

VALUE ENGINEERING COMMENTS

1. **Perform Safety Risk Assessment/Analysis on Relative Lock Size (Speculation List Item No 6):** There appears to be a major "unquantified" benefit that would be associated with a 110-ft versus a 75-ft wide lock regarding potential accidents. A significant portion of the traffic using these locks carry petrochemical and other bulk industrial products. A major accident involving such cargo could have close to catastrophic consequences. Combustible and/or hazardous material release could result in loss of life, major damage to the locks and/or create an environmental problem in the sensitive Atchafalaya Swamp Basin. Aside from the direct damage losses from the above, secondary losses, particularly that associated with closed transportation access needed for lock repair and/or environmental clean up, would also be significant.

A 75' lock would create a constriction to shipping, considering the next lock downstream is 85' wide. Given the relative safety advantages provided by a wider (110ft) lock, it is recommended that a risk assessment/analysis be performed to quantify relative expected accident losses. A similar study was performed on the Mississippi River Gulf Outlet Locks located in the City of New Orleans. Such an evaluation could very well indicate substantial safety related benefits of the wider lock which may identify it as the NED plan.
2. **Segregate Material in Disposal Area for Re-Use (Speculation List Item No 12):** Various qualities and gradations of soils will be encountered in the process of excavation of local chamber and channels. Suggest segregating materials (sand, clays, etc.) within the disposal area, effectively producing stockpiles for re-use on this and future earthwork projects.
3. **Make Upper Hinge Section (Gate Mounted) a Bolt on and Adjustable Unit, Not Fixed Size (Speculation List Item No 47):** Suggest the sector gates upper hinge sections be designed as adjustable versus a "fixed hinge". This would offer a significant improvement in replacement alignment.
4. **Use 4' Walkway Across Mitre Gates. Use Non-Metallic Walkway Size (Speculation List Item No 27):** The width of gate is approximately 2.5 feet. With installation of handrails, this narrows to less than 2 feet width. It would be convenient to have walkway 3' to 4' wide to accommodate carts and transfer of materials to the opposite lock wall. A prefabricated unit could be attached to the top of gate, providing a wider walkway. However, the lock wall must be notched for clearance when gates are open. The wider walkway would provide improvements from both a utility and safety standpoint. In addition to using a wider walkway, consider use of a non-metallic walkway structure.

VALUE ENGINEERING COMMENTS (continued)

5. **Salvage and Re-use Motors on Existing Gates Size (Speculation List Item No 29 & 31):** The current design requires the Contractor to demolish the existing lock and remove all debris from the site. The existing lock gate motors have just been replaced and are in almost new condition. The VE Team recommends that the Government salvage these motors, controls, etc., and re-use them on other Corps locks which have similar type equipment, when replacement is required. The construction contract should be written to specify that existing motors, controls, etc., should be carefully removed and turned over to the Government before demolition of the existing lock structure.

6. **Use a Fire Monitor System in Lieu of Hose Reels (Speculation List Item No 13):**
The present system has too many hose reels along the side of the locks and they get in the way of everyday operations. The VE Team feels that the number of hose reels can be reduced and a fire monitoring system be installed. The same opinion was shared by the on-site operating personnel. This proposal may also result in a slight cost savings to the project.

7. **Add Lifting Eyes to Gates (Speculation List Item No 57):** The current design does not require lifting eyes to be installed on the gates. Conversations with the operating personnel indicate a need for lifting eyes on the gates. The VE Team recommends that the lifting eyes be added to the gates to facilitate their removal for normal O&M requirements.

8. **Create Wetlands in North Disposal Sites, Add to Mitigation Bank/Credits (Speculation List Item No 38):** Several areas on the north side of project are scheduled to be used as disposal sites. Rather than filling these area to the maximum, dispose to an elevation sufficient for wetland creation. These created acres can be used for mitigation credits on this or other projects or saved for future use as part of a mitigation bank.

9. **Lower needle girder (support for needles (Speculation List Item No 41 & 42):)** Recess 42' (top of wall) to mid-wall height (which is about 20' above the gate bay bottom slab invert). Lowering the elevation of the needle girder will reduce the moment on the vertical needles thereby reducing their size. This will increase the girder size; however, the reduction in needle size will be more advantageous for O&M. Operations Division has indicated a preference for a smaller needle cross section. In addition, recommend providing a temporary filler for the girder slot to protect it from damage.

