Environmental Restoration: Part 1 - History Leading to Contract Award

An Online Continuing Education Course for Engineers

Course Number: EN-3025

Credit: 3 Hours / 3 PDH / 3 CPD

Environmental Restoration: Part 1 – History Leading to Contract Award

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General Overview

This course, Part 1, is the first in a series of six sequential courses, Parts 1 through 6, that present the history and steps taken to remediate the environmental hazards created by the land disposal of Chemical and radioactive wastes on the campus of a research institute. The practice of shallow land burial of hazardous wastes was widely used throughout the US between the 1960s and the 1980s. However, since the late 1980s both federal and state legislations were promulgated requiring the environmental regulatory agencies throughout the US to investigate operating, decommissioned and abandoned landfills of all types having in mind the ultimate goal of mitigating the impacts these waste disposal sites have on the natural environment.

I decided to write this series of courses, six in all, from the perspective of a Manager who leads a team charged with the implementation of an environmental Remedial Investigation (RI), Feasibility Study (FS) and Engineered Remediation (ER) of a hazardous waste disposal site. This perspective is especially interesting to develop because a manager is usually associated with a project from its inception and he or she has a unique overview and comprehensive understanding of the scope of work that needs to be implemented. Students, who are interested in environmental issues, will be able to follow and gain an in-depth understanding, not only of the technical and contractual aspects of the project. Even more, they will be able to appreciate the countless difficulties posed by the competing goals and desires of the various parties involved in implementing an environmental investigation of a hazardous waste disposal site. Students will learn to analyze - and then reconcile – the different goals and objectives of the owners, regulators, environmental consulting firms, the interested public and the news media. Finally, the significant impacts of these interactions on scope, budget and schedule are presented and discussed as the process of completing the project unfolds.

This series of courses draws from numerous environmental investigations that I managed across the US. As such, the scenarios that are presented are similar to those a professional environmental engineering practitioner faces in real life. The case that is developed here is used as an example and a vehicle to present and discuss concepts and project implementation strategies that I gained through my long and varied experience working in the engineering consulting business. This information is not usually found or taught in traditional or standard academic courses dealing with environmental issues or investigations. In their entity this series of courses can be considered an implementation guide for conducting environmental investigations at hazardous waste disposal sites. Students will gain unique and useful insights into the data, analyses, interpretations, recommendations and conclusions that were made and that they could then easily adapt to the situations they are likely to encounter themselves in managing their own projects.

More specifically, the environmental problems are those encountered at a decommissioned hazardous and low-level radioactive waste disposal site owned by a research institute. The presentations are sequenced in the order in which investigations would be conducted by an environmental consulting firm contracted to perform and supervise the work that would be done in order to assess the magnitude of the problem and develop appropriate mitigation strategies for the rehabilitation of the site.

Starting with the use of the site for the disposal of chemical and radioactive wastes over a period of twenty years and following the eventual decommissioning and passive custodial maintenance of the site, the presentation unfolds by addressing the following topics in sequential order:

- Initial concerns raised by the regulatory agencies,
- Request for Proposals issued by the research institute,
- Bidding process and the selection of an environmental consulting firm,
- Contract negotiation,
- Compilation and review of existing data,
- Development of work plans and preparation of sampling and testing procedures,
- Implementation of geologic and hydrologic investigations at the site,
- Evaluation of the data collected and assessment of impact on public health,
- Development and evaluation of engineering options for remediation,
- Recommendation of a preferred engineered remedial option,
- Implementation of the corrective action plan, and
- Post remediation monitoring to assess the outcome.

The introduction of each course in the series summarizes briefly the key points covered by the preceding courses in the sequence. This was done to help the students remember all that has unfolded prior to getting involved in a new topic. In addition, each course in this series was structured as a stand-alone presentation of the topics listed in the **"Course Overview"** section found at the beginning of each course. This was done to accommodate the students that have a particular interest in one aspect of the work only.

The titles of the courses in this series are:

Part 1 – History Leading to Contract Award
Part 2 – Existing Information and Regulatory Concerns
Part 3 – Project Plans and Procedures
Part 4 – Phase 1 Field Investigations
Part 5 – Phase 2 Field Investigations
Part 6 – Risk Assessment and Engineered Remediation

Part 1 Course Overview

This course, ***Part 1: History Leading to Contract Award***, starts by reviewing the history of waste disposal practices in the US and the gradual emergence of governing environmental regulations. The following topics are examined:

- Physical description of the waste disposal site,
- History of waste disposal at the site over a period of twenty years,
- Decommissioning and abandonment of the waste disposal site,
- Growing public and regulatory concern for groundwater, surface water and soil contamination from the buried waste, and
- Changes in the regulatory climate since the decommissioning of the waste disposal site.

