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Engineering Design File

Waste Placement Mapping Plan (60% Design Component)

Idaho National Engineering and Environmental Laboratory

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ENGINEERING DESIGN FILE

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This engineering design file is composed of a plan to map wastes within the INEEL CERCLA Disposal Facility Landfill. The plan evaluates alternatives and provides a recommendation on tracking waste placement. The plan details out the grid system that will be used for tracking wastes.

6. Review (R) and Approval (A) and Acceptance (Ac) Signatures:
(See instructions for definitions of terms and significance of signatures.)

	R/A	Typed Name/Organization	Signature	Date
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Checker	R	(Same as Independent Peer Reviewer)		11/30/01
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ABSTRACT

This Waste Placement Mapping Plan evaluates and provides a recommendation regarding how wastes will be mapped and tracked during placement in the INEEL CERCLA Disposal Facility Landfill. The plan evaluates two alternative tracking methods currently used at other Department of Energy sites and provides additional information regarding the recommended approach for tracking wastes.

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
GIS	geographic information systems
GPS	global positioning systems
ICDF	INEEL CERCLA Disposal Facility
INEEL	Idaho Engineering and Environmental Laboratory
IWTS	Integrated Waste Tracking System

1. WASTE PLACEMENT MAPPING STRATEGY

1.1 Introduction

The purpose of this strategy paper is to evaluate and provide a recommendation regarding how wastes will be mapped and tracked during placement in the INEEL CERCLA Disposal Facility (ICDF) Landfill. Two alternatives will be evaluated and a recommended procedure will be outlined. This method may be adjusted during the Title 2 design process as the final configuration of the landfill and evaporation pond are integrated with the Staging, Sizing, Storage, and Treatment Facility.

1.2 Primary Alternatives

The two primary alternatives that have been used at similar U.S. Department of Energy (DOE) facilities and meet the requirements of 40 CFR 264.309 include:

- Map each individual load and track locations using geographic information systems (GIS)
- Map individual loads into established grids within the landfill.

A description of each of these alternatives, along with the advantages and disadvantages of each, are provided in the following paragraphs.

1.2.1 Track Each Waste Load

Tracking each waste load has been made much easier in recent years with the use of global positioning systems (GPS) that are easy to use and affordable. Sites such as the DOE waste consolidation and closure in Monticello, Utah, and the Rocky Mountain Arsenal site in Denver, Colorado, have both used a GPS system to track the limits of each load of waste that is placed. The general procedures for mapping and tracking the waste include:

1. Bulk waste, boxes, containers, or debris are delivered and dumped or placed in landfill.
2. Waste is spread and compacted or boxes/containers are placed as required by operations plan.
3. The coordinates for the four corners and elevation of the area where the waste was placed or the corners of the box/container would be recorded on the waste profile.
4. Elevations of lifts are recorded based on GPS or surveying.
5. Tracking can be accomplished using GIS and importing the coordinates and elevations for a complete 3-dimensional map of all the waste loads.

The main advantage of this type of system is the ability to track each load of waste. The useful application of this detailed information, however, is not necessarily warranted. Knowing exactly where the waste was placed could slightly reduce the amount of waste that a potential retrieval operation would excavate, but these types of operations are rare. Another possible advantage would be the public perception that DOE knows exactly where each load was placed.

Some disadvantages associated with tracking the individual waste loads is the potential exposure of personnel who need to take and record the coordinates of each load. Another disadvantage is the operations cost because this activity would require a dedicated person to monitor

and record all the coordinates and elevations. These disadvantages could be overcome by mounting a GPS unit on the dozer or landfill compactor. This would allow measurements to be taken without a dedicated person. However, the GPS units accuracy only allows tracking of wastes to within ±25 feet. During the maximum expected activity at the ICDF Landfill, monitoring and recording of each truck would need to be completed every 6 minutes.

1.2.2 Grid System

The grid system for tracking placement of wastes utilizes a surveyed grid system at a predetermined spacing and depth interval to track which waste loads go into which grid. Temporary markings are typically placed in the operating area of the landfill cell to identify where the grids begin and end. When a waste load is brought into the site, the operators can identify which grid the load is placed in and record the grid designation on the waste profile. Typical grid spacings vary from 30 ft to 50 ft with depths typically about 5 ft.

Typical grid designators include a consecutive number for the grids in one direction and an alphanumeric letter for the grids in the other direction. The depths are typically tracked by layer numbers beginning at the bottom and increasing sequentially.