VALUE ENGINEERING COMMENTS (continued)

10. **Use Vertical Lift Gates (Speculation List Item No 51):** Mel Price Lock and Dam, at 110-ft wide, uses vertical lift gates. Conditions and head differential at Mel Price are similar to those at Bayou Sorrel. Considerable effort was spent to implement the vertical lift gate design in lieu of mitre gates. Suggest additional effort be expended to research the reasons which justified use of vertical lift gates at Mel Price. Initially we were told that the gates were less expensive and simpler to operate and maintain, but await further information from Rock Island and St. Louis Districts.
11. **Move New Lock South to Optimize Foundation Conditions, Constructability and Channel Navigation (Speculation List Item Nos 3 & 4):** The latest site layout for the new lock places the south gate bag centerline approximately 750-feet north and west of the center of the existing lock. Channel improvements south of the new lock extend southward approximately 8,000-feet. The existing East Access Channel is realigned and extended approximately 12,000-feet and reconnected to the South Bayou Sorrel Channel. The VE team concurs with the latest design siting as it is expected to benefit from better foundation conditions. Modifications of the new lock channel and East Access Channel are both impacted by the new siting placement, but net cost advantages, including construction advantages, should result in better net project cost.
12. **Revisiting Existing Lock Levee Fill Section (Speculation List Item No 25):** The proposed levee section is massive, and provides both closure for the existing lock and on-site disposal for excess excavation material. It is recommended that a minimal levee section, or core levee section, be tightly controlled engineered fill. Additional fill disposal within the old lock may be placed with less stringent specification (some settling may occur).
13. **Provide Rounded Steel For Corners On All Openings and Edges (Speculation List Item No 45):** Concept will perform better at little or no increased cost to project.
14. **Setup Motor Drive Unit So it Can Slide In and Out Adjustable From Motor Drive (Speculation List Item No 46):** Concept was suggested by Lock Operators and maybe developed into new design. No increase to project cost is likely.

VALUE ENGINEERING COMMENTS (continued)

15. **Install Multi-Video System to Eliminate Multiple Gate Houses (Speculation List Item No 53):** Current plan shows gate operator house at both ends and both sides of lock, for four total. In the old days (50 years ago) before video systems, remote operation or computer controls, this may have been necessary to permit direct visual contact during operation. Lock operators in other Corps Districts are opting for remote operation from buildings not on the lock, and by using multiple controllable video surveillance cameras to view all areas of the lock. If necessary, lock personnel can walk out on the structure and communicate with the operator, via walkie talkie, and he will have them in video and audio contact at all times. However, the video system must have a sufficient number of cameras (8 to 10) installed at strategic locations around the structure. Some can be fixed view and on recorder, others movable by remote control from the lock operator's workstation.

16. **Use Hydraulic Physical Model to Determine Required Guard Wall Lengths (Speculation List Item No 61):** Current design shows guard wall lengths of 1200-ft and 800-ft, per guidance that approach walls be same length as lock chamber one side and 2/3 length other side. Suggest using a WES physical hydraulic model to determine the actual guard wall length required. The assumption is a model will indicate that the approach walls can be shortened. However, it may indicate the opposite, adding cost to the project. Better to find out now than after several accidents, repair of damage and settlement of litigation. Long term life cycle cost savings will still be the result in either case. The model will also be useful to establish entry channel dimensions to make navigation safer and improved for entry/exit of lock. Improved navigation translates to fewer accidents, lock closures, collisions, damage and reduced maintenance and downtime. The model can be used throughout design to test alternatives to alignments. Cost of a model (\$150 -200k) is minimal compared to the potential initial construction savings, navigation improvement, reduction in accidents, litigation, and long term maintenance.

17. **Use 3-D Models to Describe The Project (Speculation List Item No 49) :** Produce a 3-D model of the project which shows how the project will appear when finished. Elements of the project can be designed in 3-D with a little additional effort. There are several advantages to this type of modeling effort. First, the project is shown as an illustration of the final design. In more sophisticated models, elemental prototyping can enhance the final design by showing several options. The idea of this comment is that computer software modeling can enhance the design, flag misfit elements or spatial relationships and provide additional design flexibility. Certainly, a 3-dimensional illustration will highlight a project far better than 2 dimensional plans. The cost to have a designer incorporate 3-D models into a set of plans is about 10% of the design fee, not a budget buster.

