

APPLICATION OF LESSONS LEARNED IN ASSURING FUTURE SUCCESS OF WASTE DISPOSAL - THE ORR EMWMF

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ABSTRACT

Bechtel Jacobs Company LLC (BJC) is the Management & Integration contractor to DOE's Oak Ridge Operations. Duratek Federal Services, Inc. (Federal Services) is under subcontract to BJC to perform the design, construction, operations and closure of the Environmental Management Waste Management Facility (EMWMF) on the Oak Ridge Reservation (ORR). The EMWMF is an on-site disposal facility, which will accept for disposal radioactive, hazardous, toxic and mixed waste generated by remedial action subcontractors under separate subcontracts to BJC. Currently the EMWMF Project has completed the design and infrastructure construction activities have begun. The EMWMF is the centerpiece in the DOE's strategy for ORR environmental cleanup. To reach this point, several important activities have been accomplished since the 1996 inception of this project and were the source of lessons learned as described in this paper. These lessons learned can be used as a roadmap by other projects of the same nature to cut their development time, garner stakeholder buy-in and implement design, construction and operations in a more efficient and cost effective fashion.

EMWMF Current Status :

Currently the EMWMF project has completed the design phase activities, which was a partitioned process (30%, 60%, 90%, 100% and Issued For Construction-IFC) to allow stakeholder and regulator interface and input in a staged approach. This process resulted in the IFC deliverables being delivered to regulators and DOE in early January. This process allowed our schedule to progress to a successful completion without holding up planned preconstruction field construction processes. By having regulator and stakeholder participation and approval the

project was able to gain acceptance of a plan to perform non-critical construction (interfering infrastructure relocations, clearing, grubbing, timber removal, etc.) in advance of formal acceptance of the IFC design. Schedule acceleration was important because several remedial action projects are ready to start sending waste to the EMWMF as soon as it opens.

In the near future, the project will achieve final design acceptance and transfer its current fieldwork focus from non-critical to the critical and essential cell construction. The cell construction is anticipated to take approximately 10 months to complete and, as such, delivery and acceptance of the first load of ORR remedial action site waste is anticipated before WM-02. The design of the EMWMF is an above grade, lined facility that will be constructed to accept Oak Ridge Environmental Remediation waste including Classified Waste.

The design of the EMWMF incorporates features from design standards for both hazardous waste landfills and radioactive waste landfills. The liner includes a compacted clay liner underlying a dual leachate collection/leak detection system using HDPE geomembrane and piping, common at hazardous waste landfills. The 12-foot-thick cover incorporates a variety of components to reduce infiltration to an absolute minimum, prevent inadvertent intrusion, and enhance long term stability:

- Compacted clay layer
- Bentonite-amended compacted clay layer
- Very low density polyethylene geomembrane
- Two sand/gravel lateral drainage layers
- Riprap biointrusion barrier
- Armored soil/rock cover layer which will support vegetation while resisting erosion

In cross section, the EMWMF will be comprised of two major "lifts," each 35 feet thick. Each lift will be surfaced with two feet of clean contouring fill. Additional clean fill will be used as necessary for intermittent operational cover to control spread of contamination. The size of the working face (the area of waste exposed to the environment) will be controlled based on the contaminant levels in the waste and the potential risk to an off-site receptor in the event of an inadvertent, sudden wind release.

The waste acceptance criteria (WAC) were established via a performance assessment, which modeled the long term performance of the EMWMF relative to a hypothetical future receptor. This hypothetical receptor was assumed to be homesteading immediately adjacent to the downgradient side of the EMWMF with groundwater as the primary pathway for exposure. Definition of the process for evaluating waste streams for disposal is being accomplished via a WAC Attainment Plan as a parallel effort to the design. Since the EMWMF will be operating under a volume-weighted-sum-of-fractions basis (wherein the actual concentration of each contaminant is divided by its WAC and the sum of these fractions must be less than or equal to 1), it is critical that this process be thoroughly documented.