The main advantage of this method of tracking is the ease for the operators that are placing wastes. Each day, the operators typically try to keep the waste in as few grids as possible. It is easy for the operators to monitor the grid in which they are placing waste by stakes or painting grid corners at the beginning of each day. Permanent grid identification stakes will be surveyed around the landfill perimeter to allow easy identification of grid boundaries within the cell. Periodic surveys will be conducted within the cell to verify waste elevations, lift numbers, and grid corners. On a day-to-day basis, the grids can be visually located within the cell to an accuracy of 1-2 feet horizontally.

The only disadvantage of this system is that each grid can contain about 20 to 25 waste loads that are lumped into one grid designation. From a practical standpoint, this information will provide adequate accuracy should excavation or removal be required.

1.2.3 Recommended Alternative

Based on the two alternatives for mapping and tracking waste, it is recommended that the grid system be utilized at the ICDF Landfill. This selection was based on minimizing personnel and potential exposure during placement operations and ease of tracking and recording the waste location on the waste profile.

It is also recommended that a 50-ft by 50-ft grid system be used with maximum 5-ft layers. This grid will provide adequate flexibility for operations while still maintaining adequate control of where the wastes are placed.

1.3 Detailed Description of Waste Mapping

Figures 1-1 and 1-2 present a conceptual plan view and cross section of the proposed grid system that will be developed for the ICDF Landfill. Any waste that is brought into the site will have a grid identifier that is developed during placement and written on the waste profile. The grid identifier will consist of a horizontal grid locator and a layer number. As an example, an initial load of waste brought into Cell 1 of the landfill may have a grid identifier of 3C-1 where 3C is the horizontal grid identifier and 1 is the layer number.

The ICDF Landfill should have the grid markers staked in the field so that anyone working in the cell can very quickly locate themselves and identify the specific grid. The layers will be tracked based on elevations and will be easily verified periodically using standard survey equipment.

