Project Plan

High Energy Line Break Revalidation Project

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1. Executive Summary

ONS performed an assessment in 1998 that identified issues with the original HELB analysis. As a result of this assessment, ONS decided to initiate a project to update the original HELB work. This initiative was communicated to Region II management during a January 26, 1999, management meeting. The primary objective of this project is to revalidate and update the Oconee High Energy Line Break Study originally completed in 1973 for the present day plant configuration.

The HELB project has been divided into four phases.
Phase I was completed in year 2000 and accomplished the following:

- Created the methodology to be used to identify the postulated break locations
- Generated a list of break locations with their associated interactions.

The main goals of Phase II are:

- To obtain NRC concurrence for methodology
- Perform evaluation of mechanical interactions on HELB SSEL

The main goals of Phase III are:

- Perform Transient and flow analysis for identified breaks
- Perform environmental and flooding analysis
- Perform control room impact assessment
- Identify an plant modifications necessary
- Produce final HELB report
- Produce Licensing change submittal

The main goals of Phase IV are:

- Support NRR review of HELB LAR
- Incorporate Approved HELB Report into UFSAR and Design Basis Documents
- Design and Implementation of Potential Plant Modifications to Support HELB Design Basis
- Establish long term maintenance of HELB SSEL Program

The scope of Phase II & III of the project is to evaluate the effects of the postulated pipe breaks and determine if the requirements of General Design Criterion 4, of Appendix A to 10 CFR Part 50 can be satisfied. This criterion basically states that the necessary systems, structures and components remain available to bring the unit to a safe shutdown state and maintain it in a safe shutdown condition following postulated accidents. The requirements for mitigation of HELB's outside containment were established for ONS by the Giambusso letter, dated December 12, 1972. The letter requested much information. Phase I provides answers to many of the questions. Phase II & III will address the following:

- Demonstrate that the failure of any structures caused by the pipe break does not adversely affect the mitigation of the consequences of the accidents or the capability to bring the unit(s) to a cold shutdown condition.
- Verify main steam line breaks do not cause loss of redundancy in protection systems, Class 1E electrical system, ES equipment, cabling penetrations, or interconnecting cables that are required to mitigate the accident and place the reactor in a cold shutdown condition.

- Verify other HELB's, that do not result in a reactor accident, do not cause a loss of capability to cope with the line rupture.
- Provide assurances that the control room remains habitable and its equipment functional after a main steam line break or feedwater line break to bring the unit to safe shutdown followed by a unit cooldown.
- Demonstrate environmental qualification of all electrical equipment needed to mitigate a main steam line or feedwater line break remain functional.
- Evaluate the potential for flooding of equipment important to safety in the event of a feedwater line break or a break in any other line carrying high energy fluid.
- Provide a summary of the emergency procedures that would be followed after a pipe break accident, including the automatic and manual actions required to place the unit in a cold shutdown condition. The estimated times following the accident for all equipment and personnel operational times will be included in the summary.
- Provide the results of the analysis, including steam generator blowdown, used to calculate the pressure and temperature transients in the Auxiliary Building and the Turbine Building.
- Provide any proposed modifications that may be required to meet the original requirements of HELB mitigation.

The Project Sponsor for Phases II and III is J. E. Burchfield

The scope of Phase IV provides the closeout activities to complete resolution of the HELB Revalidation Project. Phase IV will address the following:

- Provide responses to NRR review questions regarding the HELB submittal.
- Incorporate the approved HELB LAR into the UFSAR
- Incorporate the HELB Design Basis into plant Design Basis Documents
- Establish ownership of HELB Design Basis and its long term maintenance
- Provide designs for plant modifications, as required, to meet HELB mitigation requirements
- Provide implementation schedules for required plant modifications to address HELB concerns
- Implement plant modifications to resolve HELB concerns

The Project Sponsor for Phase IV is J. E. Burchfield.

Analysis has begun on Main Feedwater line breaks inside the East Penetration room. Plant design deficiencies were found and documented in PIP 01-815, prompting immediate evaluation to resolve the non-conformance items. The work being performed for this one class of HELB will be captured in the final design study, but the resources performing this work are not captured in the cost evaluation.

2. Work Scope and Approach

Phase II will provide the necessary information for the evaluations/analysis to accommodate a licensing basis change to Oconee for HELB's. The key elements of the second phase of the project include:

- Obtain NRC concurrence with methodology
- Identify electrical component failures
- Verify assumed HELB conditions for break locations to be evaluated
- Revise the Phase I calculation to reflect the electrical equipment identified
- Analyze Structural Interactions to identify collateral damage
- Develop HELB SSEL based on safe shutdown functions
- Evaluate the mechanical interactions/collateral damage to the systems necessary for safe shutdown

Phase III will perform the evaluations/analysis, develop the final HELB report and licensing submittal and submit to the NRC.

- Perform transient analysis on plant response from HELB's and their mechanical interactions that result in a Reactor Accident.
- Perform break analysis on plant response from HELBs and their mechanical interactions that do not result in a Reactor Accident.
- Perform a verification of Operator actions and procedures required.
- Perform environmental analysis of affected areas due to HELB's and their mechanical interactions
- Verify equipment environmental qualification acceptable
- Perform flooding analysis of affected areas due to HELB's and their mechanical interactions
- Verify required equipment not impacted by flooding
- Verify/finalize HEBL SSEL
- Complete HELB Safe Shutdown Calc/Report
- Complete and submit LAR package

Phase IV will provide the closeout activities to complete resolution of the HELB Revalidation Project.

- Support LAR review by providing responses to NRR questions regarding the HELB submittal.
- Obtain SER from NRR
- Incorporate the approved HELB LAR into the UFSAR
- Incorporate the HELB Design Basis into plant Design Basis Documents
- Establish ownership of HELB Design Basis and its long term maintenance
- Provide designs for plant modifications, as required, to meet HELB mitigation requirements
- Provide implementation schedules for required plant modifications to address HELB concerns
- Implement plant modifications to resolve HELB concerns

The work scope for each of the tasks is presented below (See Appendix A for flow chart of work flow and processes).

Phase II

1. Obtain concurrence with methodology being used to perform the HELB evaluation. This activity must be completed prior to expending resources on interaction evaluation.
    - Key Elements:
        - Eliminates certain systems that are not normally in service
        - Credits damage repair to establish cooldown to cold shutdown
        - Includes SSF as one method for mitigation strategy
        - Eliminates testing configuration from analyzed plant conditions
        - Eliminates certain piping systems from consideration based on operating times (< 1% of plant OPS or < 2% time above HEL conditions)
        - Eliminates arbitrary intermediate pipe breaks from analyzed piping
        - Changes stress limits for non-seismic piping
        - Creates new jet cone geometry
        - Creates new jet effective length
        - Changes requirement for postulation of critical crack locations
    - Deliverables:
        - Review of operating experience (other plant HELB licensing actions) to ensure ONS approach is consistent with previous NRC approved approaches at other facilities
        - Duke submittal via a letter to the NRC outlining proposed HELB Methodology
        - Ultimately, NRC concurrence with methodology to be used to perform HELB review
    - Performing Organization:
        - Regulatory Compliance (RGC) has the lead for this effort
        - Design Basis Group (DBG) will provide support
    - Estimated Work Hours:
        - Total estimated work hours – 200

2. Identify component failures related to miscellaneous electrical/instrument type equipment.
    - Key Elements:
        - Walkdowns of equipment for identification of failures and verification.
            - There are 42 unlabeled cable trays/conduits impacted by various Unit 1 HELBs
            - There are 10 unlabeled tubing tracks impacted by various Unit 1 HELBs
            - There are 17 miscellaneous electrical/terminal boxes impacted by various Unit 1 HELBs
    - Deliverables:
        - Identification of miscellaneous electrical/instrument type equipment affected by the HELB for inclusion or exclusion from the SSEL
    - Performing Organization:
        - DBG has the lead for this effort
        - Electrical contractors to augment site electrical
    - Estimated Work Hours:
        - It is assumed a comparable number of interactions for Units 2 & 3.

