

## **Appendix B. Work Breakdown Structure**

This section describes the methodology used in creating the work breakdown structure (WBS) for the EDM project. The cost and schedule are planned with the project management program Microsoft Project. Following this description, the balance of this appendix is the output from that program. For the most part, the majority of the construction project is a single detection system consisting of many closely related components. The division into a WBS is a bit arbitrary, but it is an attempt to break the project into definable subsystems that can be built by separate groups of workers. This report will need to be supplemented with a much more detailed and carefully researched plan for the cost and schedule review.

The process to obtain the most significant pieces of equipment is broken into three parts, “design”, “procure”, and “install”. The division allows times, which can vary dramatically from item to item, to be individually assigned to the three stages. Design includes all engineering and prototype work. Procure is the time to obtain the parts from a vendor. Install means the effort to complete the task once the parts are owned by the collaboration. “Float” time has not been explicitly identified, but approximately 1/3 extra time has been added to each task.

All costs are in “base” dollars. Base dollars are the money paid to vendors. The overhead or taxes at the procuring institution are handled as a lump sum (23.5% for capital equipment at LANL) at the end of the project under WBS element 16.3. Hopefully, some savings can be obtained in the future by purchasing through collaborating institutions. All costs are ascribed to the procure step. This assignment is made because the other steps are made with the labor of scientists that is not part of the construction project or of engineers and technicians that is included as a lump sum under WBS element 14. The level of engineering and technical support needed is based on experience, and no attempt to load level the staff resources has been made at this time.

For its current level of development, the contingency funds for the project are set to 40% of base cost, consistent with DOE guidelines as presented in Chapter VII. The contingency funds for the construction project are also calculated as a lump sum in WBS element 16.2.

The funding profile reported in Chapter VII is created using the summary report function within the Project program. About \$1M of the contingency funds have been moved manually into FY’07 because they will most likely be needed at the end of construction.

Institutional taxes have been applied to the contingency also. Finally, all costs were calculated in FY'02 dollars. WBS element 16.4 adds a lump sum for escalation base on the DOE escalation-rate assumptions calculated on a year-by-year basis.

WBS element 1 covers the research and development phase of the project and is shown for completeness. The burden rates are calculated somewhat differently because the majority of the money was not capital equipment. Engineering and technician costs are included in analogy with the construction project. The loaded result is reported in Chapter VII.