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No.1 Document Water Ecology Security Strategy Analysis

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1 Introduction

The No.1 Document and the “Three Red Lines” water resources policy objectives defined by MWR is a formidable and unique water resources challenge unprecedented in the world. The EU on the other hand has accumulated an unmatched wealth of good policy practices aiming at controlling water use and pollution discharge and securing a high level of water resources protection across the union. The objective of this Strategy Analysis of Water Ecology Security is to provide MWR decision makers with an insight into the rationale for desirable policy action to successfully implement the Three Red Lines defined in the No.1 Document based on EU experience with good policy practices.

2 Key messages

Based on an assessment of the current Chinese practices for water resources protection and water ecology security and a comparison with EU and EU Member State policy experience in the field, the success of the Three Red Lines policy under MWR is expected critically to hinge on the capacity of the Chinese government at all levels (central, provincial & local) to thoroughly and effectively monitor and enforce the policy.

Currently the Chinese regulations for permitting of water abstraction as well as wastewater discharge into water bodies do not enable adequate monitoring for compliance and enforcement. The required permits are not integrated (quantity, efficiency and quality) and more critically, the permits are too simply worded and do not cover in adequate unambiguous detail and precision the obligations of the permit holder with regard to Emission Limit Values (ELV), mixing zones, Best Available Technologies (BAT) requirements, monitoring and inspection, reporting requirements, sources and data to be reported, specific changes in operating conditions, which would require a reassessment of the permit, penalties to be incurred in case of breach of permit, and more.

In the EU an integrated water permit will be written by experienced inspectors who in very great detail and unambiguous precision will specify the obligations of the permit holder. It is this attention to detail and the unambiguous precision in the written permit drafted by an experienced inspector, which makes all the difference, when it comes to compliance inspection and enforcement procedures.

The key message is that to enable effective compliance and monitoring of the achievement of the Three Red Lines policy, a new water resources regulatory process, having at its core **a new integrated “Water Resources Impact Permit” for water users and pollution dischargers, and merging the three dimensions of the Three Red Lines (water quantity, water use efficiency, water quality), is an absolute necessity.**

3 Strategy outline

Based on the EU experience the new permit policy could be formulated along the following three mutually reinforcing principles:

- **1 operator**
Every operator, or enterprise, using significant quantities of water or causing significant discharge of wastewater into receiving waters is allocated “Three Red Lines Targets” for quantity, use efficiency and quality.
- **1 permit**
Every operator allocated Three Red Lines Targets is subject to a new “Water Resources Impact Permit” process controlled at the central level allowing for unambiguous and strictest reporting, monitoring and enforcement as required by the No.1 Document.
- **1 competent authority**
Every operating site allocated Three Red Lines Targets is subject to mandatory periodic inspections coordinated by a single competent authority in charge of water resources protection to control compliance with the requirements of the Water Resources Impact Permit.

The new permit is an integrated permit in the sense that it merges targets for: 1) water abstraction, 2) water use efficiency and 3) wastewater discharge.

The permit should 1) describe the conditions under water users or polluting operators, or enterprises, are allowed to operate, 2) define practically enforceable conditions for water abstraction and wastewater discharge limit values reflecting the environmental quality and pollution prevention objectives, and 3) document unambiguously and precisely pollution control and prevention measures as well as monitoring and reporting obligations of the operator with timetables that can be monitored and enforced by local authority.

The new permit should balance fairly and effectively, the reward (incentive for the use of new innovative water efficient technologies) and the punishment (administrative and judicial enforcement through civil and criminal pursuits for offenders).

In the EU such integrated permit instruments were introduced in the 1990”s. These were accompanied by strong and fair enforcement mechanisms that effectively remove the economic benefit of non-compliance. **These permits have been the most important policy tool to effectively reduce the pollution of water bodies and start a positive circle of water ecology protection and improvement in the EU.**

4 Operators subject to permitting

Operators subject to the Water Resources Impact Permit would be limited to large industrial plants handling major quantities of water, pollutants and/or hazardous substances. In an initial phase this could be applied to the largest operators responsible for 40% of the water abstracted within in a Water Functional Zone (WFZ) or the generation of 40% of the untreated wastewater discharges into a WFZ. In a second phase, the coverage could be extended to the operators responsible for around 70% of the water abstraction or pollution discharges. The remaining lower tier (smaller) polluters, who would amount to 30% of water abstraction or generated pollution, could be exempt from the need for the new permit, but be subject to a mandatory “notification” of their operation to the competent authority to ensure they are included in the water resources impact system for regular monitoring.

Operators subject to the Water Resources Impact Permit process would be clearly specified by sector, or by the production quantity that would trigger permit requirement, in an annex to the policy. Operators would be given clear time windows to register with the competent authority, to apply for the permit and to implement the requirements of the permit.