- Estimated 10 hours to identify all failures for each tray, track and box and 10 hours to be verified.
- Total estimated work hours - 4,140.

3. Verify HELB Locations and Conditions for evaluation.
   - Key Elements:
     - Determine normal steady state operating pressures for various lines
     - Determine normal steady state operating temperatures for various lines
     - Create Design Document to record temperatures and pressures from evaluation
     - Verify operating time meets criterion for inclusion as HELB location
   - Deliverables:
     - Verified list of HELB locations with associated temperatures and pressures
   - Performing Organization:
     - The DBG mechanical resources will perform this task using marked-up system flow diagrams and plant data.
   - Estimated Work Hours:
     - There are 13 systems included in the analysis
     - Estimate 10 hours to evaluate each system
     - Total estimated work hours – 130

4. Revise the Phase I calculation to reflect the electrical equipment identified
   - Key Elements:
     - Review the list of electrical equipment identified in Phase II step 1, to determine which equipment needs to be included in the calculation
     - Revise the Phase I calculation
   - Deliverables:
     - Approved revision to OSC-7516.02 – Unit 1
     - Approved revision to OSC-7517.02 – Unit 2
     - Approved revision to OSC-7518.02 – Unit 3
   - Performing Organization:
     - The DBG Civil group will support this effort
   - Estimated Work Hours:
     - Calculation Preparation – 40 hours
     - Calculation Review/Approval – 40 hours
     - Total estimated work hours – 80

5. Analyze structural interactions to identify collateral damage.
   - Key Elements:
     - Train Civil/Structural contract personnel
     - Perform evaluation to identify collateral damage
   - Deliverables:
     - Identification of equipment that will be unavailable due to collateral damage
   - Performing Organization:
     - DBG to provide lead for this effort
     - Civil Contractors via Managed Task.
   - Estimated Work Hours:

- There are approximately 60 structural elements impacted by various HELBs for Unit 1.
- Assume a similar number of structural interactions for other units
- Assume 10 hours to evaluate structural component for failure and 10 hours for checker for each structural member impacted
- Total estimated work hours – 3,600

6. Develop HELB SSEL based on safe shutdown functions
   - Key Elements:
     - SQUG SSEL was used for target identification
     - Define trains of safe shutdown equipment to perform safe shutdown functions
     - Determine SSE required to mitigate specific classes of HELBs
     - Evaluate cable tray impact on trains of SSE
     - Prepare HELB SSEL Calculation
   - Deliverables:
     - Finalized HELB SSEL
   - Performing Organization:
     - The DGB mechanical group will support this activity
   - Estimated Work Hours:
     - Estimate 40 hours to prepare calculation and 40 hours to check
     - Total estimated work hours – 80

7. Evaluate interactions on HELB SSEL
   - Key Elements:
     - Determine overall plant effect for each break (direct equipment failures from mechanical interactions).
     - Determine if breaks can be remotely isolated using available equipment (initial assumption is that local isolation is not credited while break flow exists).
     - Quantify duration of break(s) (assume NRC accepted operator response times)
     - Evaluate MS and Main FDW Line breaks first
     - Evaluate remaining breaks by system (i.e., complete all breaks in a given system).
     - Evaluation will be completed on Unit 1 first, followed by Unit 2 and finally Unit 3.
   - Deliverables:
     - SSEL for HELBs that survive mechanical/structural interactions
     - Breakdown of HELB scenarios into two groups
       - HELBs which require Safety Analysis (reactor overcooling & overheating events)
       - HELBs which do not require Safety Analysis
   - Performing Organization:
     - DBG will provide lead and support for this effort
     - Mechanical Contractors via staff augmentation
   - Estimated Work Hours:
     - Estimate 1.5 hours per break
     - Estimate 1.5 hours per break to check analysis

- Approximately 2000 breaks per unit
- Total estimated work hours – 18,000

Phase III

1. Transient Analysis
   - Key Elements:
     - Evaluate breaks and choose 1 worst case break for each system, as applicable
     - Perform Thermal-hydraulic analysis for reactor accidents
     - Develop Line break flow rate calculations for use in flooding/environmental analysis
   - Deliverables:
     - Analysis will provide necessary information to perform environmental and flooding evaluations for all HELBs that result in a reactor accident.
   - Performing Organization:
     - Transient Analysis would be performed by Safety Analysis Group (SAG)
   - Estimated Work Hours:
     - Estimate that each analysis will take a total of 250 hours
     - Assume 3 events on a unit will require analysis
     - Assume all three units are similar, i.e., one set of analysis will be acceptable for all units
     - Total estimated work hours – 750

2. Break Flow analysis – (for HELB scenarios which do not result in a Reactor Accident)
   - Key Elements:
     - Develop Line break flow rate calculations for use in flooding/environmental analysis
   - Deliverables:
     - Analysis will provide necessary information to perform environmental and flooding evaluations for all HELBs that do not result in a reactor accident.
   - Performing Organization:
     - DBG to provide lead and support
     - Mechanical Contractors via staff augmentation
   - Estimated Work Hours:
     - 10 of 13 systems to be evaluated (3 should be performed by Safety Analysis)
     - Some systems require multiple calculations depending on break location
     - Estimate 40 hours to prepare flow calculations for each system
     - Estimate 40 hours to review/approve flow calculations for each system
     - Total estimated work hours - 800

3. Verification of Operator actions and procedures
   - Key Elements:
     - Verify assumed automatic and manual actions required by transient analysis can be accomplished in their assumed times
       - Manual actions addressed by job performance measures (JPMs)
     - Verify procedures are adequate to achieve safe shutdown, following the event while considering any single active failure

- Review EOP, APs and OPs
- Deliverables:
  - Any new time critical operator actions added to calculations
  - Any revised time critical operator actions documented to calculations
  - New or Revised JPMs issued as required
  - Procedure changes issued as required
- Performing Organization:
  - This task will involve Operator Training, Operator SRO, & DBG
- Estimated Work Hours:
  - Assume minimal increase in number of operator actions
  - Total estimated work hours – 160

4. Perform environmental analysis of affected areas due to HELBs and their mechanical interactions
   - Key Elements:
     - Safety Analysis – Gothic Modeling required (TB modeled, AB is not)
     - The penetration room is the only area of the AB affected by hot water/steam from a HELB. This work is currently being performed by safety analysis.
     - Create calculation to document environmental conditions as a function of time and space
   - Deliverables:
     - Calculations documenting environmental conditions for equipment qualification
   - Performing Organization:
     - Safety Analysis Group would perform this activity
   - Estimated Work Hours:
     - Assumed number of events requiring analysis is 3 per unit (MS, FDW, AS)
     - Assume analysis is similar for all three units, i.e., one set of analysis will be acceptable for all units
     - Total estimated work hours – 600

