The need for this decision document results from a review of events in the Kootenai River Basin in 2006 which included a combination of weather conditions and Libby Dam operations that resulted in a flood event affecting areas along the Kootenai River downstream of Libby Dam. A detailed assessment of the 2006 flood event, and the facts leading up to, during, and following it, are captured in the U.S. Army Corps of Engineers (Corps) 2006 Spring Flood Event Kootenai/Kootenay River Basin After Action Report (AAR) (Nov 2006).

The Corps is responsible for the operation and maintenance of Libby Dam for multiple uses consistent with project authorizations and applicable laws and regulations. Operating decisions must be based on engineering expertise, operating experience, public health and safety, and the economic, social, and environmental needs of the Pacific Northwest and the Nation. Therefore, I am making this decision as to the 2007 operation at Libby Dam based on the best information available at this time, including consideration of local and system flood damage reduction, ability to provide flows for threatened and endangered species, the findings in the AAR and applicable laws and regulations. My primary consideration has been minimizing the risk to human life and safety while meeting other project purposes and responsibilities. Before making my decision, I sought input from my staff, key officials with state, local, Federal and Tribal governments, and the affected public.

The Corps operated Libby Dam following Standard flood control operating procedures before beginning interim VARQ operation in 2003. In previous years, the Corps has exercised flexibility in implementing VARQ by reducing outflows to increase the likelihood of achieving refill, to better match the timing of flows for sturgeon with desired temperatures and conditions downstream, and/or to assist with system flood control strategies. The VARQ operation that will be implemented in 2007 is a strict application of the eight step VARQ Operating Procedures (see attached), as described and evaluated in the Environmental Assessment (EA), Finding of No

Significant Impact (FONSI) and Decision Document signed 31 December 2002. This strict implementation is based on the questions raised regarding application of flexibility and the associated risks that cannot be answered in time for the 2007 operation.

Under this VARQ flood control operation, summer fish flows will be provided to the extent possible with available water to meet the Corps' Endangered Species Act (ESA) responsibilities under the current Biological Opinions (BiOps) from the US Fish and Wildlife Service (USFWS - 2006) and National Marine Fisheries Service (NMFS- 2004). For 2007, the Corps plans to continue operating Libby Dam to the extent practicable, at or below the 1764 foot flood stage measured at Bonners Ferry as designated by the National Weather Service at the time this decision document is signed, and will provide flows for sturgeon at a level based on the tiers in the USFWS 2006 BiOp.

This decision is for the 2007 water year only and does not reflect a long-term decision or direction for future operations. The long-term decision will require additional evaluation, as identified in the Lessons Learned section of the AAR and will be addressed in the upcoming Record of Decision for the Upper Columbia Alternative Flood Control and Fish Operations EIS (UCEIS), and any future updates or supplements thereto.

BACKGROUND

As one of the fourteen Federal Columbia River Power System Projects (FCRPS), Libby Dam is operated by the Corps for system and local flood control, hydropower generation, navigation, recreation, fish and wildlife, and in a manner consistent with Libby Dam's enabling legislation, applicable Executive Orders, Federal and state statutes, regulations and treaties, including, but not limited to the Columbia River Treaty, the International Joint Commission (IJC) 1938 Order on Kootenay Lake, and responsibilities pursuant to the Endangered Species Act (ESA), the National Environmental Policy Act (NEPA), the Clean Water Act (CWA), and the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act).

The Corps, the Bureau of Reclamation (Reclamation), and Bonneville Power Administration (BPA) (collectively the Action Agencies) have consulted with both the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS or NOAA Fisheries) to address the effects of the operation of FCRPS projects, including Libby Dam, on ESA listed species and their designated critical habitat. Beginning in 2003, the Corps began implementing VARQ at Libby Dam on an interim basis in response to BiOps prepared by the USFWS and NMFS. The intent of VARQ is to more closely mimic the natural hydrograph and increase the likelihood of refill, storing more water to provide flows for ESA listed fish, while still providing flood damage reduction. Fish flows are separate from the flood control operation but the ability to provide flows for sturgeon and for salmon and steelhead in the Columbia is improved by VARQ.

ASSESSMENT OF OPERATING PLANS FOR 2007

Preliminary review and analysis of interim VARQ in water years 2003 to 2005 indicates that the Corps exercised flexibility in shaping releases from Libby Dam, which assisted in achieving the objective of refilling the Libby reservoir to provide summer flow augmentation for salmon.

Without exercising this flexibility in VARQ implementation, refill likely would have been compromised during those same years. However, a review of the 2006 year indicates that exercising flexibility in the implementation of VARQ contributed to events that lead to spilling up to 31,000 cfs from Libby Dam. The post-flood event analyses included in the Corps' AAR (Chapter 5) indicate that little or no spill would have occurred in 2006 if the Corps had operated in strict accordance with the VARQ eight-step operating procedures (i.e., without utilizing flexibility to shape flows to accommodate operational objectives for system-wide flood control and for listed sturgeon and salmon) and also assuming the same sturgeon flow operation was implemented. These analyses point to the need for the Corps to conduct further evaluation of the risks associated with exercising flexibility to shape flows in implementing the outflow guidance offered in VARQ's eight step operating procedures, as well as evaluating the impacts of constraining this flexibility.