The production sites covered would include all large plants consuming a significant quantity of water and/or discharging wastewater into a water body including:

- Energy industry
- Mining and mineral processing
- Production and processing of metals
- Chemical industry
- Other large production industries such as pulp and paper, slaughter houses, dairies, big livestock farms, major food processing and brewery industries
- Municipal water, wastewater and solid waste management facilities.

Operators handling hazardous substances would be subject to additional requirements within the same new integrated permit system to reduce risks of pollution hazards. Operators subject to these added requirements would be defined precisely in other annexes of the policy through the specification of thresholds that may be handled, either for generic hazardous substances in line with international classification (explosive, oxidizing, flammable, toxic, dangerous, etc.) or for particularly toxic or dangerous substances.

The competent authority shall issue clear guidelines on the categories of water users required to complete the permit process each year and the thresholds in terms of water use volume and discharge flow and load. Operators requiring the new permit would have to notify the regulating competent authority to ensure the authority has a complete list of operators without the inspectors having to search for them. Failure to notify would result in sanctions and eventually closure of the operation.

Rather than directly abstracting or discharging water to the environment themselves, many water users may take their water supply from a water company and / or discharge wastewater to a municipal sewer system and wastewater treatment plant. In such cases the user is still required to prepare a permit to demonstrate water saving, best practice in pollution prevention and compliance with the discharge standards to the sewer system, agreed with the water treatment company. However some sections of the permit would be devolved to the water company and incorporated in their overall permit requirements.

5 Scope of the Water Resources Impact Permit

The Water Resources Impact Permit may be issued as a new “state level” permit to operate, that with time could replace existing provincial or local level permits.

To acquire a permit, an operator will have to submit to the regulating competent authority an “application” providing extensive information on abstraction of water, processes involving water and discharge of wastewater. The competent authority would check the application validity and assess to what extent the information submitted is complete. Issues of commercial confidentiality would be considered and respected when justified, but complete information would have to be submitted by the operator so a thorough and complete permit can be assessed and issued.

Part of the information required in a permit application would be a water resources impact study, which should document:

- 1 The extent of the potential impact, including geographical area and size of the affected population
- 2 Any effects on specifically protected areas, species or other assets of particular significance
- 3 The provincial trans-boundary nature of the impact
- 4 The magnitude and complexity of the impact
- 5 The probability of the impact
- 6 The duration, frequency and reversibility of the impact.

Operators handling hazardous substances would be requested to submit additional information concerning the risk and potential impact of an accident, such as safety measures, a safety plan and an emergency response plan, worked out by independent experts certified by the relevant competent authority.

The permit issued by the competent authority would require the cooperation of a group of experienced permit writers well versed in inspection and enforcement covering the Three Red Lines Targets (water quantity, water use efficiency and water quality). Through the extensive use of check-lists, guidance documentation and negotiation between experts working for the competent authority and the applicant, agreement would be reached on upgrading or replacement of technologies that would be implemented by the applicant operator over specified time period to ensure impact reduction targets are met at clearly specified deadlines. These necessary changes and their timing would be written into the permit.

The new permit document would be a substantial document specifying in detail:

- The receiver of the permit (operator production site)
- The scope of the permit (all water handling processes at the production site)
- Clearly defined and specified list of obligation of the permit holder in terms of water abstraction quantity, water use efficiency, wastewater treatment and discharge
- Full analysis of water resources availability, impact of abstraction on water resources sustainability and compliance with water allocation quotas.
- Water use limits appropriate to the type of industry and volume of production representing best practice in water use efficiency.
- Emission limit values to be fixed for every relevant pollutant and considered as best practice for the relevant process and production
- Expected receiving water quality and specified mixing zone, location of receiving water functional zone monitoring point, assimilation capacity of receiving water, with assumptions used in its calculation (flow, velocity, decay coefficient, temperature, etc.)
- The flows and loads in the discharge and receiving waters to be used as the basis of calculation of impact and likely compliance with receiving water quality at the downstream control point
- Full water resources impact assessment using river water quality modelling systems to verify the calculations and assess the impact in relation to other abstractions and discharges in the area
- Statistical means of assessing compliance or failure with abstraction, discharge and WFZ standards for flow volume and quality
- Efficient technologies to be progressively introduced and the timing of their introduction
- List of requirements to be implemented by the operator as well as by the authority responsible for monitoring and reporting
- Special and detailed obligations concerning all important inspection procedures especially regarding continuous and discontinuous measurements
- Rights of access for regulatory inspectors to access the production site and take samples without advance notice
- Temporal limitation of the permit
- Costs of inspection
- Penalties to be incurred in case of breaching the permit conditions
- Requirements and plans for monitoring and reporting water use and discharge flow and load

If the above considerations indicate that operations will impact water resources negatively, although meeting best practice production standards, then tighter requirements for water use efficiency and pollution load discharge may need to be negotiated to satisfy the objectives of the Water Functional Zone within an agreed timetable.