5. Verify equipment Environmental Qualification Acceptable
   - Key Elements:
     - Using the environmental conditions performed in Phase III item 4, verify SSEL equipment is qualified to remain operable
     - TB equipment must be evaluated
     - Cable, Equipment and Control room are not affected
   - Deliverables:
     - List of equipment which either meets or does not meet environmental qualification
   - Performing Organization:
     - General Office Electrical Systems - EQ
   - Estimated Work Hours:
     - Assume one evaluation is applicable for all units
     - Total estimated work hours – 250

6. Perform flooding analysis of affected areas due to HELBs and their mechanical interactions.
    - Key Elements:
        - Calculate break flow rate for HELB
        - Create calculations to document flooding conditions
    - Deliverables:
        - QA-1 calculations to document analysis
    - Performing Organization:
        - Safety Analysis Group (SAG) for accidents
        - Mechanical Contractors via staff augmentation for non-accidents
    - Estimated Work Hours:
        - Assume 13 systems require flooding analysis
        - Estimate 40 hour to perform worse case analysis for each system break
        - Assume analysis is similar for all three units, i.e., one set of analysis will be acceptable for all units
        - Total estimated work hours – 520

7. Verify required equipment not impacted by flooding
    - Key Elements:
        - Evaluation of electrical penetrations in the penetration room
        - Evaluation of other electrical equipment for submergence
        - Evaluation of the effects on submerged mechanical equipment
    - Deliverables:
        - Document flooding analysis in HELB SSEL Calculation
    - Performing Organization:
        - DBG to provide lead
        - Mechanical Contractors via staff augmentation
    - Estimated Work Hours:
        - Total estimated work hours – 250

8. Verify/finalize HELB SSEL
    - Key Elements:
        - Verify sufficient equipment that is required for safe shutdown remains functional following the event while considering any single active failure.
        - Verify that the unit can be brought to cold shutdown or long term core cooling can be achieved
        - Identify any required plant modifications that must be implemented to assure safe shutdown
    - Deliverables:
        - Finalized HELB SSEL
        - Modifications required to assure safe shutdown
    - Performing Organization:
        - DBG
    - Estimated Work Hours:
        - Assume each unit has a HELB SSEL Calculation
        - Estimate 40 hours to complete calculation for each unit
        - Estimate 40 hours to review and approve calculation for each unit
        - Total estimated work hours – 240

9. Verify Control Area Cooling for equipment and personnel following HELBs
    - Key Elements:
        - Evaluate effects on HVAC & chillers
        - Based on effects and environmental conditions, determine Control Room, equipment room and cable room heatup
        - Assume only hot water/steam systems created conditions not bounded by blackout analysis
    - Deliverables:
        - Revised room heatup calculation for Control Room(s), Cable Room(s) and Equipment Room(s)
    - Performing Organization:
        - DBG to provide lead
        - Mechanical Contractors via staff augmentation
    - Estimated Work Hours:
        - Assume 10 hot water/steam system may impact HVAC
        - Estimated 80 hours required per system
        - Total estimated work hours – 800

10. Complete HELB Safe Shutdown report and supporting calculation
    - Key Elements:
        - Compile all information into final HELB report
    - Deliverables:
        - Final HELB report to support licensing submittal
    - Performing Organization:
        - DBG will assemble information into one report
    - Estimated Work Hours:
        - Total estimated work hours - 120

11. Complete and submit LAR
    - Key Elements:
        - Provide criteria used for determining break locations and break sizes
        - Describe analytical considerations for stress criteria, dynamic analysis and structural analysis for pipe breaks
        - Describe consequences of postulated piping breaks (including environmental and physical damage to the plant)
        - Provide operational status and mitigation of accidents resulting for postulated piping breaks
        - Provide interim measures, as needed, to mitigate postulated piping breaks
        - Provide proposed station modifications, as needed, to mitigate postulated piping breaks
    - Deliverables:
        - LAR Cover Letter and Package
        - New HELB Report
        - Proposed UFSAR Change
    - Performing Organization:
        - DBG provides new HELB Report
        - RGC provides LAR package
    - Estimated Work Hours:

- Estimated RGC work to be 80 hours
- Estimated DBG work to be 40 hours
- Total estimated work hours - 120

Phase IV

1. Support LAR Review by NRR
   - Key Elements:
     - Respond to questions raised by NRR during review phase
   - Deliverables:
     - Documentation of NRR questions with Duke's Response.
     - SER from the NRC for new HELB Report
   - Performing Organization:
     - RGC to provide lead for discussions with NRR
     - Site Engineering to support development of responses
     - GO-Safety Analysis to support development of responses
   - Estimated Work Hours:
     - A high degree of uncertainty exists in determining expected work hours
     - Impact on site resources is dependent on the amount of questions raised by the NRC
     - Duration for review by NRC is unknown
     - This task is excluded from the cost estimate

2. Incorporate Approved HELB Report into Plant Licensing/Design Documents
   - Key Elements:
     - Prepare UFSAR Changes
     - Prepare Design Basis Document Changes
     - Establish ownership of HELB Design Basis
   - Deliverables:
     - UFSAR Change Package issue in accordance with NSD-220
     - DBD Change Packages issued in accordance with EDM-170
   - Performing Organization:
     - DBG to provide lead and support
     - Site Engineering to perform task
   - Estimated Work Hours:
     - The estimated work hours is unknown
     - The estimated duration and work hours will be updated when phase III nears completion

3. Design/Implementation of Plant Modifications required for HELB Mitigation
   - Key Elements:
     - Perform detailed design of proposed plant modifications (if required)
     - Generate cost estimates for proposed plant modifications
     - Establish implementation schedule for proposed plant modifications
     - Implement proposed plant modifications
   - Deliverables:
     - Modification packages generated in accordance with NSD-301
     - Implementation schedule

- Performing Organization:
  - Modification Engineering
- Estimated Work Hours:
  - The extent of plant modifications for HELB mitigation is unknown
  - The estimated duration and work hours will be updated at the completion of phase III

3. Cost Estimating

- *Describe funding (201) methodology (advance, regular1, regular2, supplement, other)*
- Describe project budgeting (Capital Budget and Spend Plan) methodology
- Detailed cash flow plan

Reference Forms	PM005	Cost Estimate Template
	PM016	Capital Common Units of Property
	PM037	NGD Wage Rates 9-99
	PM038	Stores Loading Rates 2000
	PM039	Single Source Purchase Template
	PM040	Single Source Purchase Example
	PM041	Understanding AFUDC
	PM042	AFUDC Example

See Appendix B for cost estimate.

4. Economic Analysis

- Explain the proposed project
- What are the quantifiable benefits of the proposed project
- Please describe and as practical quantify the potential impact of any risks associated with the anticipated outcome.
- Have other corporate support groups been involved in the development of this project Accounting Roll-up Information

Reference Forms PM043 Guidelines for Policy Committee Presentations
PM044 Economic Analysis Questions Non-Policy Committee
PM047 NPV After Tax Calculation
PM048 NPV After Tax Example
PM049 NPV / IRR Techniques Help

1. Describe the various options that were considered and provide either a payback analysis or net present value comparison of these options.
   Option A: Do Nothing
   Option B: Recommended Option
   Option C: Other

The do nothing option was considered untenable due to age of the existing HELB analysis and the previously noted regulatory commitment. Phase I of the project has already been completed. Phases II and III must be completed to fully assess the effects of high energy line breaks.