These evaluations will take several months and are not available for my decision concerning the 2007 water year. Because the evaluation of risks has not been completed and there are no new risk assessment tools available beyond what was available in 2006, the Corps will not apply flexibility to the VARQ operation in 2007 as has been done in past years to accommodate or optimize other objectives.

For 2007, the Corps has reviewed the most up-to-date analysis concerning impacts associated with two flood control operations: Standard flood control, and strict implementation of VARQ. Standard flood control is that which is outlined in the Treaty Flood Control Operating Plan (May 2003) and CRT-63.

The Corps' existing modeling and analysis compares VARQ to Standard flood control based on strict application of either flood control alternative and does not include flexibility or deviations to achieve other operational goals. Therefore, the analysis below compares strict VARQ flood control, following the operating procedures (with no deviations that would go above the rule curve or reduce outflow except as necessary for human life and safety, or to comply with the IJC Order) with Standard flood control.

To reach a decision on 2007 operations at Libby Dam, I considered the factors summarized below. Additional information on these important considerations is found in the AAR, and previous NEPA documents and records of decisions.

COMPARISON OF FLOOD CONTROL OPERATIONS

Under VARQ flood control, the Libby Dam reservoir elevation is held higher during the January to April period than under Standard flood control, given a certain range of "normal" snow pack conditions. The VARQ procedures identify sufficient discharges from Libby Dam during the refill period in the spring to accommodate the anticipated remaining runoff of the snow pack. The VARQ flood control procedures are designed with the intent of improving the likelihood of providing flows for listed fish in spring while also ensuring a higher likelihood of reservoir refill for summer fish flow releases than Standard flood control.

Since 31 December 2002, the Corps has been operating Libby under VARQ flood control on an interim basis until completion of the EIS process for a decision regarding long-term Libby Dam

operations. Compared to Standard flood control, VARQ flood control provides less system flood control storage space at Libby Dam prior to spring runoff (i.e., the depth of reservoir draft is less from January through about April), generally in years when the seasonal water supply forecast is between about 80 and 120%. During reservoir refill, VARQ flood control and Standard flood control also differ. Since the reservoir is higher with VARQ than Standard in years with a near-average water supply forecast, some of the water that would be stored during the refill period under Standard flood control would instead be passed through the dam under VARQ flood control. This means that dam outflows with VARQ would tend to be higher for longer periods in the spring in these years than with a Standard flood control operation.

HUMAN LIFE AND SAFETY

Local Flood Control:

The 2006 flood event highlights the importance of Libby Dam to providing local flood damage reduction. The AAR identified damage reductions downstream due to operation of Libby Dam by comparing regulated (conditions with Libby Dam) with unregulated (conditions without Libby Dam) river stages at selected sites. Estimated damages prevented with regulated and unregulated flows are based on a pre-flood inventory of the following damage categories: basic crops, hops, commercial structures, public structures, residential structures, outbuildings, farm buildings, and estimated emergency costs. The damages prevented due to regulation of the Kootenai River in 2006 are estimated at $27 to $45 million, but this estimate does not include the costs associated with flood fighting, damage to non-Federal levees, and seepage damage, or any impacts in Canada. The estimated damages prevented due to regulation are primarily the result of two predicted levee failures that likely would have occurred at river mile (RM) 156 and RM 108.

The AAR also notes that flexibility was exercised in implementing VARQ in 2006 in an attempt to maximize benefits to threatened and endangered fish while providing for local and system flood hazard reduction. The analysis in the AAR indicates that if the VARQ Operating Procedures were strictly followed (and assuming sturgeon flows were provided as actually occurred), there would have been little or no involuntary spill, and the river would likely not have exceeded the 1764-foot flood stage at Bonners Ferry. Further, the most current Corps analysis indicates that operating Libby Dam with sturgeon flows under either Standard or VARQ flood control, results in approximately the same likelihood of exceeding the current 1764-foot flood stage at Bonners Ferry at around 2% in any given year. In summary, either flood control operation (with sturgeon flows) provides a similar level of local flood damage reduction, compared to unregulated conditions, if the operating procedures are followed strictly.

System Flood Control:

Analysis of system flood control[1] indicates that the likelihood of exceeding a flood level flow of 225,000 cubic feet per second (cfs) in the Columbia River at Birchbank, British Columbia (one of the control points) would be 6% for VARQ, 5% for Standard. The estimated likelihood of exceeding 450,000 cfs in the Columbia River at The Dalles, Oregon, would be about 35% with VARQ, 32% with Standard. The estimated maximum increase in peak flows at The Dalles from

[1] U.S. Army Corps of Engineers. 2002. Hydrologic Analysis of Upper Columbia Alternative Flood Control and Fish Operations on Columbia River System Including the VARQ Flood Control Plan at Libby and Hungry Horse Projects. Northwestern Division, Portland, OR. November 2002.

Standard to VARQ based on the EA would be approximately 28,000 cfs. At Vancouver, Washington, the likelihood of exceeding a stage of 16 feet would be about 22% VARQ and 19 % with Standard. The differences between the likelihood of exceeding flood stages under VARQ or Standard flood control is judged to be well within the modeling sensitivity (i.e. the differences do not appear to be significant). This information will be updated before making a decision on long-term implementation of VARQ.

