The influence of licence conditions on mine water management

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Abstract

Mines in South Africa are required to obtain a Water Use Licence (WUL) and must undertake compliance audits to assess the extent to which compliance to the WUL is being achieved. Over time it has become clear that mining operations vary in taking ownership of the issued WUL and putting measures in place for achieving compliance. This variation impacts on meeting the objectives of a WUL, namely to protect the Water Resource but without limiting the economic benefit of the mining operation. A Licence Implementation Plan is proposed to incorporate the WUL into the day to day mining operations.

Keywords: Department of Water and Sanitation (DWS), Licence Implementation Plan (LIP), Water Use Licence (WUL), Water Use Licence Application (WULA)

Introduction

Mining operations in South Africa are required to obtain a Water Use Licence (WUL) in terms of the National Water Act, Act 36 of 1998 (Act) before any Section 21 water use activities may commence. Water uses that require authorisation in terms of Section 21 of the Act are presented in Table 1 below. Mines in operation prior to the promulgation of the Act have been required to obtain a WUL for the existing operations in order to continue mining. WULs are issued by the National Department of Water and Sanitation (DWS) based on information provided in a Water Use Licence Application (WULA). WULA content has been informed by various guidelines but was standardised in March 2017 with promulgation of the WULA regulations (Government Notice R267, Government Gazette 40713, 24 March 2017), which should facilitate the WULA review process. Inclusion of a 300-day WULA time frame in Regulation R267 aligns WULAs with the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) processes required for environmental authorisation of mines. Alignment of the WULA and EIA/EMP processes is schematically presented in Figure 1.

Each WUL issued contains the following:

- A general set of conditions applied to all issued WULs;
- Site specific conditions based on the information provided in the WULA, outcomes of any engagement between the applicant and DWS during the WULA review process and the DWS management objectives for the catchment within which the mine falls;
- Quality and quantity limits for the authorised Section 21 water uses. Water quality limits may also apply for the surface and groundwater resources in the mine area.

An on-line WULA submission system, known as the Electronic Water Use Licence Application and Authorisation System or e-WULAAS, was launched in several catchments in 2017 to support the 300-day process and follows the three phases in Figure 1 below. Objectives of the e-WULAAS are twofold (DWS, 2017):

- Firstly to provide an online portal to DWS clients to register and subsequently submit their water uses alongside the current paper based system.
- Secondly the system will provide an internal web based interface for the authorisation staff to manage, coordinate, track and finalise the authorisation processes of registered water uses culminating in the issuing of a WUL.

The system is being further developed based on user feedback towards continual improvement

Table 1. Section 21 water uses

Section 21	Description of use	Comment
(a)	Taking water from a water resource	Any reuse of water authorised under Section 21(j) will also trigger Section 21(a) water use
(b)	Storing water	Applies to clean/raw water storage
(c)	Impeding or diverting the flow of water in a watercourse	Mining activities within 100 m or 100 year floodline of a watercourse or within 500 m of a wetland also trigger this use
(d)	Engaging in a stream flow reduction activity	Only use of land for afforestation currently applies
(e)	Engaging in a controlled activity (e.g. irrigation with water containing waste and recharging an aquifer)	In the context of mining irrigation with water containing waste and recharging an aquifer will trigger this use
(f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit	Reuse optimisation has to be demonstrated before this use will be approved for mining
(g)	Disposing of waste in a manner which may detrimentally impact on a water resource	Applies to storage of dirty water, disposal of mine residues and run of mine or other stockpiles that may have the potential to pollute water
(h)	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process	Does not typically apply to mining
(i)	Altering the bed, banks, course or characteristics of a watercourse	Section 21(c) water uses also trigger Section 21(i) water use as does undermining of a watercourse (mining within 100 m vertical depth of a watercourse)
	Removing, discharging or disposing of water found underground for the continuation of an activity or for the safety of persons	Dewatering of open pit and underground workings
(j)		May apply to water bodies on mine property used for fishing, boating or other recreational purposes
(k)	Using water for recreational purposes	