2. Describe the justification for the recommended option and tell why it gives the highest value at the lowest overall cost.

As a result of internal and regulatory assessments (Ref. PIPs O98-3902, O95-1606, & O98-5293), Oconee has committed to complete a revalidation of the HELB licensing and design basis. The design of Oconee is rather unique with regard to mitigation of high energy line breaks. Development of the safe shutdown equipment list is so specific for Oconee that only personnel intimately familiar with Oconee's design may perform this function.

Evaluation of structural interactions is somewhat more generic, in that resources may provide the civil/structural analysis to determine if failures are possible. Site civil resources are better suited to evaluate the consequential failure of civil structures. Site civil resources would only be impacted as a contingency should failures be discovered.

Numerous miscellaneous electrical targets were discovered in Phase I, but the consequences of these interactions are unknown. Site electrical resources would provide the most efficient method for determining the consequences. However, the scope of work is sufficiently large that the site resources could not provide timely evaluation to support project completion. Contractors would provide a more timely evaluation, with some support provided by ONS electrical.

ONS Mechanical systems would provide the most efficient means of evaluating the mechanical interactions on the equipment necessary for safe shutdown. However, due to the amount of work involved, site resources cannot support timely completion of the project. The development of the generic HELB SSEL and the roadmap created for evaluation of impact to safe shutdown systems, contract resources can be used to evaluate the mechanical interactions. Some support from Mechanical Systems Engineering may be required, but the impact should be minimal.

GO Safety Analysis Group will provide the transient analysis for the events deemed to be reactor accidents. Due to the complexity of the safety analysis, use of contractors to perform this task is not considered to be prudent.

Mechanical Systems Engineering would be the most efficient means of performing break flow calculations for non-reactor accidents. However, site resources cannot support timely project completion. Contractors will be used to perform break flow analysis for non-reactor accidents. Some support from system experts may be required, but the impact is expected to be minimal.

GO Safety Analysis Group is considered to be the most efficient resource for providing the analysis for determining environmental conditions. There is considerable uncertainty related to the availability of safety analysis resources. A contingency is provided to contract this work out to personnel qualified to perform this type of analysis. The project budget provides for this contingency. GO Safety Analysis, however, will be responsible for this work.

GO Electrical EQ Group is considered to be the most efficient resource for evaluating electrical equipment given the resulting environmental conditions. The needed resources are expected to be available to support the project. However, contingency plans have been developed to acquire the necessary resources. The project budget provides for this contingency.

Mechanical/Electrical Systems Engineering would be the most efficient means of evaluating flooding effects on the safe shutdown equipment list. However, site resources cannot support timely project completion. Contractors will be used to determine adverse flooding effects on safe shutdown equipment.

Mechanical Systems Engineering would be the most efficient means of evaluating control room habitability effects. However, site resources cannot support timely project completion. Contractors will be used to determine the effects on control room habitability.

3. Describe why this option is the right investment now as opposed to waiting until sometime in the future.

This option is the right investment at this time to prevent continued regulatory pressure in this area, and to prevent possible more costly mandated options. The existing HELB report is outdated. Subsequent station modifications did not account for the effects of HELB. A comprehensive revalidation should prevent future impacts to site resources to justify or evaluate the effects of individual HELB's as requested by the NRC.

4. Have other companies or other Duke locations implemented similar projects? If so, what was the outcome?

The situation at Oconee is believed to be unique, in that control of the HELB design basis and analysis has been non existent since the completion of the analysis in 1973. The current Oconee HELB design basis and analysis is governed by what is known as the Giambusso letter. McGuire and Catawba by contrast are Standard Review Plan (SRP) plants that have well defined HELB design bases and analyses and as such do not require a revalidation. In an effort to gain insights into those "Giabusso plants" that have updated their HELB design basis, a benchmarking effort was undertaken during the initial stages of the project. It is believed through the benchmarking effort, and a review of current SRP guidance, some relaxation in the HELB analysis requirements may be attained.

5. What are the plans for verifying that the anticipated benefits from this investment are achieved?

Ultimately, acceptance of the new HELB Report and LAR by the NRC provides the realization of a successful project. The previously alluded to reduction in regulatory pressure, and the prevention of possible more costly mandated options are the primary benefits of the project. The project may, however, uncover undesirable consequences for certain HELB's. Plant modifications may then be required to enable ONS to respond to HELB's.

6. Does this investment involve a major purchase of equipment or software? If so, what protection will be provided to the company in the form of warranties and guarantees?

A major purchase of equipment or software is not involved. This request is for an engineering revalidation and analysis. Any recommendations for upgrades or changes to major equipment will be requested under other special projects and or included in planned plant modifications.

7. Define the long lead materials and describe how their deliveries have been incorporated into the project plan.

There are no long lead materials required for this project.

8. Will this project result in significant inventory obsolescence? If yes,

   A. Who is the C&F contact?
   B. In what year will the disposal occur?
   C. What is the book value of the obsolete inventory?

There are no resulting inventory obsolescence issues associated with this project.

5. Accounting Roll-up Structure

Reference Form PM015 Accounting Roll-up

Phase	Activities/Description	Estimate	Start Date	Comp. Date
Phase II	Civil U 1 Structural Analysis U 2 Structural Analysis U 3 Structural Analysis	378,980	10/15/01	2/3/02
Phase II	Electrical U 1 Electrical Identifications U 2 Electrical Identifications U 3 Electrical Identifications	431,141	1/1/02	5/5/02
Phase II	Mechanical U 1 Mech. Interactions Analysis U 2 Mech. Interactions Analysis U 3 Mech. Interactions Analysis	1,943,938	5/11/02	8/31/03
Phase II	Licensing/Misc. Methodology Concurrence Verify of Locations & Conditions Develop Draft SSEL	30,432	9/3/01	10/14/01
Phase II	PM	75,012	9/3/01	8/31/03
Phase III	Electrical Environmental Analysis Equipment Qualification	64,621	11/10/03	2/2/04
Phase III	Mechanical Transient Analysis Break Flow Analysis Flood Analysis Control Area Impact	337,487	9/1/03	5/16/04
Phase III	Licensing/Misc. Defined Plant State Finalize HELB SSEL Finalize HELB Report Prep/Submit LAR	33,175	2/2/04	6/27/04
Phase III	PM	21,000	9/1/03	6/27/04
Phase IV	Licensing/Misc. Long-term Maint. Update licensing documents			

6. Schedule

- *Scheduling methodology (use of template, stand-alone schedule, adding additional tasks, etc.)*
- *Define milestones*
- Define fixed dates
- Where is the information kept and how often is it updated

Reference Forms

PM017 Accounting Tree Example
PM024 Milestone Schedule
PM031 Attributes of a Good Schedule

Milestones:

NRC Concurrence on HELB Methodology	12/31/2001
Complete Structural Damage Evaluation	02/01/2002
Complete Impact List for Unlabeled Elect. Equipment	05/15/2002
Complete SSEL Mechanical Interaction Evaluation	09/01/2003
Complete Plant Response Analysis	11/17/2003
Complete SSEL Environmental/Flooding Evaluation	03/01/2004
Complete Control Area Cooling Evaluation	05/17/2004
Complete HELB Report	06/07/2004
Submit HELB LAR to the NRC	06/28/2004

7. Project Controls Plan

Meetings and Progress Reports

- *Define team meetings, frequency, attendees, minutes, etc.*
- *Define project review meetings, frequency, attendees, etc.*
- *Identification and method for updating project reports*
- *Define documentation and communication plans (includes status reports)*

Reference Forms	PM019	Project Change Order Form
	PM021	Project Change Order
	PM022	Scope Management DB Guidelines
	PM023	Change Management DB Guidelines
	PM024	Milestone Schedule
	PM025	Measure Form
	PM026	Measure Guidelines
	PM034	Earned Value

Working with the Refurb Project Controls group, a detailed resource loaded project schedule will be prepared in Projectview. The inputs for the schedule will include:

- WBS, duration, and resources defined in Section 2
- Resource costing information defined in Section 3
- Contractor schedules

When 201 funding is approved specific chartfields will be established to track cost of the project.