The VARQ operation assumes that projects downstream, primarily Grand Coulee, would accommodate additional changes resulting from VARQ releases at Libby or Hungry Horse Dam.

OTHER CONSIDERATIONS

Levee Condition:

Effective flood damage reduction in the Kootenai River valley depends upon both Libby Dam operations and a system of non-Federal levees extending from Bonners Ferry to the Canadian border. The Corps' Seattle District recently completed an inspection of the condition of the non-Federal levees below Libby Dam. Given the levee repairs accomplished in 2006, the observed condition of the remaining levees, past studies of levee integrity, the Bonners Ferry Flood Level Study (NWS 2005), and the small likelihood of exceeding the 1764-foot flood stage under either flood control operation (with sturgeon flows), the Corps believes that the risk of dam operations leading to levee failure in Bonners Ferry is low. Sturgeon flow augmentation which would be provided under either Standard or VARQ flood control, likely affects levee condition as much or more than the difference between flood control operations because sturgeon flow augmentation holds flows at a higher level for an extended period of time.

Emergencies:

While unlikely, unforeseen project emergencies, power reliability, floods, imminent levee failure, or other natural disasters may occur during 2007 under either flood control operation. In implementing strict VARQ flood control operations at Libby Dam for the water year of 2007, the Corps does not plan on modifying its operational strategy, including powerhouse operations, spill, reservoir fill, or draft goals in any way that would cause the reservoir to be above the flood control rule curve or reduce outflow below the minimum prescribed VARQ outflow except to address an imminent risk to human life and safety, or to comply with the IJC Order of 1938 on Kootenay Lake. In that case, the Corps would consider reducing outflow from Libby Dam if at all possible on a short term (e.g., one-to-two days) basis only. If necessary, flow augmentation for fish (above outflow required for flood control) will be reduced if such reductions will help protect human life and safety downstream. If an imminent flood risk should exceed the capability of local and state emergency response resources, the Corps will undertake flood fight operations.

Seepage Impacts:

For the Kootenai River Valley in Idaho, the Corps has conducted an evaluation of the estimated agricultural losses due to high groundwater (seepage) behind the levees associated with the two flood control operations, both with sturgeon flows[2]. In any given year, VARQ operations would

[2] U.S. Army Corps of Engineers. 2005. Kootenai River Valley Agricultural Seepage Study Summary Report. Seattle District, Seattle, WA. September 2005.

tend to increase the duration of higher river stages, which tends to increase the magnitude of seepage impacts to agriculture in the Kootenai valley. In a typical year, the seepage study estimates that agricultural losses with VARQ flood control would tend to increase less than 1% above the estimated losses with Standard flood control. In the type of year where the difference in springtime river flows would tend to be greatest between VARQ and Standard (i.e., a year where the water supply forecasts through the draft season are lower than the May 1 forecast and the actual seasonal runoff is greater than 120% of normal), the study estimates that VARQ operations would tend to increase agricultural losses by approximately 10% over estimated losses with Standard. Similar to levee impacts, a large portion of the estimated losses are associated with the addition of fish flows for sturgeon spawning and recruitment under either flood control alternative.

2007 Seasonal Water Supply Forecast:
The 1 December 2006 Corps water supply forecast for Libby Dam estimates the April through August water supply above Libby Dam for 2007 is 122% of normal. If this forecast holds or increases through the winter, operations under VARQ or Standard flood control would tend to be very similar or equivalent for reservoir draft and refill. A new forecast will be available in early January that will be used to determine the end-of-January reservoir elevation target.

Since 1 December the Corps of Engineers has prepared an informal water supply forecast that is approximately 112% of normal. The Northwest River Forecast Center (NWRFC) has also prepared an early bird water supply forecast for the April through August period that is 107% of normal. The current indications are that the 1 December forecast was too high, and operations at Libby Dam in 2007 will be influenced by the VARQ operation strategy.

TDG/Spill – Libby and System:
Total dissolved gas (TDG) in rivers becomes elevated by spill at dams (or other features) as falling water plunges and traps atmospheric gases at levels above normal saturation levels, and is therefore a consideration in dam operations. This is a concern because high TDG levels can negatively affect aquatic life, including fish and invertebrates. Analysis indicates that the likelihood of involuntary spill at Libby Dam at rates sufficient to elevate TDG levels above the 110% Montana State Water Quality Standard would occur in about 6% of years with VARQ and in about 2% of years with Standard (sturgeon flows were an assumption in modeling of both flood control operations). This analysis addresses involuntary spill that could occur as a result of either flood control operation and does not refer to voluntary operations such as test releases of powerhouse capacity plus 10,000 cfs (spill is the only way to provide such flows at this time) from Libby Dam.

Unanticipated events such as transmission line constraints or the loss of a generating unit at Libby Dam could limit the ability to pass flows through the powerhouse. Because of the typically higher releases required under VARQ during refill, if such an event happens it could become necessary to provide the outflows via spill in order to maintain the reservoir storage space called for by the eight step process. The likelihood of spill in such circumstances is expected to be low under either flood control operation, but VARQ may marginally increase the need for spill in the event of generation or transmission problems.

