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ENTRANCE TO THE PAST – KNOWLEDGE TRANSFER WITHIN THE WISMUT ENVIRONMENTAL REHABILITATION PROJECT

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Abstract: For about 30 years now, the federally-owned Wismut GmbH has been remediating the legacies left behind by former uranium ore mining and processing operations in Eastern Germany. As final result, sites as well as their complex individual objects (roughly 450) will be rehabilitated in a sustainable way. During the process, a lot of experience how to handle this matter has been gained. It's worth to preserve it for further projects in an easily accessible way. Furthermore, several objects with contaminated radioactive material, covered and left on the site, will remain. The resulting re-use restrictions have to be kept in mind by someone for long term, may be "forever". In contrast to this objectives, the primary source of knowledge, the human resource, is in a steady process of change: Qualified staff becomes retired and new employees (without experience) are hired. Moreover, restructuring of WISMUT or even the end of operation of the company becomes an option, and therefore knowledge transfer (KT) related solutions are needed. As a consequence, WISMUT decided to provide all the gained information about remediated mining and milling residues for present as well as for future users in a compressed, easily comprehensible and reliable way. The intended dual information system includes digital and paper-based components. It consists of a technical database named AL.VIS/W for long-term operation, which contains and link all information about objects and environment before and after its remediation (inclusive re-use restrictions) and which is connected to a web-based information system with different research access and GIS/map features. Beside this, Wismut designed a standardized remediation documentation for each complex remediation object (paper as well as its digital version), which is directly connected to AL.VIS/W. The contribution describes the WISMUT solution and its implementation in current activities.

Kurzfassung: Seit nunmehr ca. 30 Jahren saniert die bundeseigene Wismut GmbH die Hinterlassenschaften früherer Urangewinnung und –verarbeitung im östlichen Teil Deutschlands. Im Endergebnis werden diese Standorte samt ihrer zahlreichen komplexen Objekte (insgesamt ca. 450) nachhaltig renaturiert sein. Während des Prozesses wurde eine Menge an Erfahrungen gesammelt, die es wert sind, für weitere Projekte bewahrt und in greifbarer Weise zur Verfügung gestellt zu werden. Darüber hinaus verbleiben für eine Reihe von Objekten auch nach einer ordnungsgemäßen Sanierung noch langzeitliche Nutzungseinschränkungen, z.B. aufgrund verbleibender (abgedeckter) Restkontaminationen im Untergrund. Auch diese Informationen müssen über Generationen erhalten bleiben. Im Gegensatz dazu unterliegt die primäre Quelle des Wissens einer ständiger Veränderung: Die am Sanierungsprozess Beteiligten mit ihrem Detailwissen scheiden aus dem Unternehmen aus und neue Fachkräfte werden eingestellt. Selbst die Auflösung des Sanierungsunternehmens stellt zu einem späteren Zeitpunkt eine denkbare Option dar. Für vorgenannte Szenarien bedarf es eines effizienten, rechtzeitig begonnenen Wissenstransfers. Die Wismut GmbH hat dafür eine duale Lösung entwickelt. Diese besteht zum einen in der langzeitlichen Ausrichtung einer technischen Datenbank, welche weitreichende Informationen über alle Sanierungsobjekte und -technologien führt und vernetzt. Darüber hinaus werden objektspezifische, thematisch standardisierte Sanierungsdokumentationen erstellt, die alle wichtigen Informationen zu einem Sanierungskomplex bündeln. Die Dokumentation ist im Endausbau sowohl physisch als auch digital verfügbar, textrecherchierbar und in Langzeit-stabilem Format gespeichert sowie an die technische Datenbank angebunden. Der Beitrag illustriert die firmenspezifische Lösung zum Wissenstransfer.

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Objectives of the KT initiative

Exclusive business of Wismut GmbH consists in decommissioning, cleanup, and rehabilitation of the uranium mining and processing sites in Eastern Germany. Assuming the scale and complexity of the legacies left behind in densely populated regions, the rehabilitation has to comply with high technical standards as well as to meet challenging socio-economic requirements. In this context, federal laws and regulations as well as stakeholder interests have to be taken into account. Meanwhile the WISMUT environmental restoration project is running for about 30 years. Final project implementation and post-remedial measures will take some more decades. With reference to this dimension, it is quite obvious that huge amounts of data, information and documents as well as a complex know-how have been generated. This knowledge has to be preserved for decades, because it could be essential for later investigations and should be found by a plain access. For a number of objects, especially in case of residual contamination in underground, the requirement applies „forever“. In contrast to this objective the primary source of knowledge is in a steady changing process: Qualified staff becomes retired and new employees (without Wismut specific experience) start their business. Rather somedays remediation will be finished and possibly the company will be closed. That's why WISMUT decided that all the gained information about remediated mining and milling residues inclusive re-use restrictions should be provided for present as well as for future users in a compressed, easily comprehensible and reliable way.

Description of the KT initiative

The main parts for KT have been designed as

- a complex web-based Information System with various research access and GIS/map features, named „AL.VIS/W". It combines a variety of issues, related to the remediation objects like shapes, properties, measuring points, time series, etc…
- a standardized paper driven remediation documentation for each complex object (from the beginning to the end, including declaration about remaining re-use restrictions); in parallel, the documents get transferred to a digital version in a long-term valid manner and will be stored in a document management system.