With these two items in place the project will be monitored using monthly Project Summary Reports. This report will provide site management with an overview of the project. In addition, the PM will monitor progress and quality on a daily basis, insuring that project goals are met or exceeded.

Each resource group will be provided with budget, schedule and deliverables for their assigned tasks. The performance of these groups will then be monitored to insure project success. A Change Order process will be established for all contracts let by this project. These will be incorporated into the project and funded by the PM owned contingency funding.

8. Communications Plan

Reference Form PM029 Communication Plan Process

The goal of the communication plan for the HELB project is to accomplish the following:

- External
  - Keep Senior Site Management advised of the project status and concerns
  - Keep the NRC Residents advised of project status
  - Keep NRC Region updated on up-coming licensing change requests and project status
  - Communicate to future HELB Program owner, project status and turnover schedule
- Internal
  - Communicate project information to and from project contractor
  - Communicate project information to team members

External Communication goals will be accomplished by:

- Producing a Monthly Project Summary Report will be produced to provide schedule and cost information. The PSR will also have a section for the PM to provide comments about the project.
- Providing status updates at Engineering Staff meetings
- Presentations on HELB project as requested
- Meeting with Resident and Region NRC Personnel on a regular basis to apprise them of project status

Internal Communication goals will be accomplished by:

- Kick-off meeting with team and contractors to establish goals and targets for the project
- Formalized written communications to the team
- Formalized communications of progress towards meeting the goals and targets
- Weekly and monthly status reports, (including look aheads for future months).
- Regular meeting to involve stakeholders in the project.

9. Quality, Document Control, Environmental & Safety Plan

- *Define quality management plans and systems*
- *Define quality assurance and control*
- *Testing and validation*
- *Acceptance criteria*

- *Define project files and what is to be retained (state retention requirements)*
- *Use and disposition of personal files*
- *Use and disposition of project files*

Reference Form PM014 Environmental & Safety Checklist

Quality:

This project is designated as QA Condition 1 since it establishes the ability of ONS to achieve and maintain safe shutdown following postulated High Energy Line Breaks. The quality management plan includes the following:

- All work will be performed in accordance with approved procedures
- Work will be checked/verified in accordance with these procedures
- All individuals will be trained/qualified to the appropriate procedures
- Results will be documented in a QA-1 Calculation per EDM-101

Document Control:

Project files will be maintained in accordance with the approved file structure. QA documents created by this project will be filed and maintained as required.

Environmental & Safety:

There are no Environmental Safety concerns associated with this project.

Most of the work will be performed in an office environment. No work will be performed on plant equipment or structures under this plan; however, plant walkdowns are expected to be necessary. Level I Safety Assessments will be included in all aspects of the project, both in the office and in the field.

10. Procurement / Contract Management Plan

- *Define procurement process and activities; include materials, equipment, supplies, services, transportation, storage, subcontracting/outsourcing, logistics, etc.*

- *Where will materials, components and services come from*
- *What contracts must be created and administered*
- *Who administers the contracts*

No materials or components will be purchased under this project.

Nuclear Supply Chain will be the contracted agent for this project.

Engineering services will be contracted. It is the plan to use DE&S to perform the tasks under this project. These tasks are:

- Identification of electrical equipment
- Structural Analysis
- Mechanical evaluation of interactions
- Break Flow analysis for non-accidents
- Flooding impact analysis on plant equipment

No other contracting or purchasing is anticipated.

11. Project Organizational and Interface Plan

- *Develop a project organization chart of all stakeholders; include internal and external resources, clients, vendors, etc. (include in Appendix)*
- *Define the resource plan*
- *Where do the resources come from*
- *What are the logistics (e. g. offices, etc.)*
- *Define roles and responsibilities*
- *Define authority structure, internal and external*
- *Define teambuilding requirements and plans*

There are numerous interfaces, internal and external to the Oconee Site. A functional organizational chart can be found in Appendix C.

Phase II:

The Design Basis Group will provide overall lead for this project. The majority of the engineering work will be outsourced to DE&S. Provided below is an overview of the task and resources:

A submittal will be made to the NRC outlining ONS's proposed HELB methodology. Site resources will be used to create the document as well as respond to questions raised by the NRC. One person from both RGC and DBG will be required to complete the activity.

Verification of HELB locations and internal piping conditions will be performed by DBG. Two people from DBG will perform this activity, one preparer and one checker.

Identification of electrical equipment interactions will be outsourced to DE&S for staff augmentation. Six people will be requested to perform this activity. Exact number of people to be located at ONS is to be determined. Office locations are to be determined. Minimal support from Site Electrical Engineering will be required.

Evaluation of structural interactions will be outsourced to DE&S as managed task. Trips to ONS may be required to obtain reference material. However, analysis work will be performed at DE&S Offices. Estimated resources is six Civil Engineers with a DE&S Project Manager. Site Civil Engineering group will evaluate structural failures.

Evaluation of mechanical interactions will be outsourced to DE&S for staff augmentation. Required resources are six Mechanical/System Engineers for year 2002, and nine Mechanical/System Engineers for year 2003. The exact number of people to be located at ONS is to be determined. Office locations are to be determined. Project management to be provided by ONS for this task. Minimal support from DBG will be required.

Phase III:

Transient analysis will be performed for events, classified as reactor accidents, by the General Office Safety Analysis group. This task will require two people, one preparer

and one checker. Support will be required from DBG to define events and design assumptions for analysis. In addition, Operations support will be required to verify assumed actions (automatic and manual) and procedural guidance is adequate.

Break flow calculations for non-accident events will be outsourced to DE&S for staff augmentation. Required resources are two Mechanical/System Engineers. These people will be located at ONS for the duration of this activity. Office locations are to be determined. Support will be required from DBG to define events for analysis.

GO Safety Analysis Group will determine environmental conditions in the plant. This task will require two people, one preparer and one checker. Support from DBG will be required to determine the bounding cases for analysis.

Plant flooding calculations will be outsourced to DE&S for staff augmentation. Required resources are two Mechanical/System Engineers, one preparer and one checker. These people will be located at ONS for the duration of this activity. Office locations are to be determined. Support from DBG will be required to determine the bounding cases for analysis.

The same personnel involved in the flooding calculations will perform plant flooding evaluations. Support from DBG will be required.

Site resources within DBG will complete the Final HELB SSEL Calculation. This task will require 2 people, one preparer and one checker.

The control area cooling analysis will be outsourced to DE&S. Required resources are two Mechanical Engineers familiar with room heatup calculations. Support from DBG will be required to assist in determining boundary conditions and assumptions.