ACCOMPLISHMENTS AND THE SOURCES OF LESSONS LEARNED

Historically there have been two efforts initiated to develop a waste disposal facility on the ORR. The first effort began in the 1980s and ended in 1987. The second effort began in 1988 and ended in 1994. Both of these efforts failed due to strong regulator opposition. (1) This then became the first lesson learned to apply to the new process. The current and apparently successful effort began in 1996 and in the past four years has easily surpassed previous efforts due chiefly to the application of lessons learned from the previous failures.

Sources of the lessons learned that have been applied to the successful planning and implementation of these plans are detailed below.

- An active CERCLA public participation process from the project outset to define cleanup priorities, establish future land uses, and confirm that managing ORR waste on-site was an accepted responsibility
- Acceptance of the conceptual approach by regulators and stakeholders as an integral solution to overall ORR cleanup. Obviously, this lesson learned was not applied to the two failed prior attempts to site a CERCLA disposal facility on the ORR
- Development of a Remedial Investigation to identify a site and to determine waste streams and volumes
- Performance of Feasibility Studies to develop the conceptual design, confirm the technical and economic viability of the on-site disposal option, and define the environmental risk represented by the on-site disposal versus off-site disposal
- Development and approval of a Record of Decision and approval of the Report to Congress
- Use of a two part competitive bidding for award of the design, construction, operations and closure subcontract.

Lessons learned from accomplishing these activities could easily fill a book. Some were positive lessons and some seemed to be not so positive at the time. But in any case, all are leading us through a continuation of the string of successes and all factor into us staying the future course and getting this facility built and operating in time to meet ORR remedial action cleanup milestones.

Application of Lessons Learned:

- Engage the regulators early and keep them informed and active in the process. Provide a stakeholder atmosphere/relationship as early as possible since they steward the state's and country's environment. Another positive factor that was applied on the EMWMF project was to involve the regulators and the contractors in comment resolution meetings to allow a direct interface between all parties in defining acceptable solutions and uncovering and defining misunderstandings.
- Well-conceived front-end site development can result in a more defensible, regulatory acceptable site. Don't let politics pick the site, use sound, unbiased science and tailor the site to the wastes' volume concentration characteristics, and realistic future land uses.

This factor allowed for a more flexible development process that could accommodate changes without major upsets to the progress.

- Perform a risk assessment and establish acceptable and manageable risk and then provide a design that has flexibility and reasonable factors of safety relative to the risk. The public can be your most valuable ally or your worst enemy. Involve them early to ensure they perceive ownership of the process and decisions. Always be honest and sincere, which may mean keeping the PR “suits” at home and letting the “pocket protector” scientists discuss the details with them. The public today is much more knowledgeable than in past years. Often times, and as a reality in the Oak Ridge, Tennessee community, the public is comprised of retired technical people who had previous involvement at ORR.
- Plan the process and incorporate into your plans the following eventualities: it will take longer than you want and there will be last minute crises. Crises were often mitigated by having a relationship with stakeholder and regulators, which resulted in same-day resolutions. An example of a potential crisis-creator was the introduction of classified waste into the EMWMF waste stream during the 100% design iteration. The project also experienced some delays due to turnover among the regulators and the resulting learning curve of replacement staff.
- Proactively provide documentation of consistency with industry practice--in the state, in the EPA region, and, for us, especially within the DOE complex. If you are deviating from standard practice or guidance, proactively address the reasons and benefits of doing so.
- Select the bidder who takes your conceptual approach, improves it, and still has the lowest cost. Look for direct experience rather than big bottom lines. Don't micro-manage the subcontractor or you will stifle his competitive creativeness.

SUMMARY

The EMWMF CERCLA waste disposal site development project will be a success for DOE and the ORR due to application of lessons learned to the process planning and execution. Without such an effort, it is likely that historical dysfunctions would have been repeated. Other developing or planned facilities of this nature can apply our lessons learned and increase their likelihood of success.

REFERENCES

1. M.J. Williams, P. E. Corpstein, M.J. Reif, “Disposal of Mixed CERCLA Waste at the Oak Ridge Reservation in an On-Site Disposal Facility,” Tucson, Arizona, WM-00, February, 2000.