At dams on the mainstem Columbia River, analysis indicates that implementation of VARQ flood control would increase the incidence of flows in excess of spill caps designed to limit high total dissolved gas levels by about 1% compared to Standard flood control. Under either Standard or VARQ, the highest incidence of spill in excess of spill caps would likely occur at Wells, McNary, and Bonneville dams.

Potential Change to Flood Stage at Bonners Ferry, Idaho:
The National Weather Service is responsible for setting flood stage. This stage is currently defined as the river level at which flow over the banks of the river occurs, causing a hazard to lives, property, or commerce. Since 1996, the flood stage on the Kootenai River at Bonners Ferry has been elevation 1764 feet. To the extent possible, the Corps operates Libby Dam to maintain river levels at Bonners Ferry no higher than 1764 feet.

The Corps understands that the local community has requested that the National Weather Service lower their designated flood stage at Bonners Ferry, and that a revised flood stage of elevation 1762 is being considered. The Corps has compiled data on the flood threat and over-bank flooding associated with the 2006 spring flood event and provided this data to the National Weather Service to assist in reviewing the Kootenai River flood stage at Bonners Ferry. A decision by the National Weather Service is expected in late January 2007.

The Corps is currently planning to continue to operate Libby Dam to avoid voluntarily exceeding elevation 1764 feet, to the extent practicable in 2007. Should the National Weather Service change the flood stage at Bonners Ferry sometime during 2007, the Corps will continue to operate to elevation 1764 feet at Bonners Ferry. Additional analysis would be required to evaluate the effects of trying to operate to 1762 feet (or any other elevation) before the Corps changes operations to manage to a different elevation.

Columbia River Treaty:
The Columbia River Treaty between the United States and Canada was ratified in 1964 and provides for the addition of reservoir storage for flood control and power production, at three dams in Canada. The Treaty allowed for the construction of Libby Dam in Montana. Together, the Corps and BPA comprise the U.S. entity under the Treaty, and coordinate the planning and operation of the FCRPS with BC Hydro, the Canadian entity under the Treaty.

Pursuant to the Treaty, an agreement was developed to address operational changes at Libby. The Libby Coordination Agreement (LCA) sets forth the implementing procedures for the Entities continuing cooperation on coordination of the operations of Libby Dam with the operation of hydroelectric plants on the Kootenay River in Canada. The U.S. Entity provides annual updates to the Canadian Entity on the expected operation of Libby Dam including power, flood control, and other nonpower requirements. The updates are referred to as the Libby Operating Plan (LOP). The U.S. Entity updates the LOP to reflect relevant changes in planned Libby Dam operations, as needed. The coordination of operations for flood control at Libby Dam in 2007 will be addressed with the Canadian entity through existing channels.

The International Joint Commission:
The operation of Libby Dam is also governed by the 1938 IJC Order on Kootenay Lake. The 1938 Order addresses elevations of Kootenay Lake, located 140 miles downstream from Libby Dam in Canada, and can constrain the operation of Libby Dam, particularly in January through early April when releases from Libby Dam cannot cause the elevation of Kootenay Lake to exceed the upper limit specified in the Order. If the elevation of Kootenay Lake exceeds the upper limit, the outflow from Libby Dam is reduced to as low as the natural inflow to the reservoir behind Libby Dam. Libby may operate above its flood control rule curve to satisfy the Order. The Corps coordinates Libby Dam operations with BC Hydro and Fortis BC (formerly, Aquila, Inc.) to assure compliance with the 1938 IJC Order.

The Endangered Species Act (ESA):
The 2006 USFWS BiOp on the effects of Libby Dam Operations on the Kootenai River White Sturgeon, Bull Trout, and the Kootenai River White Sturgeon Critical Habitat, includes a Reasonable and Prudent Alternative (RPA), with a performance-based approach for achieving habitat attributes to promote successful sturgeon spawning and recruitment. Among other items, the 2006 USFWS RPA recommends continued implementation of VARQ flood control, development of a protocol for evaluating sturgeon flows, as well as flow operations for bull trout.

For listed anadromous species (salmon and steelhead), the most recent ESA BiOp was prepared in response to the District Court remand order dated June 2, 2003[3]. The Action Agencies submitted the 2004 Updated Proposed Action (UPA) to NOAA Fisheries, which considered and concluded in the 2004 NOAA FCRPS Biological Opinion that the action would avoid jeopardy. For Libby Dam, those actions include implementation of VARQ Flood Control, improved forecasting procedures, targeting refill of the reservoir by approximately June 30 each year, and drafting to meet salmon flow objectives during July and August, with draft limits of elevation 2439 feet (20 feet below full pool) by end of August.

Implementation of VARQ in 2007 is consistent with both of the existing BiOps. However, with strict implementation of the VARQ operating procedures, the likelihood of refill will be reduced from that achieved in recent years and there will likely be less water available for summer flows. There is also an increased possibility of double peaking below Libby Dam. Double peaking can occur as a result of following high flows for sturgeon with reduced releases to attempt to refill and then providing higher releases in July and August for salmon and steelhead.