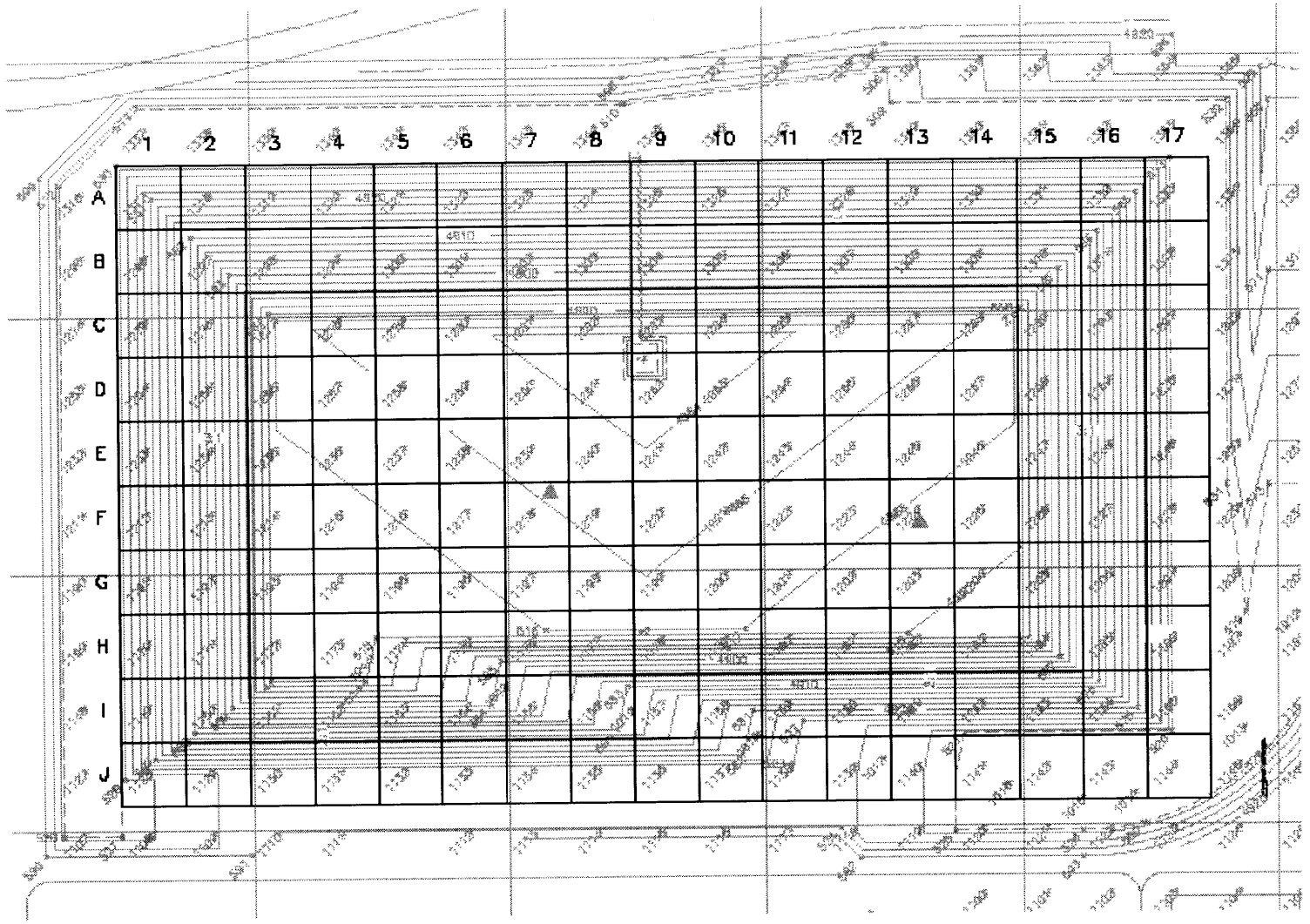

Figure 1-1. Plan view of grid layout.

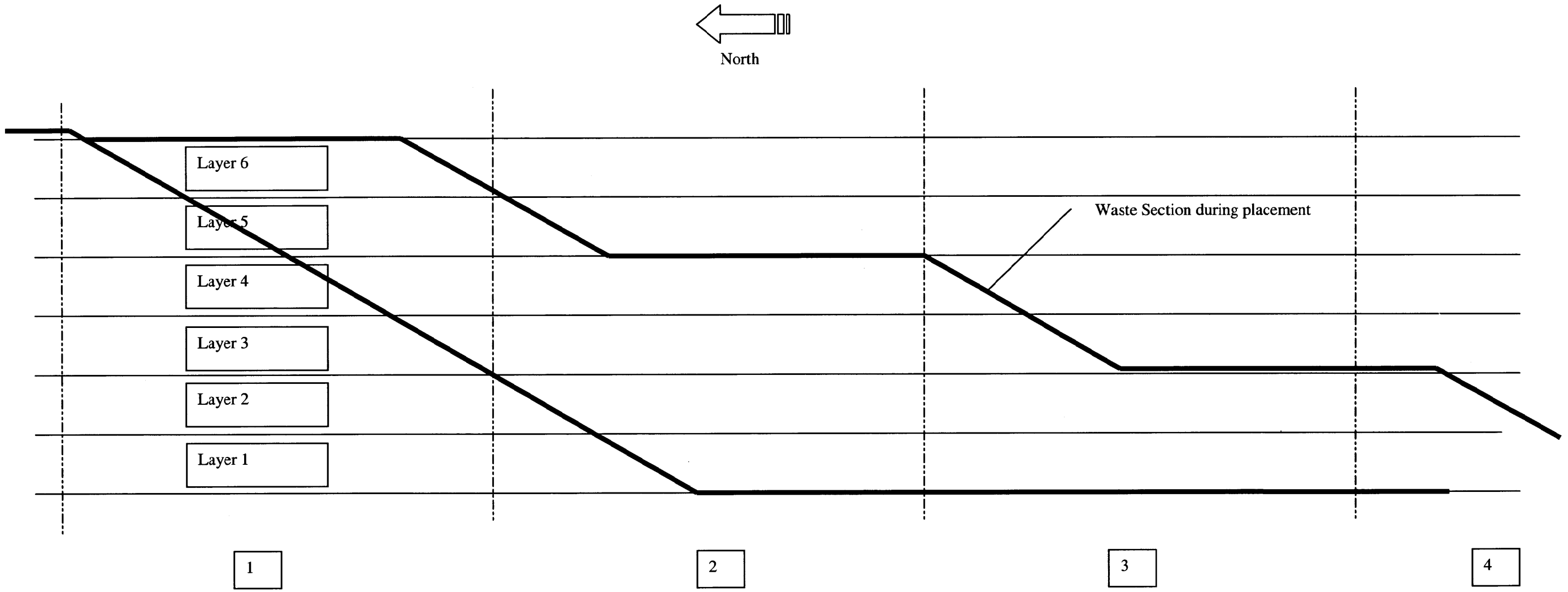

Figure 1-2. Grid cross section cut north-south.

The grid identifier on the waste profile will be provided to ICDF Complex to track the waste entering the landfill and the location. This information will be included in the Integrated Waste Tracking System (IWTS) tracking system at the ICDF.