Site resources within DBG will prepare the final HELB report. This task will require two people, one preparer and one checker.

Site resources within RGC will prepare the final LAR package. Support will be required from DBG in developing the LAR package.

12. Risk Management Plan

- Risk Identification
- Risk Analysis
- Risk Mitigation
- Contingency Plans and Reserves

Reference Forms PM032 Critical Issues & Risk Analysis Summary
PM033 Risk Matrix Guidelines & Work sheet

Risk Identification:

The project scope and execution has been reviewed. A series of risks has been identified for this project. These risks are listed on the Risk Evaluation Worksheet included as Appendix D.

- New Methodology for HELB Identification not approved by the NRC
- Structural Analysis identifies plant structural failures
- Mechanical Interaction Evaluation identifies a failure to meet one or more safety functions
- Transient Analysis identifies cases where manual operator action cannot be credited for accident mitigation
- Environmental Qualification Evaluation identifies a failure to meet one or more safety functions
- Flooding Evaluation identifies failure to meet one or more safety functions
- Control Area Cooling Evaluation identifies that the control room cannot provide for safe shutdown
- Loss of key personnel
- Contractual Issues with DE&S
- Interruption or Diversion of efforts from NRC involvement
- Funding interruption by higher priority work

Risk Assessment and Evaluation:

Each of the identified risks was evaluated and its relative impact and importance. Each risk was then slotted to permit a determination of the appropriate mitigation and contingency planning. This was accomplished using the Risk Severity/ Impact versus Occurrence Probability Matrix.

Risk Mitigation and Contingency Plans:

See Appendix D.

13. Staffing & Training

- Type & Classification of the Project
- Experience of the Project Manager
- Skills Required for the Project
- Management Agreements for Internal Resources
- Use of Contractors
- Organizational Chart
- Project Specific Training Needs
- Vendor Training
- End User Training Needs

Reference Forms

PM002 Project Classification Form
PM009 Project Expectations Form
PM035 Org-chart Example
PM036 Roles & Resp Example

The HELB Revalidation Project was divided into four phases. The first phase has been completed. The second and third phases have been scoped to provide estimates for resources as well as duration. The fourth and final phase has been discussed to communicate the remaining tasks required for project closeout. Resource estimates as well as duration for the fourth phase is contingent of the results of Phase III.

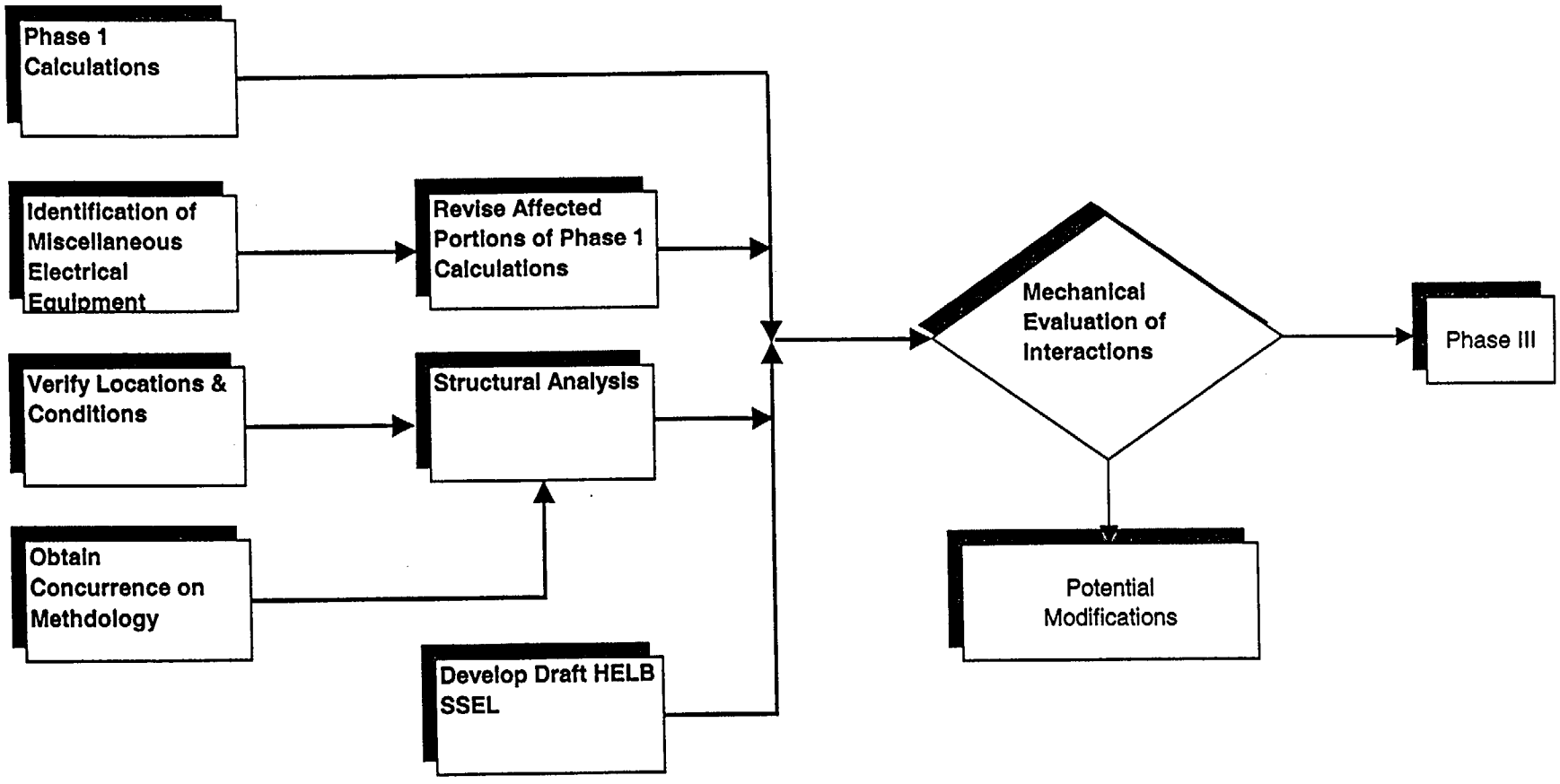
The requisitioned Civil resources must be trained to meet the qualifications to originate civil calculations.