The National Environmental Policy Act (NEPA):
The Corps has considered the effects of both Standard Flood Control and VARQ Flood Control operations in existing NEPA documents, and concluded that effects of Libby Dam operations within current powerhouse capacity are addressed in these documents. These NEPA documents include the: Libby Dam and Lake Koocanusa EIS dated January 1972; System Operation Review EIS (SOR EIS) completed with the issuance of a Record of Decision (ROD) in 1997; and the Upper Columbia Alternative Flood Control and Fish Operations Interim Implementation at

[3] Consultation on Remand for Operation of the Columbia River Power System and 19 Bureau of Reclamation Projects in the Columbia River Basin (revised and reissued pursuant to court order, NWF v. NMFS, Civ. No. 01-640-RE (D.Oregon).

Libby and Hungry Horse Dams Environmental Assessment (EA), Finding of No Significant Impact (FONSI) and Decision Document signed in December 2002.

The Upper Columbia Alternative Flood Control and Fish Operations Environmental Impact Statement was finalized in April 2006. The preferred alternative for Libby Dam operations includes VARQ with flows for sturgeon up to 10,000 cfs above Libby powerhouse capacity. The Record of Decision for long term implementation of alternatives discussed in the EIS is scheduled to be developed in 2007, pending further analysis and evaluation as identified in the AAR in response to the 2006 Flood Event.

Continued implementation of VARQ at Libby Dam in 2007 is supported by the 2002 EA, FONSI and Decision Document for interim implementation, as well as the most recent analysis concerning the system and local impacts of VARQ and Standard flood control operations.

The Federal Water Pollution Control Act (Clean Water Act (CWA):
Libby Dam Operations will be implemented in the 2007 water year in a manner consistent with the Corps' legal obligations under the CWA, to the extent practicable. The State of Montana's water quality standards have been taken into consideration, and the Corps has determined that actions voluntarily exceeding state water quality standards require coordination with the State with the objective of operating Libby Dam in a manner that harmonizes compliance with both ESA and applicable state water quality standards.

The Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act):
The Corps is required to exercise its responsibilities for operating the FCRPS in a manner that provides equitable treatment for fish and wildlife, along with other authorized project purposes. Pursuant to the Northwest Power Act, the Corps has taken into consideration the Northwest Power and Conservation Council's Fish and Wildlife Program and Mainstem Amendments, to the fullest extent practicable in making a decision regarding the Flood Control Operation at Libby Dam for the 2007 water year. The mainstem amendments call for implementation of VARQ at Libby Dam.

The mainstem amendments also call for drafting Libby dam to an elevation 10 feet below full pool by the end of September rather than 20 feet below full pool by the end of August. This operation is under discussion in the FCRPS remand collaboration and a decision has not been made on it at this time.

Tribal Trust Responsibilities:
The United States government recognizes the sovereign status of Native American Tribes. Treaties between the United States and some Columbia Basin Tribes document agreements reached between the Federal government and these Tribes. The Federal government has a trust responsibility to protect the tribal rights under these treaties and to consult with Tribes on management and use of resources, such as preserving and maintaining the trust asset. In carrying out its fiduciary duty, it is the Corps' responsibility to ensure that Indian Treaty rights are given full effect and to act in accordance with the Executive Order on Consultation and Coordination with Indian Tribal Governments. In formulating and implementing activities that have Tribal implications, the Corps consults with the affected tribes.

In making the decision as to which Flood Control operation to implement in water year 2007, the Corps has taken into account the Northwest Treaty Tribes' fishing rights, the United States' trust responsibility to Indian Tribes and its responsibility to act in a manner consistent with that trust responsibility.

12 Corps of Engineers Actions for Change:
On August 24, 2006, the Chief of Engineers, LTG Carl A. Strock, announced 12 "Actions For Change" that are intended to act as a blueprint as the Corps changes the way it does business in the years ahead. The actions arise from lessons learned from Hurricanes Katrina and Rita on the U.S. Gulf Coast.

The 12 actions are to be used to guide the Corps' ongoing and future work, and to ensure that it has an organization that is adaptable, flexible, and responsive to the needs of the nation. The concepts, which fall within three overarching themes -- effectively implementing a comprehensive systems approach, communication, and reliable public service professionalism, are designed to examine both processes and institutional culture of the Corps. To meet these objectives, the Corps has applied the 12 actions to analysis of potential Libby Dam operations for 2007, as summarized below:

Effectively Implement a Comprehensive Systems Approach: Comprehensively design, construct, maintain and update engineered systems to be more robust, with full stakeholder participation.

Libby Dam is operated as part of a system to provide both local and system flood damage reduction. The AAR and lessons learned called for development of additional modeling and risk assessment tools that are not available for this decision on 2007 operations but will be considered in making a decision on long-term implementation of VARQ. The most up-to-date information and analysis as to both standard and VARQ flood control operations were used to make the decision for 2007.

Communication: Effective and transparent communication with the public, and within the Corps, about risk and reliability.

The Corps has been coordinating, and will continue to, coordinate with the public, local, state, regional, Tribal, Federal, and Canadian officials concerning Libby Dam operations. The AAR was made available on the internet and discussed at a public meeting in Bonners Ferry, Idaho on November 6, 2006. My staff has coordinated with various Federal, state, local and tribal officials to seek input leading up to this decision, and my decision will be shared with the public.

