International Conference on Advancing the Global Implementation of Decommissioning and Environmental Remediation Programmes CN-238

Contribution ID: **141** Type: **Poster**

# EVIDENCE AND DOCUMENTATION OF REMEDIATION SUCCESS ACHIEVED AT FORMER URANIUM PRODUCTION SITES IN GERMANY

*Wednesday 25 May 2016 09:00 (9 hours)*

Abstract: At the advanced state of remediation of complex legacies left behind by uranium mining and milling, the need arises to provide and document evidence of re-medial success. In the case of large amounts of radioactive materials remaining near the sur-face evidence can only be provided in the framework of a prolonged monitoring process. Objective documentation of the remedial success as part of the knowledge management is a pre-condition for the release of rehabilitated objects from regulatory control. Such documentation also provides the basis for implementing long-term tasks on rehabilitated objects including institutional control. This paper illustrates by case examples the way in which evidence of the remedial success is provided and the required data and information on remediation are made available to various users.

1. INTRODUCTION For 25 years now, the federally-owned Wismut GmbH has been remediating the legacies left behind by former uranium ore mining and processing operations in the East of Germany. In that area, the former Soviet-German stock company SDAG Wismut had produced a total of 216.000 tonnes of uranium during a period of more than forty years whereby it had evolved into the world' s fourth largest uranium producer at that time. As a result of mining low-grade ores, more than 800 million tonnes of low-level radioactive materials were deposited in densely populated areas, in some cases in the immediate neighbourhood of residential areas. This created a situation which required in situ remediation associated with residual radioac-tive materials left after clean-up. Remedial progress achieved so far makes it imperative to substantiate and document the remedial success.
2. CRITERIA OF THE REMEDIAL SUCCESS Criteria whereby a remedial action can be considered as successful are both site-specific and object-specific. With regard to achieving environmentally relevant remedial targets at objects with residual contamination left at the site, the efficiency of technical barriers is of particular importance. Especially in the case of covers it revealed that even a long time after their placement they were still subject to alterations, such as in terms of water balance or gas per-meability. As a consequence thereof, contaminant releases via seepage water and radon exha-lation remain in the longer term susceptible to alterations. Therefore, Wismut has identified the criterion for remedial success that the cover performance must have achieved an stable condition, the intended degree of performance is maintained and the risk of negative trend reversal can be precluded.
3. APPROACH TO PROVIDING EVIDENCE OF REMEDIAL SUCCESS. In an effort to provide evidence of remedial success WISMUT first and foremost applies methods of source monitoring (e.g. measurements of contaminant release via seepage, radon exhalation measurements). In addition, methods of source as well as person related environ-mental monitoring are used. These methods allow establishing the residual and overlapping impact of all kinds of remediated objects at relevant exposure sites. Establishment of cover performance oftentimes requires complex investigations of the cover water balance and gas permeability. For a long period of time after cover placement was completed, vegetation suc-cession and various forms of bio-intrusion will continue to produce alterations. To some ex-tent highly sophisticated investigation techniques were used in order to understand the proc-esses going on in covers and to provide evidence of the remedial success [1].
4. CASE EXAMPLES Evidence of the remedial success is demonstrated by the case examples „Evolution of the radon situation"and „Evolution of contaminant release via seepage water", exemplified by reclaimed waste rock piles at the Schlema-Alberoda site. Complex investigation methods included among others:
5. Lysimeter investigations to quantify water balance of the cover;
6. Tracer gas applications to analyse airflow within the system waste rock pile –cover as well as infrared investigations to identify air leaks;
7. Time- and site-resolved measurements of gas permeability and radon exhalation rate.
8. DOCUMENTATION OF THE REMEDIAL SUCCESS WISMUT has devised the technical data base system AL.VIS(W) [2]. The environmental data base is also part of the system. Remediation documentations contain all information required for tracking reme-dial steps and the state of remediation of individual objects. Data and information which con-tinue to be accumulated from post-remedial activities are periodically integrated. The web-based platform AL.VIS(W) enables Wismut as well as authorities and other authorised users to access data and information.

REFERENCES

[1] SCHMIDT,P., REGNER,J., Improvement of the Radon Situation at Former Uranium Mining Sites in East Germany, 6th Conference on High Levels of Natural Radiation, Osaka, 2004, Internat. Congress Series Vol. 1276 (2005) 238-240.
[2] KREYSZIG,E., GÖTZE,J., The Wismut Technical Information System, International Conference WISSYM_2015, Bad Schlema, Reclaimed Mining Sites between Post-Remedial Care and Reuse, ISBN: 978-3-00-049882-4 (2015) 345-347.

## Country or International Organization

Germany

## Type ”YES” to confirm submission of required <br> Forms A and B via the official channels

YES

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**Session Classification:** Session 4B - Poster

**Track Classification:** Technical and Technological Aspects of Implementing Environmental Remediation Programmes