The permit would be reviewed and updated each time the operator changes processes or increases process capacity, within specified limits defined and documented in the permit.

6 Competent Authority

To ensure the water resources impact permit satisfies the objective of compliance with the Three Red Lines Targets, the permit should be coordinated and supervised by a single competent authority at the national level.

Depending on the size and potential impact of the production site requiring the new permit, the permitting could be handled by a local representative office of the central level competent authority.

The main functions of the competent authority would include the following:

- Issue the policy and publish nationwide the request for relevant operators to notify the competent authority
- Process the notification received by the operators and ensure validity
- Submit application forms to notifying operators with deadline for submitting their application for the Water Resources Impact Permit
- Check completeness of application received
- Coordinate the participation of other special authorities and experts in the permit assessment process to cover the Three Red Lines Targets (water quantity, efficiency and quality)
- Coordinate the consultation and participation of the public in relation to the review of the water resources impact study and the Environmental Impact Assessment (EIA)
- Evaluate whether the preconditions to issue a permit are fulfilled
- Determine and coordinate the obligations to be fixed in the written permit
- Coordinate monitoring, inspection and enforcement.

In many developed countries this type of permit would be managed by the water directorate of the environmental agency or ministry. China is an exceptional case. Due to the historic importance of water quantity in China, but also the severe water quality problems facing China, the competent authority can be either MWR or MEP, or both decided on a case by case basis.

7 Phased introduction of the permit

The establishment of a new national “Water Resources Impact Permit” at the scale and depth necessary for the No.1 Document successfully to achieve the targets of the Three Red Lines, will take time to develop in China. Important hurdles need to be overcome, including the qualification and experience of the professionals writing the permits, the establishment of dedicated representatives of the central level competent authority in the provinces and agreement on the penalties to be incurred by permits violators and legal enforcement rules to ensure swift processing.

Consequently a phased approach allowing the regulatory framework progressively to converge to an optimal and efficient status compatible with the three targets of the red lines is desirable.

Building on EU experience, it is recommended that the implementation of the No.1 Document starts first by addressing the largest and most heavy polluters in each WFZ. At that time, the capacity of MWR and other relevant authorities to issue a formal permit will not be available. It is therefore suggested that during the first phase of the implementation, the requirements imposed on the largest water abstractors or polluters within each WFZ are embedded in a formal “proto-permit” that allows strict enforcement without having the character of a fully fledged permit. This will enable testing of the practical permitting procedure and the progressive build up of the expertise and capacity by relevant authorities across the country to handle the fully fledged permit procedures required in a second phase without overloading the capacity of authorities and the operators.

The proposed implementation plan foresees three phases.

1st Phase: Urgent Initial Improvement during 12th Five Year Plan (FYP)(2012-2015)

The focus of this phase will be to significantly reduce large water abstraction and wastewater discharge at point sources by targeting a first tier of large operators representing the highest Three Red Lines improvement potential. The target is to achieve an overall cumulative improvement in the WFZs of at least 30% for each of the Three Red Lines.

During this phase the targeted companies will be selected by the competent authority based on WFZ water abstraction and pollution load scenarios, allowing identification of the highest improvement opportunities through regulation of a minimal number of operating sites in each WFZ.

During this phase the targeted operators will be asked, based on the documentation in the Water Resources Impact Permit, to agree on a “protocol” for Three Red Lines improvement allowing unambiguous and efficient monitoring, reporting and enforcement that subsequently will be negotiated between the operator and the competent authority. The development of these protocols, which will have character of “proto-permits”, will allow the competent authorities to test the practical permitting

process and procedures and prepare for the launch of formal permits in the second phase. The first phase will also contribute to build the capacity and expertise of competent authorities for permit coordination, writing and issuance and of clarifying rules and procedures for related compliance monitoring, inspection and enforcement.

2nd Phase: Establishment of the Water Resources Impact Permit during the 13th FYP (2016-2020)

In the second phase the attention will be turned to the second tier of the most significant abstraction and discharge point sources to harness the bulk (around 70%) of the excessive water abstraction, especially those depleting groundwater levels, and the pollution loads reaching water bodies. The Water Resources Impact Permit will be officially launched in a staged approach for each WFZ, addressing successive groups of operators starting always with those having the highest potential for reduction of water abstraction or pollution discharge, and those with the highest risk of accident hazards. During this period non-point sources will also start to be targeted through improved agricultural practices.

Finally during this phase the Water Functional Zones will be supplemented or replaced by “water ecological zones”, which will be identified and documented based on the ecology, morphology and hydrodynamics of the river and the degree of artificial modification incurred so far. For these zones an assessment of main pressures and impacts using as basis the WFZ scenarios, but now adapted to the newly defined ecological zones, will be developed and documented as basis for defining “good ecological status” objectives for all river bodies to be implemented in the third phase.