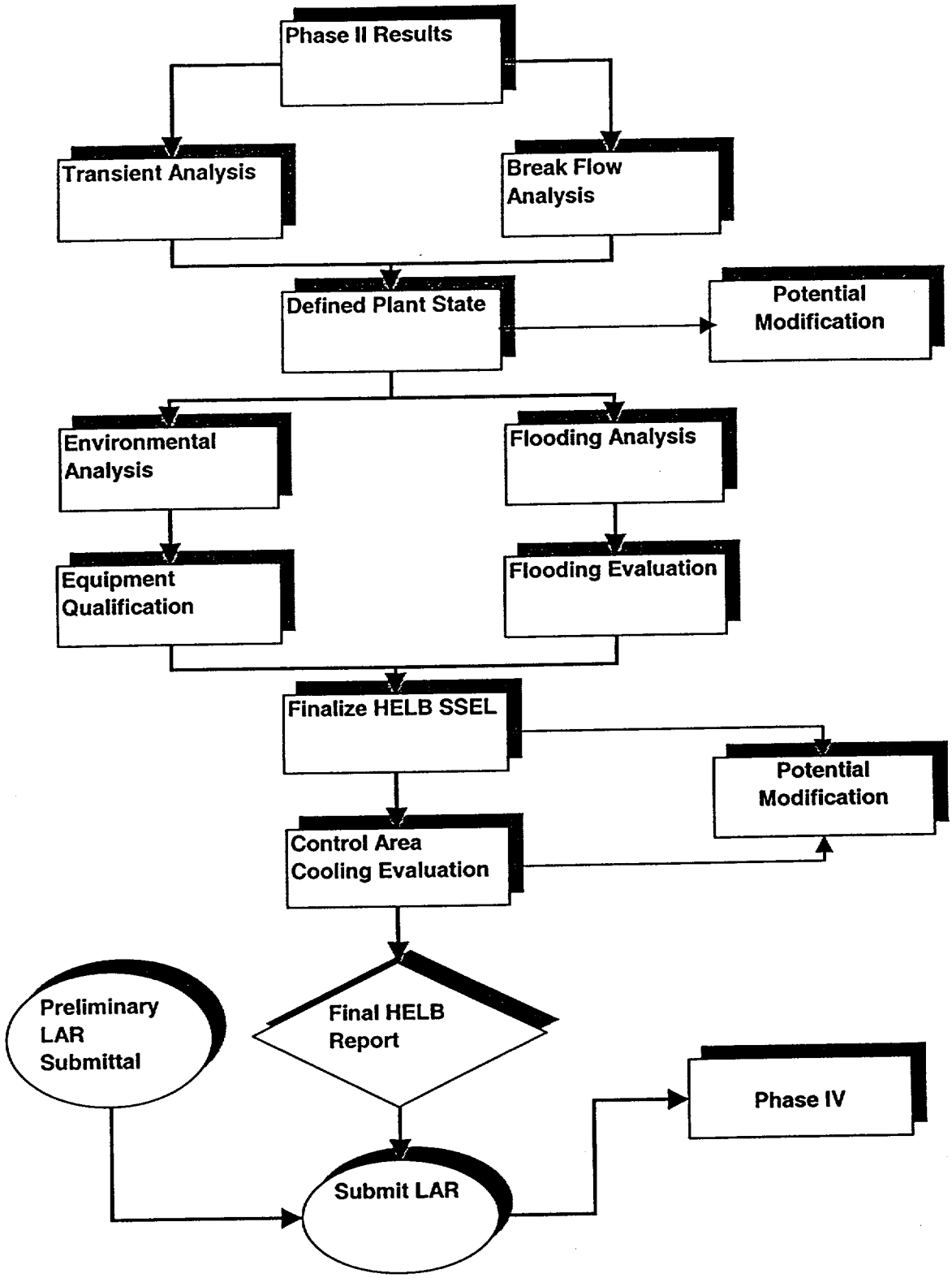
The requisitioned Mechanical resources must be trained to meet the qualifications to originate mechanical calculations. In addition, training must be provided for unescorted access.

