ON-SITE LOW-LEVEL RADWASTE STORAGE

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ABSTRACT

The Low-Level Radioactive Waste Policy Act Amendment of 1985 set forth a policy to ensure that the states or regional compacts made adequate progress toward being able to manage their own low-level radwaste burial by January 1, 1993. With the impending closure of the existing radwaste burial sites on that date and the delay of the startup of the state regional radwaste compacts, it has become necessary for utilities to seek other alternatives. This paper is concerned with one of those alternatives which we believe is more economical than the others.

INTRODUCTION

In March of 1990, Bechtel commenced a conceptual plan for an on-site low-level radwaste interim storage facility. This initial study was to design a facility that would meet all of the appropriate regulations and criteria. Approximately thirty different references are applicable, especially NRC Generic Letter 81-38 and Information Notice 90-09. Both documents are generic in nature and cover many types of facilities including the Bechtel design. The principal design criteria are:

1. Non-seismic, non-safety grade
2. 10CFR50.59 Safety Evaluation-no license amendment for 5 year storage
3. One mrem/yr to the nearest permanent resident

The Bechtel design is based on our extensive experience in radwaste treatment, processing, handling and temporary storage. (See Figs. 1-4.)

The basic Bechtel design consists of a concrete storage pad with gantry crane. The radwaste is stored in rectangular vaults optimally sized to hold an integral number of all of the standard radwaste containers with minimal void (or wasted) space. These vaults are stacked 2 layers high with the size of the typical 5 year storage array being 100' x 100'. Rectangular vaults with highly compacted dry active waste (DAW) are placed around the perimeter of the array to act as shielding. Rectangular vaults with low and intermediate radiation level high integrity containers (HICs) with dewatered resin are inside the array. High radiation level HICs are stored in heavily shielded cylindrical casks in the center of the array. These HICs are loaded into the casks using a transfer bell shield. The vaults and casks are fabricated in sections off-site and assembled on the pad. The sections are sized to permit over-the-road transport without overweight or oversize permits. The vaults and cask sections have lap-joints and rubber gasket seals to prevent in-leakage or out-leakage. The bottom section is a "bathtub" design to contain potential liquid leaking from a HIC and to prevent water ingress. Sample connections are provided for detection of potential airborne and liquid leakage. Extra shielding is placed on the top of the array to minimize skyshine and permit placement of this type of facility on the typically cramped plant sites in the northeast.

The principal advantages of the Bechtel design are:

1. Low cost
2. Short schedule
3. Leak resistant design (from the inside or the outside)
4. Sampling provisions
5. Self shielding
6. ALARA
7. Station oriented
8. Practical, economical solution
9. Meets all of the NRC/EPA criteria

Consider each of these items

Low Cost

The typical cost of the facility is approximately half of the cost of an enclosed building. The approximate costs are: gantry crane $500K, pad $1.9M, and vaults for 5 year storage $1.9M for a total of $4.2M. These low costs are enhanced by the use of the optimized Bechtel vault design.

Short Schedule

The schedule is controlled by the procurement of the gantry crane which requires a 9 month lead time. Otherwise the pad can be constructed quickly.

Leak Resistant Design

The bottom part of the vaults is a "bathtub" to prevent leakage in or out. The lap joints are high on the inside and sealed with a gasket to keep water out.

Sampling Provision

Sample connections are provided on the top and bottom sections to permit surveillance of potential liquid or airborne leakage.

Self Shielding

The highly compacted DAW stored in vaults is used as shielding around the perimeter of the array.

ALARA

The shield bell is used for loading high radiation-level HICs. The gantry crane is remotely operated using TV during such transfers.

