HAZARDS TYPICALLY ASSOCIATED WITH DIFFERENT CONVERSION SITES AND INVESTIGATION STRATEGIES FOR HISTORIC MILITARY LAND-USE ANALYSIS AND RISK ASSESSMENT

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Abstract. Based on the experiences of projects in the field of conversion, the hazards typically associated with different conversion sites such as former military training areas, airfields, barracks, bunkers and fortifications, depots, battlefields, armament factories, explosives production facilities and chemical warfare agent production facilities are presented. Then, strategies for the historic investigation of former military sites and sources of information including historic maps, aerial photographs, archival records, eye witness interviews, analysis of contemporary literature, military specifications and service regulations are discussed with respect to their utilisation and acquisition from different archives and libraries and their value as sources of historic information. Finally, the combination of single pieces of historic information into a mosaic depicting a near-complete image of activities at former military sites and its application for risk assessment are considered.

1. Introduction

Undoubtedly, former military sites and battlefields pose threats to public safety and environmental security. Former armament production facilities and former military sites that are subject to military-civilian conversion usually reveal numerous hazards, including burials and disposals of hazardous wastes, wide-spread contamination with unexploded ordnances (UXO), contaminations of soil and groundwater with explosives, fuel hydrocarbons and other organic and inorganic contaminants. Depending on the history of a certain site, hazards and contaminations occur either concentrated in hot spots or as more or less uniform contaminations over larger areas, or both. Also depending on the history of a site, certain contaminations may occur in homogeneous patterns while others are distributed in a highly inhomogeneous way. The specific hazards at conversion sites largely depend on the site type and military
land-use forms. Typically, hazards and contaminations found on former military training areas are different from those found at the sites of barracks, airfields, depots, former battlefields, etc.

Despite being obstacles to successful military-civilian conversion, these hazards need to be addressed to prevent damages to the civilian population or continued environmental pollution from source areas after the termination of military use.

Police law and other laws on public safety generally require the protection of the public from hazards or risks that exceed the average risk level of normal life. The protection of the public from the threats posed by former military sites might be achieved by closure of the sites to the public and/or unexploded ordnance (UXO) clearance, clean up and remediation.

The first option, the prohibition of access to sites that have already been closed for decades because they were used by the military, is often unpopular with the general public in general and the local population in particular. The second option, the elimination of hazards posed by hazardous wastes, unexploded ordnance and contaminants, is often unaffordable, even in for “wealthy” industrialised countries, because much painstaking manual labour is required for the clean up of these sites due to the hazards involved.

However, both options require comprehensive site investigation to identify the hazards (e.g. hazardous waste deposits and burials, UXO contamination, etc.) on a particular site and conduct a thorough risk assessment. In the first case, the knowledge of the hazards is necessary to define the areas to be closed to the public and the surrounding safety buffers. In the latter case, knowledge of the hazards that have to be expected is necessary to develop a remediation plan with a priority list and to provide the necessary occupational safety measures for employees working in the clean-up projects. For example, it is absolutely necessary to know or assess whether chemical warfare agents, depleted uranium ammunition or other particularly hazardous materials have been or could have been used on a particular site.

To achieve this objective, either a technical site investigation or an in-depth historical investigation of historic military land use can be carried out. Technical site investigation applying geophysics, UXO clearance of representative areas of a particular site and sampling and analysis is extremely expensive (in particular for large sites and facilities) and does not provide complete coverage. Due to inhomogeneities and hot spots, important information might be missed in a technical site investigation limited to representative sampling, e.g. the use of chemical warfare agents or ammunitions could be highly localised and could escape detection by representative sampling.

A detailed historical investigation including multiple sources of information (or virtually all available sources of information) does not require the