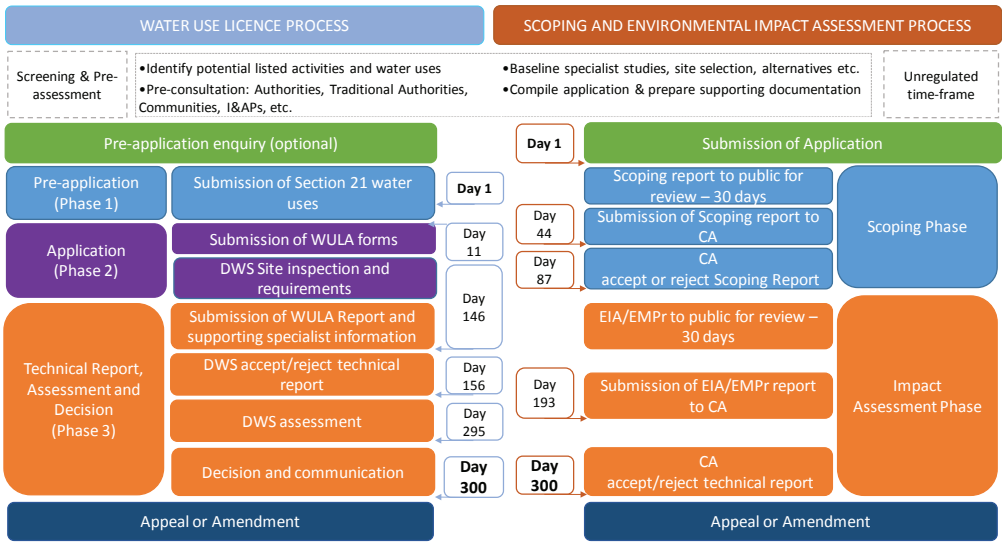

Figure 1: Alignment of the 300-day WULA and EIA/EMP processes

that will facilitate role out to the catchments not yet geared up for online submissions.

Currently the biggest challenge for WULA approval is limited resources within the DWS to adhere to the regulated time frames. A related challenge is having adequate specialist information in the initial application to demonstrate to DWS that impacts on the water resource and the communities that rely on this water will be appropriately minimised and managed. As WULAs may be initiated at pre-feasibility or feasibility stage to allow sufficient time for approval prior to project implementation, limited project information may be available to inform the studies.

Over almost two decades of mines applying for and operating under WULs it has become clear that mining operations vary in the

extent to which ownership of the issued WUL is taken and measures are put in place to comply to the WUL and WULA commitments. WULA commitments become legally binding once the WUL is issued, as WULs typically have one or more conditions requiring that the authorised water uses are carried out in accordance with the 'Report', the 'Report' being the WULA and all supporting documentation as defined at the start of the WUL.

How a WULA may influence WUL conditions, what influences implementation of the WUL and how development of a Licence Implementation Plan (LIP) can facilitate incorporation of the WUL into the day to day mine operations is discussed.

How a WULA may influence WUL conditions

With each new WUL that is issued, additions to the suite of general conditions and site specific conditions that have been based on the WULA content are evident. In instances where the WULA related condition may have been taken out of context or misinterpreted by DWS, this can lead to errors or technical issues in the WUL that pose a regulatory risk to the licensee. For examples, a Rock Engineering report may cover the full extent of the mining area where undermining may occur and include pillar and stope specifications for all levels. If the WUL stipulates incorrect details for the undermining area, the implication may be that no mining or only limited mining can occur in that area. As an amendment application to rectify the error may take some time this could delay mining with serious economic implications. In the case of vegetation of clean water diversions, the hydraulic forces along steep sections of the diversion may render the establishment of vegetation not feasible with only a hard engineering approach viable (concrete, gabions etc.) to protect against erosion and sustain the diversion's integrity.

To minimise the risk of impractical and unrealistic WUL conditions based on the specialist report findings and recommendations included in the WULA, the following approach to developing a WULA is proposed: developing a WULA is proposed:

- **Combined specialist site assessments** as far as this is practical and/or as a minimum pre- and post site work integration sessions that include the respective specialists, project engineers, designers, project manager and site geologist. The key specialists in this regard are the geohydrologist, hydrologist, aquatic specialist, heritage specialist/archaeologist and possibly also a hydropedologist if mine dewatering or any other mine activity has the potential to impact on river baseflow.
- **An integration workshop** with the applicable specialists and project manager at draft report stage to optimised structuring of the reports to minimise the potential for information being taken out of context for inclusion in WUL conditions, alignment of findings and recommendations and where considered applicable, preparation of appropriate motivation(s) for proposed alternative to anticipated WUL conditions – mostly related to Section 21(c) and (i) conditions. For example, hydrological motivation for sections of a clean water diversion that need hard engineering instead of the DWS preferred vegetation.