Reliable Public Service Professionalism: Improve the state of the art and the Corps' dedication to a competent, capable workforce on a continuing basis. Make the commitment to being a "learning organization" a reality.

The AAR and lessons learned identified the need for further improvements in the assessment and management of risk when making operational decisions. I am committed to completing those assessments and have directed my senior staff to continue an active role in overseeing the implementation of the recommendations in the AAR.

Public Involvement:
The 2006 flood event and AAR have been fully coordinated with the public, including public meetings held in Bonners Ferry on September 6 and November 6, 2006. Subsequent to the spring 2006 operation, and in parallel with the development of the After Action Report, and in conjunction with deliberations regarding an operating plan for 2007, numerous exchanges of information have occurred through meetings or correspondence with key government entities, stakeholders and interests. These include the States of Montana, Idaho and Oregon, the Kootenai Tribe of Idaho, Mayor of Bonner's Ferry, Idaho, Northwest Power and Conservation Council (NPCC), Salmon Managers (System Operational Request 2006-8), National Marine Fisheries Service (NOAA), US Fish and Wildlife Service, Bureau of Reclamation, Bonneville Power Administration, BC Hydro, and several members of the public.

In summary, the input from these interested parties can be classified as either supporting VARQ operation in 2007, provided it is implemented strictly according to the operating guidelines, or, supporting a very conservative flood control operation that minimizes the potential for high flows in the Kootenai River downstream of Libby Dam. BC Hydro indicated by letter in July 2006 that it supports reverting to Standard flood control until VAR Q is further reviewed. Letters were received from the State of Montana and Kootenai Tribe of Idaho, NPCC and NOAA and a local guide company supporting VARQ operation in 2007. Montana and the Kootenai Tribe of Idaho (joint letter dated December 1, 2006) support implementation of an approach that balances the need to protect citizens from damaging floods with the biological needs of Kootenai River white sturgeon. The State of Idaho has indicated support for VARQ provided there is appropriate protection for areas of flood risk downstream such as Bonners Ferry, Idaho.

FINDING

I have reviewed and considered the foregoing information, the AAR and lessons learned, and the comments received in writing and via staff discussions with the States, Kootenai Tribe of Idaho, local officials and Federal agencies.

I have considered Libby Dam's authorizing legislation, the Corps' tribal trust responsibilities, Columbia River Treaty requirements and compliance with all applicable environmental laws. This action has been coordinated with the Tribes, States, BC Hydro, the Northwest Power and Conservation Council and other interested parties and coordination will continue as part of the on-going implementation.

It is my determination that implementing VARQ flood control operation according to the attached operating procedures, and providing fish flows at Libby Dam in 2007 is in the public interest. This decision is based on analysis that shows that strict application of VARQ provides a reasonable level of flood protection (similar to Standard flood control when fish flows are considered). Using strict VARQ flood control will enable the Corps to meet its ESA responsibilities and will provide more water storage for fish flows, while mimicking a more natural river flow compared to Standard flood control.

I recognize that there will always be a risk of high water events, including flooding and spill, in any given year with either Standard or VARQ flood control. The flexibility exercised in implementing VARQ, along with unforeseen weather conditions, contributed to the 2006 flood event. Additional analyses are needed for the Corps to categorize and convey the public risk when exercising flexibility in a VARQ operation. The Corps needs additional time to perform theses analyses. Therefore, the Corps will not consider or implement any deviations from the VARQ operating procedures in 2007 that would cause the reservoir to be above the rule curve or reduce outflow below the prescribed VARQ outflow, except for short-term deviations when necessary to protect human life and safety and to comply with the IJC Order. The likelihood of achieving reservoir refill, and consequently the volume available for summer fish flows, will be reduced compared to recent years because of strict adherence to VARQ operating procedures; I find this to be an acceptable tradeoff given the importance of flood damage reduction.

Date: 5 Jan 2007

GREGG F. MARTIN
Brigadier General, USA
Commanding

Attachment 1

VARQ Operating Procedures at Libby Dam

INTRODUCTION. The following pages contain a description of the rules that govern the VARQ FC procedure at Libby Dam. The general rules are listed below and will be applied in 2007.

Rule 1. Storage Reservation Diagram. *A storage reservation diagram (SRD) for Libby Dam (see figure below) guides the evacuation of space for flood control. Required space is a function of the April-August runoff volume forecast at Libby Dam. Following the evacuation period, the project is required to maintain this space until the initiation of refill. During evacuation and up until the initiation of refill, outflows should be limited to hydraulic capacity of the powerhouse to the best extent possible. However, situations such as the loss of hydraulic capacity or rapidly changing forecasts may require spill to meet flood control requirements.*