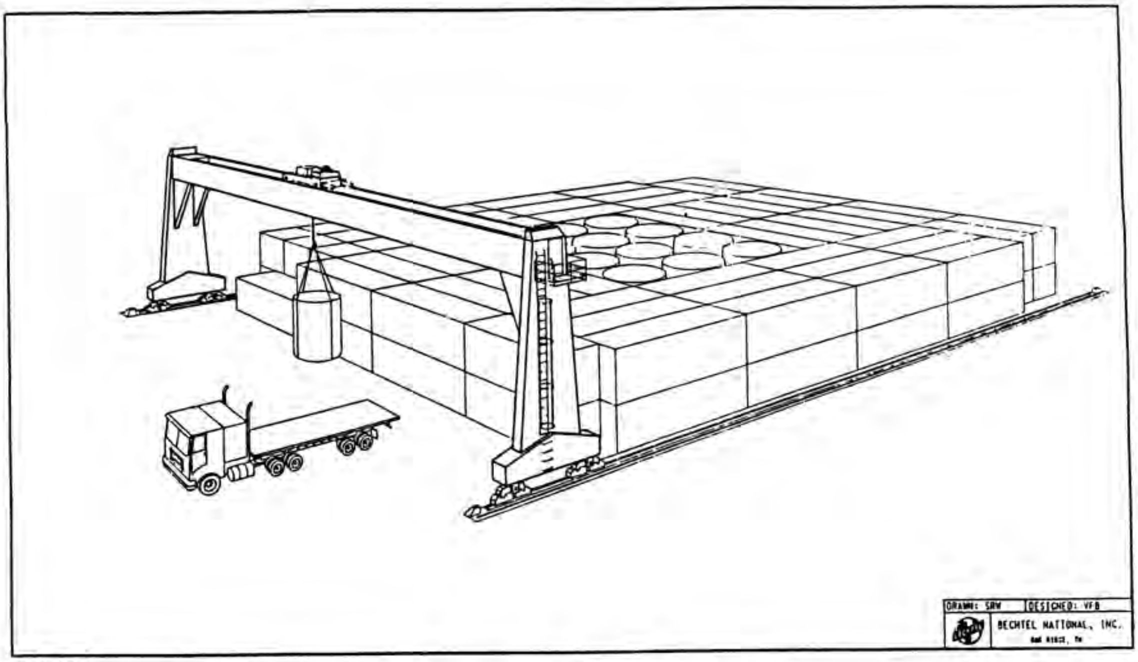

Fig. 1. On-site radwaste storage.

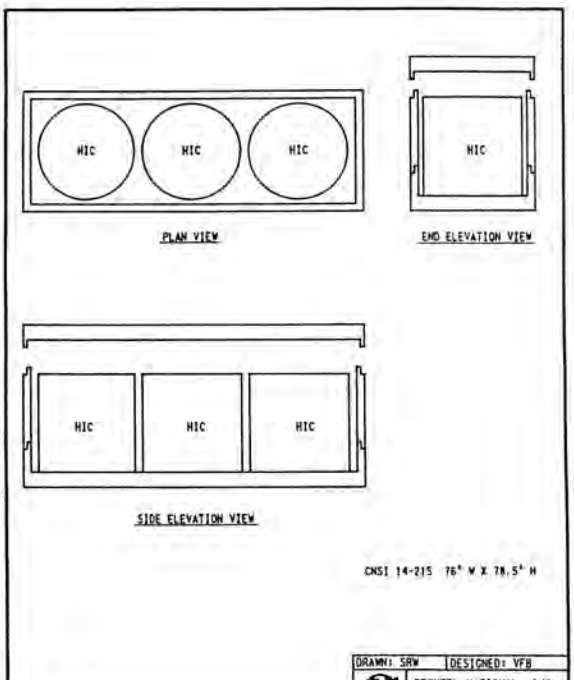

Fig. 2. CNSI 14-215 radwaste storage in vault.

Station Oriented

Bechtel has consulted with utility operations, maintenance, health physics, ALARA, QA, licensing and security personnel in order to optimize the design to fit utility needs and desires.

Practical, Economical Solution

The Bechtel facility is very compact and costs less than half of that for a building.

Meets All NRC/EPA Criteria

The regulations and guidance of the NRC and EPA were factored into the design of the facility from the beginning. Presently the Bechtel design is the only one which meets these criteria particularly with regard to surveillance of the containers inside the vaults and the calculation of the extremely low off-site radiation dose rate.

SUMMARY

The Bechtel design of the on-site low-level radwaste interim storage facility encompasses all of the criteria imposed by the regulatory agencies. In addition, Bechtel consistently uses good engineering practices with concerns for operations, ALARA, safety, economics, environmental protection, radwaste generation, and decommissioning in our policy of engineering excellence.