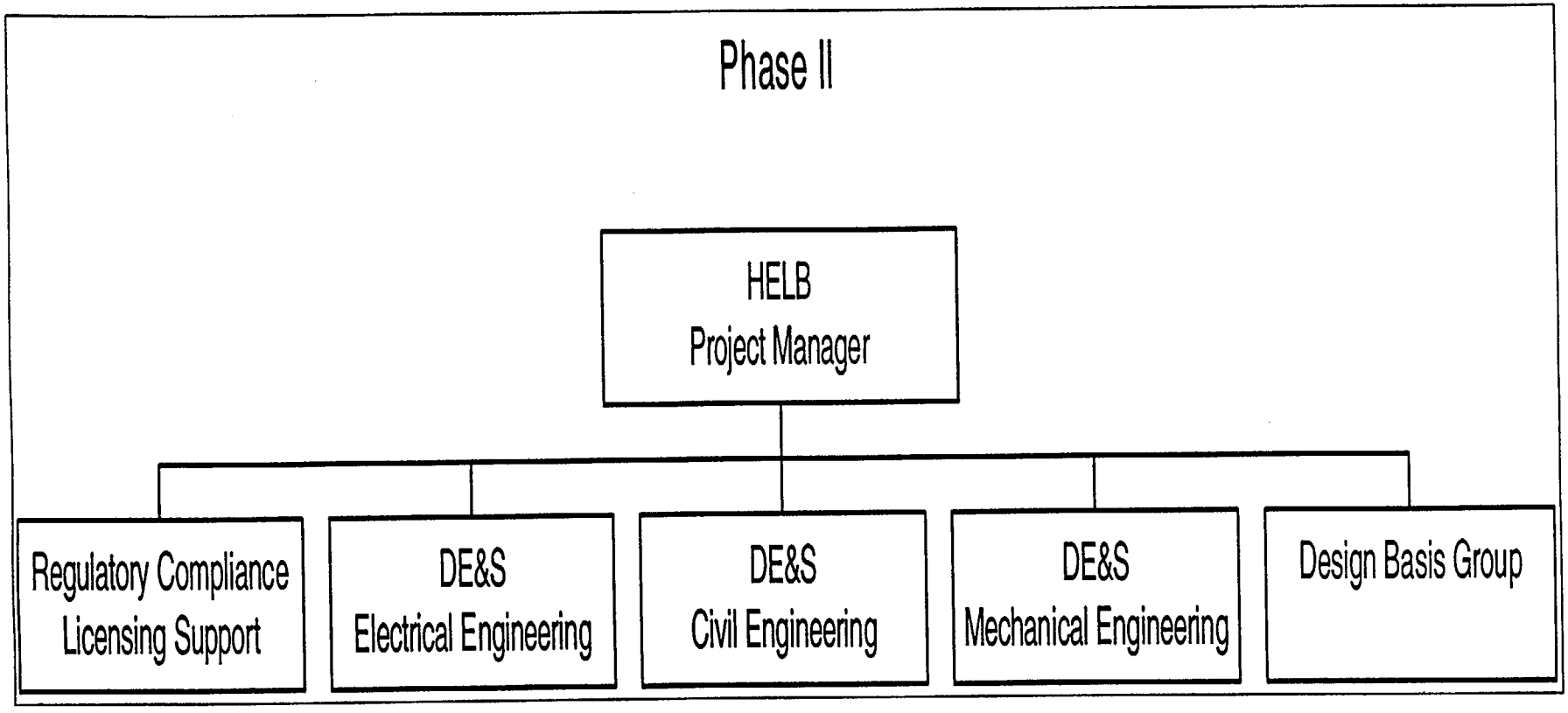
14. Appendices

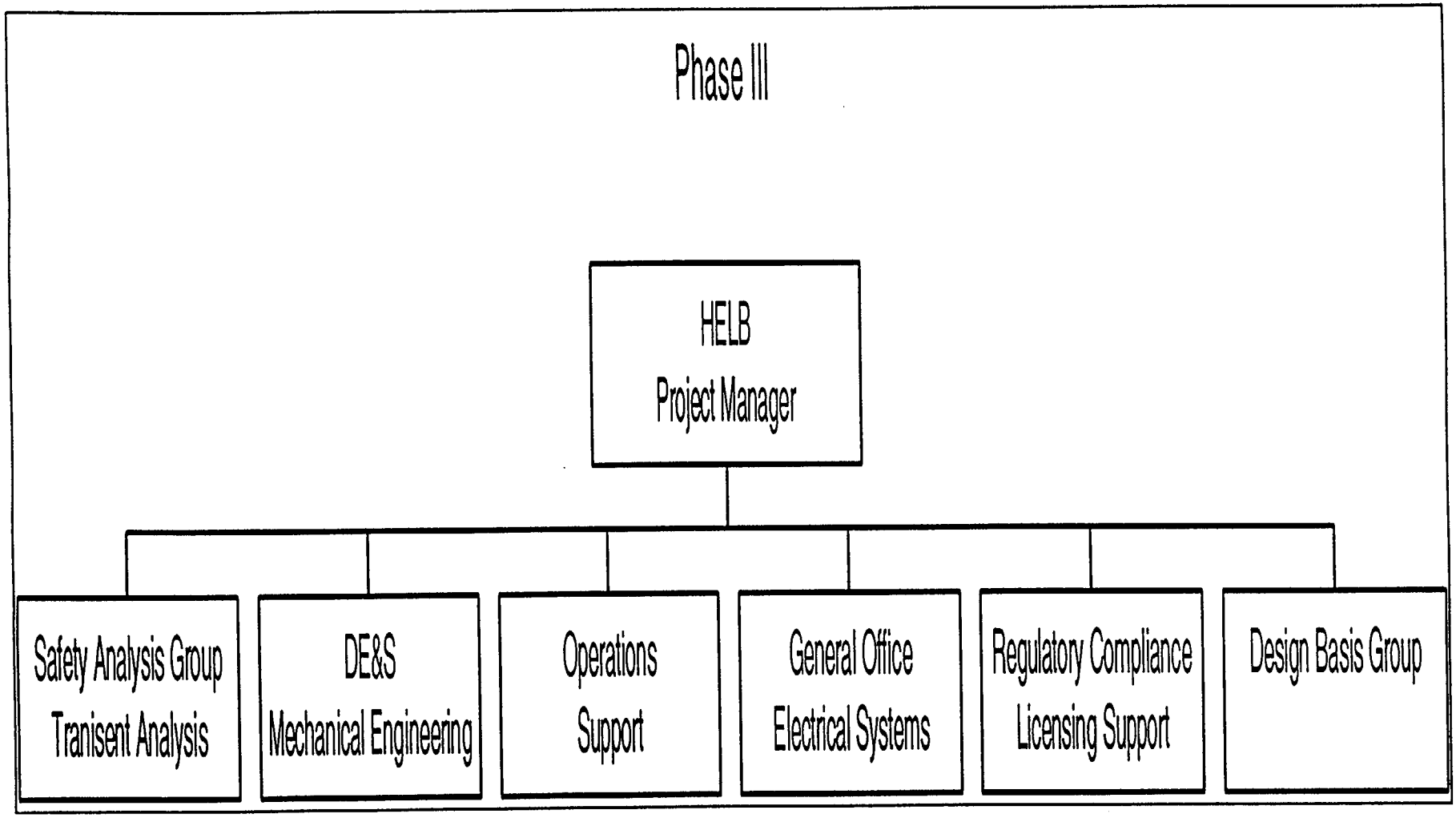
- *Project funding authorization (201)*
- *201 Project Expectations form*
- *Organizational chart*
- *Schedules*
- *Cash flow analysis*
- *Contracts*
- *Procedures*
- *Etc.*

Appendix A: Work Process Flow Chart
Appendix B: Cash Flow Plan and Resource Estimate
Appendix C: Organizational Chart
Appendix D: Risk Analysis Worksheet


Phase 1 Calculations
Identification of Miscellaneous Electrical Equipment
Revise Affected Portions of Phase 1 Calculations
Verify Locations & Conditions
Structural Analysis
Obtain Concurrence on Methdology
Develop Draft HELB SSEL
Mechanical Evaluation of Interactions
Phase III
Potential Modifications


Phase II Results
Transient Analysis
Break Flow Analysis
Defined Plant State
Potential Modification
Environmental Analysis
Flooding Analysis
Equipment Qualification
Flooding Evaluation
Finalize HELB SSEL
Potential Modification
Control Area Cooling Evaluation
Preliminary LAR Submittal
Final HELB Report
Phase IV
Submit LAR


Phase II
HELB
Project Manager
Regulatory Compliance
Licensing Support
DE&S
Electrical Engineering
DE&S
Civil Engineering
DE&S
Mechanical Engineering
Design Basis Group


Phase III
HELB
Project Manager
Safety Analysis Group
Tranisent Analysis
DE&S
Mechanical Engineering
Operations
Support
General Office
Electrical Systems
Regulatory Compliance
Licensing Support
Design Basis Group

Risk Evaluation Worksheet

Risk Num	Description	Impact		When Is It Likely To Occur	Probability Of Occurrence	Ranking	Expected Value	Mitigation Plan
		Schedule	Cost					
1	NRC disagrees with methodology	3 mo.	$200,000	12/31/2001	10%	Serious	$20,000	Additional plant walkdowns would be performed to determine additional break interactions.
2	Structural failures are found	3 mo.	$150,000	2/1/2002	70%	Serious	$105,000	Use site civil resources to evaluate the effect of failures
3	Loss of safety function found in Mech Interaction review	N/A	N/A	9/1/2003	10%	Serious		Contingency Plan to be developed prior to start of the task
4	Transient analysis finds manual operator actions cannot be credited	N/A	N/A	11/17/2003	25%	Serious		Contingency Plan to be developed prior to start of the task
5	Loss of safety function found in Envir. Qualification review	N/A	N/A	3/1/2004	10%	Serious		Contingency Plan to be developed prior to start of the task
6	Loss of safety function found in flooding review	N/A	N/A	3/1/2004	5%	Serious		Contingency Plan to be developed prior to start of the task
7	Loss of control from the control room found in control area cooling review	N/A	N/A	5/17/2004	10%	Serious		Contingency Plan to be developed prior to start of the task
8	Loss of key personnel	N/A		At any time	25%	Minor		Backup personnel will be identified for key positions. Affected personnel will be kept informed of project details
9	Contractual issues with DE&S	N/A		At any time	25%	Moderate		Communication plan provides updates to contract resources. Scheduling changes will be managed to minimize risk to resource availability.

Risk Evaluation Worksheet

Risk Num	Description	Impact		When Is It Likely To Occur	Probability Of Occurrence	Ranking	Expected Value	Mitigation Plan
		Schedule	Cost					
10	Interruption or diversion of efforts from NRC involvement			At any time	50%	Moderate		The communication plan details period updates with RGC and the NRC in order to minimize NRC intervention. Requests made by the NRC affecting schedule will be routed to senior site management for review. Any interruptions of resources affecting schedule, must be approved by the Engineering Manager or Site VP.
11	Funding interrupted by higher priority work			At any time	20%	Serious		Any interruption in funding must be approved by the Engineering Manager or Site VP.
12	Error in assumed times to complete critical tasks			5/15/2002	60%	Serious		Critical tasks will be monitored to verify assumptions used in time/cost estimates were correct. If assumptions are found to be incorrect resulting in significant changes to schedules/costs. Site Management will be notified and changes to the 201 funding will be prepared.
13	NRC rejects HELB LAR			10/28/2004	25%	Critical		Discussions with the NRC at the beginning of the project and continued updates throughout the project should minimize the probability of this happening. If this should occur, the extent of rework would be evaluated in Phase IV.