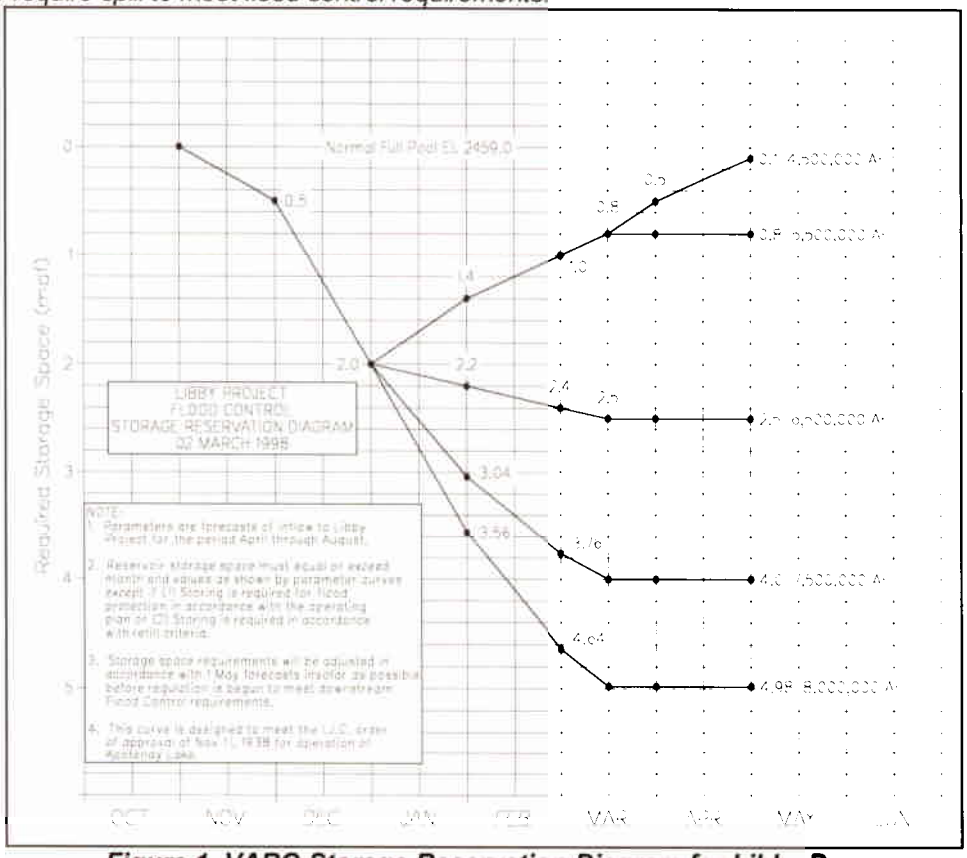

Figure 1. VARQ Storage Reservation Diagram for Libby Dam

Rule 2. Initiation of Refill. Initiation of refill is determined by the operating procedures for system flood control on the lower Columbia River. These procedures are described in *Columbia River Treaty, Flood Control Operating Plan, October 1972.* At Libby Dam, refill is initiated approximately ten days prior to when streamflow forecasts of unregulated flow are projected to exceed the Initial Controlled Flow (ICF) at The Dalles, Oregon. This criterion applies most of the time: however, if the reservoir intersects with its flood control refill curve (FCRC) prior to ICF being reached, then refill is initiated at that time. The FCRC is a refill curve that fills the reservoir with 95 percent confidence at minimum outflow.

Rule 3. Initial VARQ Outflow. Use the figure below to determine an initial VARQ outflow for Libby Dam.

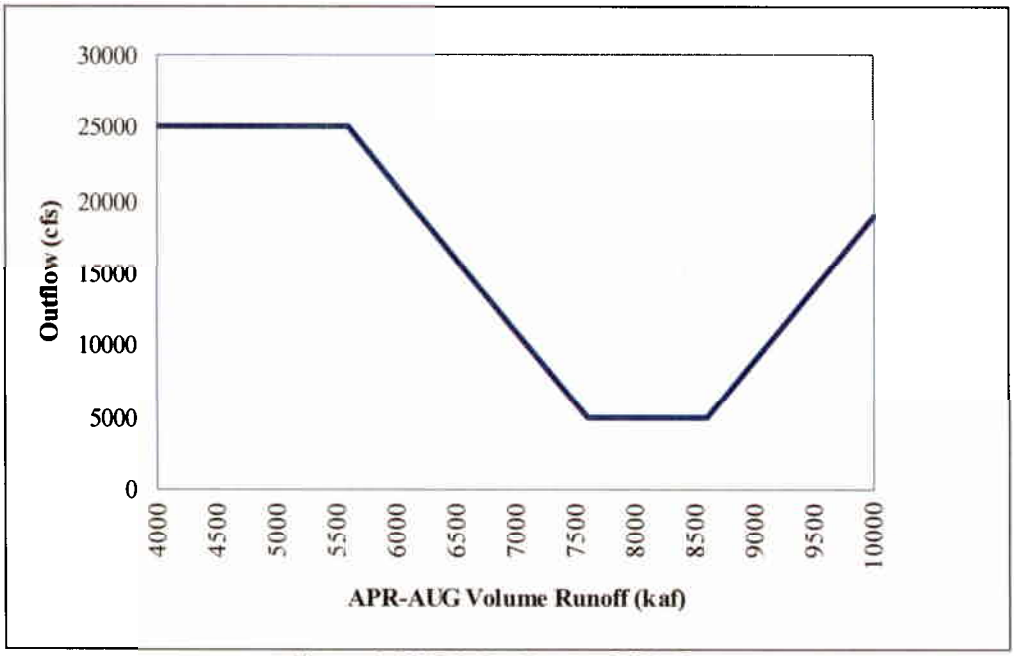

Figure 2. VARQ Outflows at Libby Dam

Rule 4. Adjusting VARQ Outflows for Delta Storage. Adjust the initial VARQ outflow, if necessary, to compensate for any storage difference between the actual reservoir level and the space required for flood control. This difference can reflect under or over-drafted conditions (Delta). This is done in the following manner:

- Estimate the duration of the system flood control operation (Duration) using the figure below. Select the appropriate curve based on the level of the latest projected control flow at The Dalles (ICF).