As the WUL applicant has control over the detail provided in the WULA, it is important when preparing a WULA to ensure high quality specialist input and that all information included in the WULA is clear and concise with all specialist recommendations and management commitments practical, reasonable and achievable. Should DWS deem that the submitted information is inadequate, additional specialist work including amendments to designs may be required for the WULA to be approved.

What influences implementation of the WUL

Over time there has been a greater emphasis of WUL conditions on resource quality which encompasses the following (DWS, 2016):

- quantity: assurance of instream flow;
- quality: physical, chemical and biological;
- instream and riparian habitat;
- aquatic biota.

In order to fully comply with the resource quality related conditions in a WUL mines are required to extend managing water and water containing waste generated and consumed on site to managing the riparian zone and underlying aquifers, and all influences

Table 2. Factors that can influence WUL implementation and compliance

Factor	Influence
WUL Conditions	Negative: • Extent to which the conditions are applicable and appropriate for the operation including conditions with errors. • Extent to which the conditions are achievable within the stipulated time frames and available budgets. • Conditions that are ambiguous or unclear and require clarification. Positive: • Opportunity to improve on operational awareness and efficiencies. • Benchmarks against which the operation can assess its performance.
Resources	• The extent to which personnel delegated with implementing the WUL have familiarized themselves with, and made others aware of the WUL requirements • Support provided by fellow colleagues and management in developing and implementing improvements in water management measures. • Availability of an appropriate WUL implementation budget with priority on actions needed to address non-compliant audit findings and avoid further non-compliant findings in future audits.
DWS relations	A positive relationship with, and support from DWS.

on these as stipulated in the WUL. Factors that can influence implementation of and thus compliance to the WUL are presented in Table 2. Managing these factors can be facilitated through a formalised Licence Implementation Plan (LIP) discussed in the next section.

Licence Implementation Plan

Development of a LIP provides an approach for improving the manner in which WULs are incorporated into the day to day running of operations thus facilitating compliance to the WUL. A LIP can assist with audits especially those conducted by the DWS Compliance and Enforcement officials as documentation and compliance records back dating to when the WUL was first issued may be requested during the audit. A lot of unnecessary time can be wasted in sourcing this information if an effective LIP is not in place.

The LIP can range from a simple Excel file to an interactive web-based system. A schematic representation of a LIP is presented in Figure 2. The main steps in developing a LIP are as follows:

- Convert the WUL to an Excel format.
- Categorise the WUL conditions to facilitate implementation and auditing. Proposed categories are as follows:
    1. **Document needed** as proof of compliance e.g. meter calibration certificate;
    2. **Site assessment required** to verify compliance e.g. adequate bunding in place;
    3. **Timeline applies**, mostly related to required submissions to DWS e.g. quarterly monitoring data, annual audit reports etc.
    4. **To note** i.e. not auditable/not yet applicable, but important to be aware of e.g. timeline is in the future or Section 21 water use has not yet been initiated;
    5. **Amendment needed** – it is important to review the WUL details for correctness and engage with DWS to amend any errors.
- For **Category 1** items develop a list of supporting documentation required, remembering to include reference to the WUL Condition number. Collate what is available and develop a schedule for obtaining outstanding documentation and routinely required documentation e.g. annual water balance updates. Set up appropriate folders and registers for storage and record keeping, respectively. Where the document may require appointment of a service provider to undertake a particular study e.g., update of a groundwater model, this will need to be scheduled and budgeted for well in advance of the stipulated deadline.

- For **Category 2** items develop a list of activities, equipment, facilities or any other materials that may be required to give effect to the site requirements. Prioritise the requirements based on current level of non-compliance, risk of ongoing non-compliance, costs, time required for implementation and any other factors that may apply. Once prioritised, develop a schedule for implementation, apply for budget and put the necessary measures in place to adhere to the schedule.
- Most **Category 3** items will have a link to Category 1 and/or Category 2 Items. Develop a schedule of required submissions and actions, and a system of reminders to ensure deadlines are met. The mine is required to notify DWS if a deadline cannot be met and submit an extension request. An amendment application may be required for unreason able timelines or align timelines for routine data submissions especially where the DWS offices are located far from the site and DWS insists on hard copy submissions.
- In order to align the various actions and ensure a cost-effective approach is factored into the LIP, actions can be grouped into sub-categories with categories that will apply to most mining WULs provided in the LIP Schematic in Figure 2.
- Formalise the above in a documented LIP Procedure that is allocated a company document number and approved by management. Review and revise the LIP Procedure as required to keep it current.