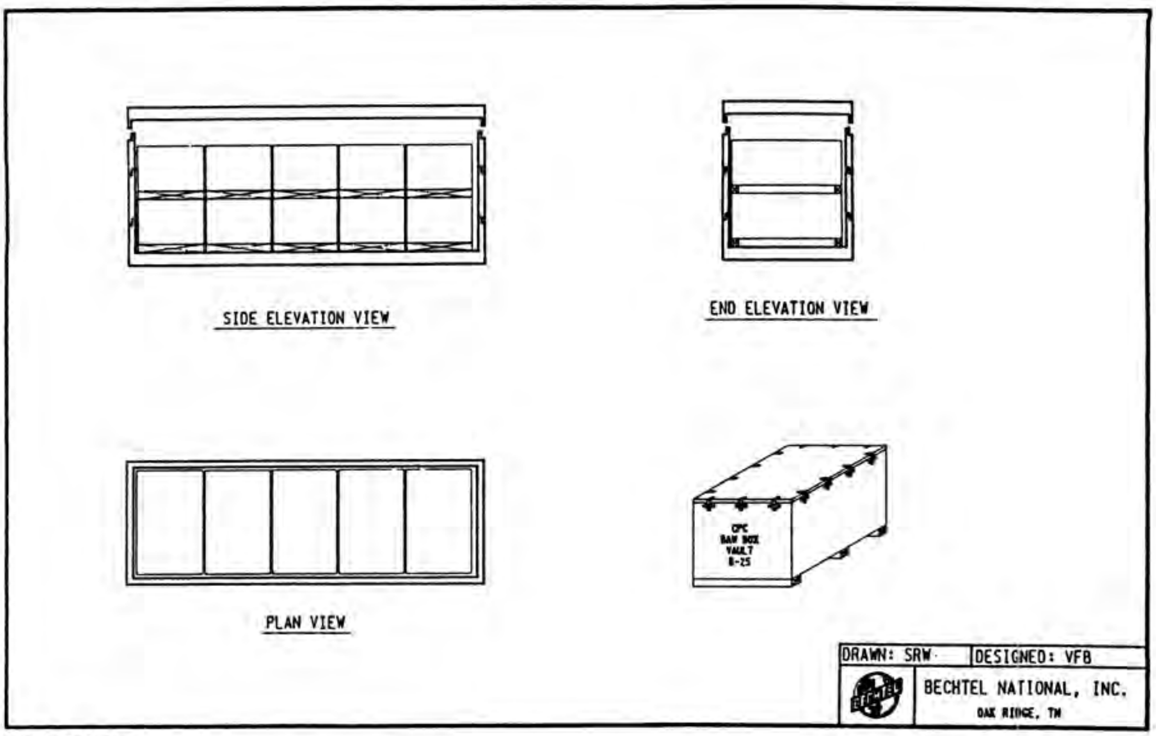

Fig. 3. Radwaste storage B-25 LSA box clearance in vault.

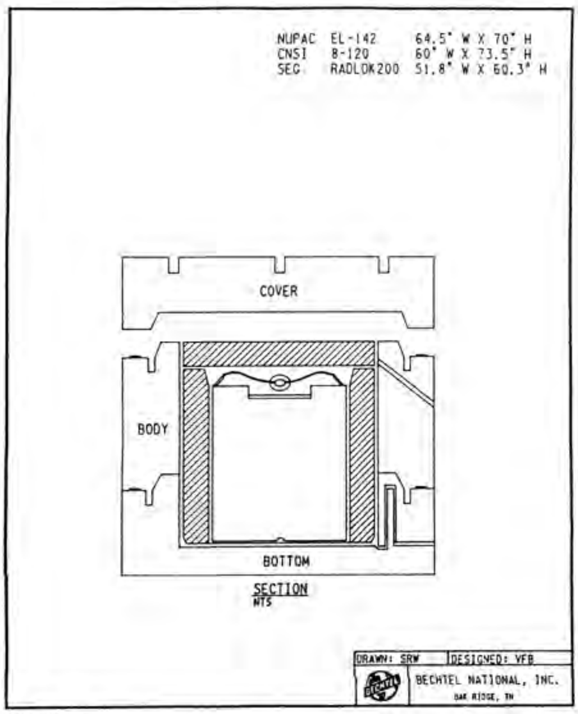

Fig. 4. Radwaste storage reactor cleanup demineralizer HIC concrete shield cask.

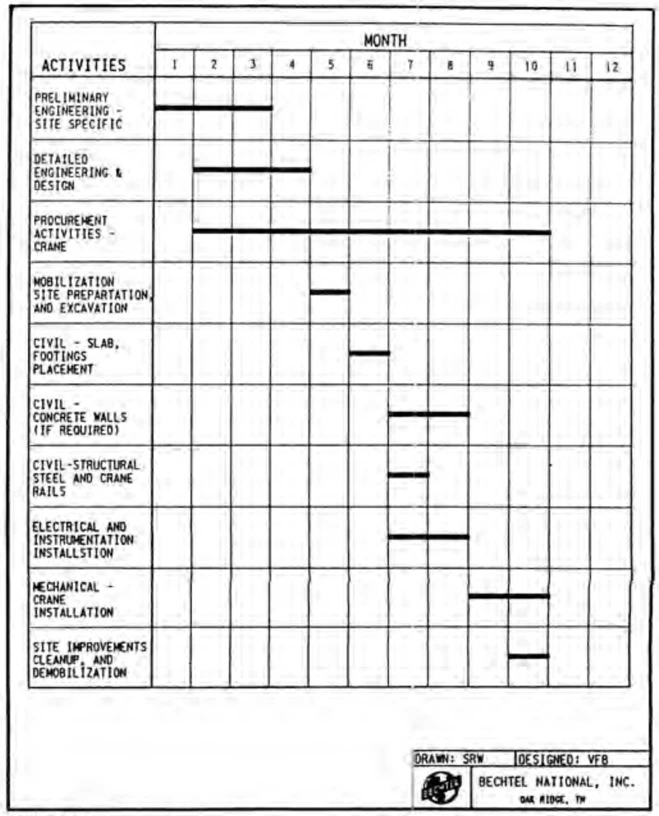

Fig. 5. Radwaste storage facility schedule (10 months).