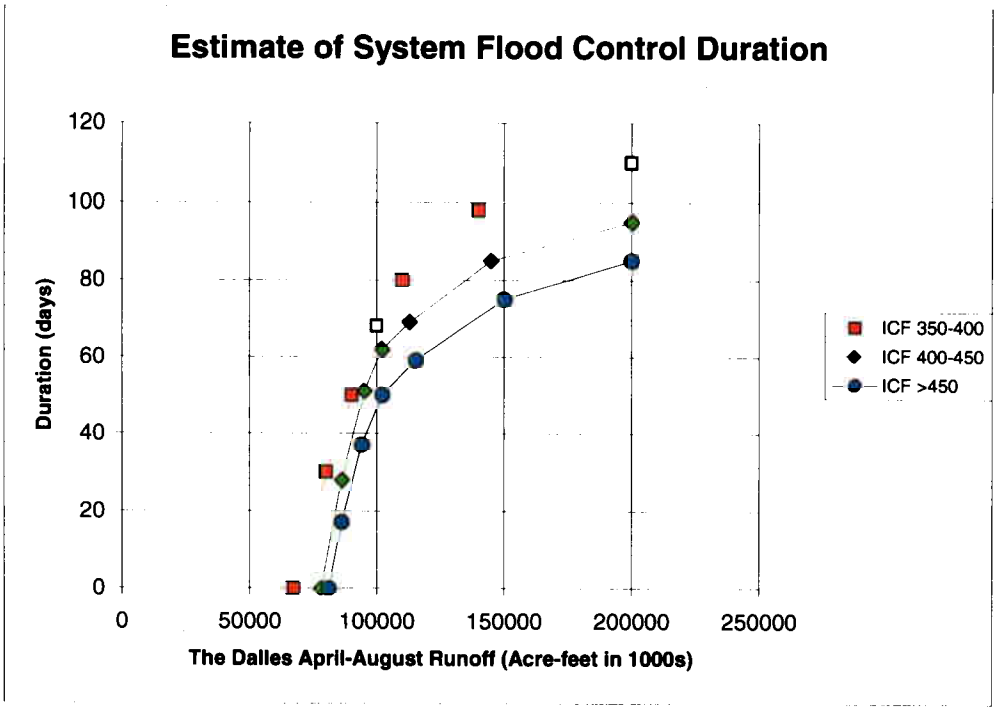

Figure 3. Estimate of System Flood Control Duration

- From the selected curve determine the flood control duration using the April-August runoff forecast for The Dalles.
- Compute the VARQ storage adjustment:
  ADJSTO = [Delta(kaf) x 0.5(ksfd/kaf)] / Duration(days)
- Compute the new VARQ outflow:
  VARQ(new) = VARQ(initial) + ADJSTO

If the runoff forecast at The Dalles is less than 85 million acre-feet, it is likely that system flood control of any significant duration will not be necessary for the lower Columbia River. Use streamflow forecasts to adjust VARQ outflows, if necessary, to compensate for any storage difference between the actual reservoir level and the space required for flood control. Reduce the VARQ outflows as necessary to provide protection against local flooding and to improve the likelihood of refill.

Rule 5. Adjusting VARQ Outflows for Prior VARQ Releases. VARQ releases are seasonal in nature, generated using seasonal runoff forecasts.

- This rule accounts for the difference in outflows released since the initiation of refill and the new VARQ outflows developed using the updated runoff forecast:

ADJDUR = [VARQ(new) – VARQ(prior)] x [Prior Release(days) / [New Duration(days) – Prior Release(days)]]

- Compute final VARQ outflow:
  VARQ(final) = VARQ(new) + ADJDUR

Rule 6. Inflows Less than VARQ Outflows. At the initiation of refill, if inflows are less than the VARQ outflow, pass inflow until inflows rise to the VARQ level. Thereafter, if inflows drop below the VARQ outflow, pass inflow until they rise again to the VARQ level.

Rule 7. Updating VARQ Outflows During Refill Season. Update VARQ outflows throughout the refill season as new runoff forecasts are developed. Use streamflow forecasts to evaluate the performance of the

VARQ outflows in meeting system and local flood control objectives. Reduce VARQ outflows if necessary to provide protection from local flooding. Return to VARQ outflows once local flooding is over.

Rule 8. Final Stages of Refill. Increase outflows during the final stages of refill to avoid overfilling and unwanted spill. Likewise, decrease outflows during the final stages of refill if the present outflow would otherwise not fill the reservoir. Use streamflow forecasts and engineering judgment to select the appropriate outflows.