To ensure the LIP is effectively implemented the following will be required:

- Development of a program for ongoing training and awareness on the WUL conditions and supporting LIP. Linking this into existing programs will be most effective. Where significant behavioural

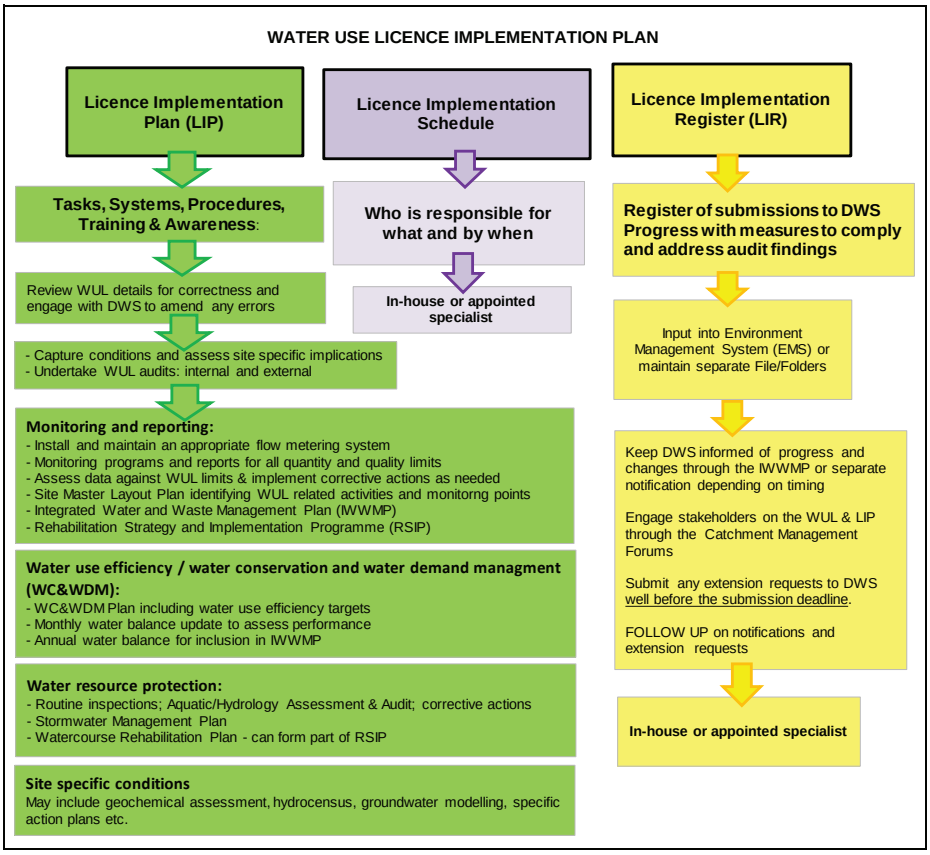

Figure 2: Licence Implementation Plan

changes are needed to give effect to the LIP in order to comply to the WUL, it is important for all personnel to understand what changes are needed, why these changes are needed and how these change will benefit the water resources. A key example is changeover from wet to dry cleaning or use of process water instead of potable water wherever possible.

- Allocate tasks and timelines for implementation and compliance. An interactive on-line system that caters for scheduled reminders and tracking progress will facilitate this process. Extension of the existing Environment Management System, that everyone should be familiar with, to cater for this step, rather than development of a new system is recommended.
- Review and report on progress at the routine management meetings. This is a critical step to maintain management buy-in to ongoing WUL compliance.
- Develop and maintain a Licence Implementation Register that can generate records of submissions to DWS and progress reports on all actions, especially corrective actions to address audit findings and recommendations.
- Maintain records of all DWS engagements and notifications in the WUL folders as these will be important to provide to DWS Compliance and Enforcement officials when they conduct WUL compliance audits on site.

Conclusion

Awareness of WUL conditions and how these can be influenced by the WULA and in turn can influence water management practices on mine sites is important to optimise protection of water resources and maximise the socio-economic benefits of the mining operation. A suitable LIP is required to facilitate WUL compliance and requires to be supported by adequate resources, an implementation schedule and implementation register that will provide the required records for compliance audits.

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