18. **Develop a Sequence of Construction, i.e., Construction Schedule, Coincident With The Design (Speculation List Item No 60):** Develop a construction sequence that describes the major milestones and initial critical path for the project. The schedule needs to be more than general in nature. The idea of this comment is to have a fundamental idea of how the project will be built and generally in what order important milestones should occur. The schedule should be developed using the prevailing construction software, i.e., Primavera. Most construction claims are based on an approved construction schedule as provided by the construction contractor. This comment addressed the need to become more familiar with the project as a preemptive measure. It is from experience that all too often when a significant claim arises the Governments' position is compromised due to a faulty understanding of construction scheduling and the sequence of events. Professional documentation can be very helpful. There are several ways to enhance the Governments' position:

(a) Develop an Initial Construction Schedule Prior to Contract Award: This could be accomplished concurrent with design and prior to award. The intent is to have someone from the Government responsible for initiating and developing the design/construction schedule. This process is slightly different than usual in that the scheduler is working with the designers, cost engineers and construction personnel. A detailed construction schedule is not the end result, rather a realistic sequence of construction events that note milestone events as well as intermediate activities. The goal is to have a schedule set up with a critical path identified. Please note this is not advocating that a schedule be issued with the contract solicitation. This is an in-house, Government document to be used for comparison purposes, to determine if there is an issue with the design or construction sequences.

(b) Immediately after award, review the initial contractor schedule to determine if there are any major discrepancies. This is done by reviewing the contractor's schedule used to assemble the bid.

(c) Require the contractor to have the same version of scheduling software and provide the Government with a copy (plus any updates and training for Government personnel). Verbiage in the general requirements of the contract will be essential. OVEST can assist with a sample document if requested.

(d) Hire a scheduling professional to assist the Government, from the beginning, to clarify contractor changes to the schedule and to note the realistic impact to the approved baseline schedule. This scheduling professional should be a registered Professional Engineer with the experience and education to challenge

VALUE ENGINEERING COMMENTS (continued)

proposed construction changes. Employing a consultant would strengthen the Governments' position and provide another level of expertise for the project. Also, once the construction schedule is approved the consultant would only be needed for milestone review meetings, significant proposed changes, or quarterly review meetings. Typically a consultant would charge \$1,500 to \$2,000 per quarter for project reviews of complex projects.

19. **Electrical/Generator House Next to/with Operator House (Speculation List Item No 39):** Rather than two separate structures for operator and generator, consolidate both into one partitioned building. Noise from generator will only occur during emergency power outages, which are rare. Convenience of operations and access within one building will be enhanced at a cost reduction to the current two-building plan. Facilities such as pump stations commonly have pumps, generators, electrical and operator offices all under one roof. This provides convenience of access and monitoring, especially during times of bad weather, when generators will probably see use.

20. **In Corporate Chemical Clean Up Facilities in Maintenance Area (Speculation List Item No 40):** Bayou Sorrell is access point to the heavily traveled petrochemical trade corridor. There exists a continual threat of hazardous/toxic chemical spills from collisions, accidents or leakage. Clean up facilities must be provided in a centrally located and easily accessible area such as the maintenance area. In addition to clean up, breathing apparatus should also be available or a safe room where employees can congregate in event of a toxic fume incident. The safe room should have filters or bottled air supply and access to communication to permit workers to remain safe and breathing for a period of time awaiting rescue or ending of danger from toxicity. Facility should also contain first aid for chemical burns and related injuries.

21. **Combine All Functions into One Large Building (Speculation List Item No 50):** Operator, maintenance, electrical, generator, clean up facilities and other functions should be combined into one large building. Most pump stations are setup exactly that way, and this provides easy monitoring and access to systems. This becomes critical during emergency situations and provides convenience and safety during bad weather. Continuous access and operation of functions within the building, as well as the external lock operation by video monitoring and control, can continue uninterrupted during extreme and adverse conditions. In addition there should be considerable cost savings realized for one structure instead of many smaller ones with same aggregate square footage.

VALUE ENGINEERING COMMENTS (continued)

22. **Site Adapt Calcasieu Multi-Purpose Building (Speculation List Item No 52):**
Operations personnel suggested adapting the Calcasieu multi-purpose building design for construction at Bayou Sorrell. A structure concept that is already designed or proven effective would save considerable design effort and cost. Site adapting could involve minor improvements evolving this building into a "Standard Design" for future locks.