The first named part was developed for daily work since the late 1990th originally. Meanwhile it is stepwise grown to a powerful information platform, which is well developed and should be the baseline for all research activities during the next generations. Inside the technical data base different issues are linked to each other by name, ID or geometry. Main entrances are via map („stich in“ and request for former remediation objects), via object research (ask for a special object and get all the related information, e.g. the remediation documentation, affected parcels and its re-use restrictions) or via site view (which contains environmental relationships to remediation objects).

The remediation documentation itself includes 17 standardized registers for each remediation object (e.g. register 1 = vita, register 2 = administrative decisions, register 3 = photo do-cumentation and so on). Therefore the following steps have to be done:

(A) Location of important documents from different storage places and assignment to register
(B) Paper Archiving
(C) Digitization in a long-term valid manner (pdf/A) plus text recognition (OCR)
(D) Storage inside a Document Management System (DMS)
(E) Connection of term (C) to the information system AL.VIS/W
(F) Development of efficient tools („assistants") for an easily available plus plain way of search for all user.

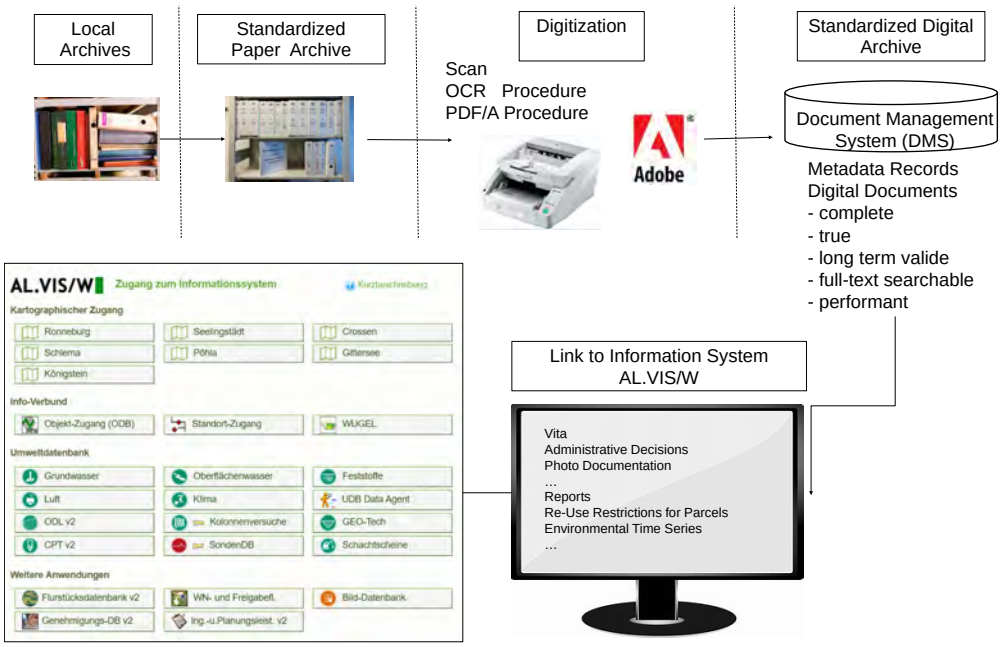

Fig. 1 Simplified scheme of the process

For compilation of roughly 450 remediation documentation during the next 10 years, a team of ten employees in total was founded in 2018, most of them with many years of operational experience in Wismut GmbH. Furthermore, guidelines have been developed to design remediation documentation in a standardized form. Last but not least the process has to be accompanied by training programs for the staff, who is in charge of operating the system daily. Currently time-expencive tasks like pdf/A generation from pdf-scans and text recognition (OCR procedure) will be automated in order to increase efficiency and to reduce costs.

Major challenges and achievements for proper documentation of all remediation actions

Besides the huge dimension, the diversity and long-term performance of the WISMUT remediation, a major challenge was to gain acceptance for the necessity and to get capacity for this project. For a long time the management has been focused too much on substantial daily tasks, losing sight of documentation. Consequently, KT as a coordinated unit started very late. This means that numerous remediation objects are already finished and the documentation work has to be done retrospective and simultaneously to the running operations. That's why it was (and it is) a challenge to find the right, experienced persons, who have to be involved for generating the documentation in a standardized matter.

Conclusions, achieved level, outlook

Knowledge transfer to next generations is not a self-running process. It needs a vision, a qualified concept, adequate staff and therefore sufficient financial resources. Furthermore, it requires the active cooperation of all concerned departments within the organization. The earlier this process starts, the smaller are the problems arising in implementation, because all the relevant data, records and information (which are primary digital nowadays) can promptly implemented into the right place by a well sorted data base system or archive. For this purpose the company-driven information system AL.VIS/W, which originally was developed for the period of remediation, is well prepared. It will be enhanced step by step to an assistant-supported complex system, gaining all information about former processes and remaining use restrictions to the next generation in a digital way. The process includes also the ongoing maintenance and further development of software standards beside content-related aspects. The efforts to compile a standardized proper documentation of all remediation actions and their results have been increased during the last two years, to fill the gaps in paper archive by still available contemporary witnesses in a timely manner. Simultaneously, the efforts to digitize all the paper-based records are going on.

Involved partners

- WISUTEC Umwelttechnik GmbH Chemnitz,
  programmer for all in AL.VIS/W implemented applications;
- IDU IT+Umwelt GmbH Zittau,
  programmer of web-based framework with GIS/map features.