Following this introductory background, the course shifts to a set of initial meetings and written exchanges that took place between the owner of the disposal site and the regulatory agencies. These meetings, in which the regulatory agencies expressed their concerns and the ensuing exchange of correspondence, led the owner to prepare and issue a "Request for Proposals (RFP)" that was distributed to a number of qualified engineering consulting firms. The proposals were evaluated, a contract was awarded and contract negotiations were initiated with the successful bidder. The initial technical approach proposed by the winning environmental consulting firm is presented. Because lengthy contract negotiations became necessary to resolve technical, budgetary and liability issues, which are typically involved in the implementation of this type of environmental projects, a revised scope of work was formulated. The process of contract negotiation is discussed and the clauses that were agreed-upon and adopted are presented in summary form. A comparison between the proposed initial scope of work and the final scope of work provides a concrete example of how changes are made and adjusted to by both parties once a contract award has been successfully negotiated. It is only then that technical work on the project can be initiated.

A glossary of terms and acronyms used throughout this course follows the conclusion section, at the end of this presentation. This glossary will assist the student understand the terminology used throughout the course series.

Introduction

A Research Institute ("Institute") had for many years used a variety of radioactive materials and numerous hazardous chemicals in conducting experiments in their laboratories. In order to dispose of the waste products of this research, the Institute operated a small shallow land burial facility on the grounds of its research campus. The liquid and solid wastes were placed in various types of containers which were then placed in narrow parallel trenches dug into the soil to a maximum depth of about 8 to 12 feet below the ground surface. Once a trench was nearly filled, dirt was placed over the waste, compacted, graded, fertilized and seeded. In areas where parts of older trenches subsided, due to breakage of containers or compaction of the waste, additional dirt was placed in the sunken areas and these parts were re-graded and re-seeded. In this case, the site itself slopes gently downhill, so that surface water would run off the burial area and into the woods down-slope of the landfill. The site is located in a part of the U.S. that receives a moderate amount of rainfall per year.

Shallow land burial at the site was carried out by the Institute for a period of 20 years, from the 1960s to the 1980s. The entire research facility is under a system of controlled access and admission to the research campus is through a guarded gate. In addition, the waste disposal site itself is fenced, padlocked and posted as shown on Figure 1.

Figure 1: Waste disposal site owned by the Research Institute

At this point it is important to note that shallow land burial of radioactive and chemical wastes at this site was conducted in accordance with the accepted federal and state standards that were in force during the time of its operation. The Institute was never cited for improper disposal practices or other violations. Both the Institute and the Regulatory Agencies agreed that the site was managed and operated properly. After the site was decommissioned in the 1980s, only minor maintenance was completed, and the site and fence became overgrown with vegetation.

Since the late 1980s, however, public awareness of the dangers of contamination from landfills of all types was growing throughout the country. In response to this heightened awareness, regulatory

agencies charged with the protection of public health and safety became increasingly concerned that disposal practices that were once considered acceptable may have long-term negative impacts on groundwater, surface water and soil. The US Environmental Protection Agency (USEPA) started to issue drinking water standards that specified minimum acceptable levels for a number of common industrial chemicals, including some radioisotopes. Federal and state legislations were promulgated requiring environmental regulatory agencies throughout the US to investigate operating, decommissioned and abandoned landfills of all types. The Superfund program was initiated at the federal level to help fund the cleanup of abandoned hazardous waste landfills.

Legislative Backgro

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Low-Leve

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Starting in th thods for the disposal of l arded into the ocean. In an disposal and began op of radioactive waste was dis allow land burial sites were licensed and c pecify defined performance criteria. The governing sta disposal of low-level radioactive wastes were not promulgated until 1981, when most of the commercially-owned and privately-owned disposal sites had begun to curtail their operations and close down. Presently, the official standards for the disposal of low-level radioactive waste are documented in Section 10 of the Code of Federal Regulations, Part 61 (10 CFR, Part 61). Since the early 1980s the disposal of radioactive waste has been regulated by the US Nuclear Regulatory Commission (USNRC). Only a few sites in the U.S. are licensed to receive and dispose of commercially generated low-level radioactive waste.