3rd Phase: Fulfilment of the No.1 Objectives during the 14th and 15th FYP 2021- 2030

At the beginning of the third phase, river ecological flows and water quality are expected to have been significantly improved to levels compatible with the establishment of genuine “good ecological status”. In addition the competent authority will, at that stage, have acquired experience and expertise in handling and coordinating an efficient and enforceable water resources impact permitting tool with enforcement capability. This will open the door for the fine tuning of pollution prevention and control in water bodies for any individual operator handling chemical substance considered a priority hazardous substance and deserving attention for reduction as part of the Environmental Quality Standard (EQS) improvement process. This third phase will then focus on incrementally improving and restoring the ecology of the water bodies using instruments and tools similar to the ones defined and applied in the WFD in the EU.

8 Inspections, incentives and penalties

Inspections are the most important element of enforcement and compliance efforts. Under the new permit, stronger and more thorough inspections would need to be deployed to all permit holding sites. Inspection should be conducted by government inspectors, or by independent agencies hired by and reporting back to the responsible enforcement agency. There are a number of different types of inspection activity that need to be deployed for effective compliance monitoring and enforcement of the Water Resources Impact Permit.

Among others the following inspection types may be considered:

- *Walk-through inspection*
A walk-through inspection provides a quick survey of general issues, e.g. control equipment and working practices. This type of inspections helps to determine whether more extensive inspection is needed. These inspections can be announced or can also be unexpected.
- *Compliance evaluation inspection*
Compliance inspection involves an intensive examination of a particular technological process or a whole facility, but does not include sampling. It would consider records, interview staff, review self-monitoring data, examine control equipment, etc.
- *Sampling inspection*
- Sampling inspection includes the visual and record examination described above, but also includes collecting and analysing physical samples. This is the most resource intensive type of inspection.

Criteria to decide on frequency and type of inspection would include:

- The potential hazard of the production to water bodies
- The complexity of the inspection needed to evaluate compliance
- The history of the operator in relation to compliance
- The availability of self-monitoring information
- Specific inspections resulting from accidents or requests from the local population.

Inspection of a production site should systematically lead to an inspection report specifying:

- 1 Does the operator have an accurate permit?
- 2 Is the correct water consumption and pollution release monitoring equipment installed?
- 3 Is all monitoring equipment properly maintained and accurately operated?
- 4 Are all records properly maintained?
- 5 Does the plant comply with all emission limits and other operating conditions?
- 6 Is the plant implementing agreed upgrading requirements?
- 7 Does the management plans include compliance requirements?
- 8 Are there any signs of deliberate falsification of records, equipment, etc?

Incentives under the new permit are essentially the access to innovative and efficient technologies that allow an operator to lower its water consumption, minimize pollution release and improve productivity, quality and efficiency, leading to lower cost and higher profitability. Through the integrated nature of the permitting process, regulatory experts can assist the operator to obtain access to best available technology adapted to its specific process and production situation.

The penalty system for the enforcement of the Water Resources Impact Permits needs to be effective, proportionate and deterrent. Effectiveness means that penalties are sufficiently serious to ensure a high level of compliance with the policy and achieving the desired objective. Proportionality implies that penalties adequately reflect the seriousness of the violation and do not go beyond what is necessary to achieve the desired objective. Effectiveness requires that penalties have a deterrent effect on the offender, who should be discouraged from repeating the offence and on other potential offenders to commit a similar offence.

Penalties should include a broad “toolkit” of civil sanctions for regulators to promote and enforce regulatory compliance. This may include fines or other financial sanctions, which should be sufficiently high to deter and combat non-compliance (current penalties are too low and ineffective) and the strengthening of statutory notices to work alongside criminal law rules for worse and repeating offenders.

9 Human resources development requirements

Professionals involved in the permitting process and follow-up inspections under the new integrated permit will require extensive qualification and training to be able to deal with the large diversity of processes used by operators and the complexity of dealing with an integrated permit.

Entry level requirement should be high, preferably four years university degree or equivalent. Inspectors and permit writers will need extensive initial training up to 1 year including formal courses, self-learning and practical experience gained on-the-job under supervision by senior staff. Regulatory permitting and inspector staff should be subject to periodic professional evaluation of performance by superiors and be eligible for continuing professional development training to keep abreast of changes in technology, legislation, standards and management systems. Due to the great diversity of operator processes, the inspectors may need specialised training and knowledge of the range of production technologies involved. Finally the inspectorates should be equipped with professional quality management systems offering transparent mechanisms for assessing efficiency of procedures including training.

The number of production sites managed by inspectors should also be limited to allow thorough inspection. A number of sites between 30 and 100 per inspector depending on the nature and complexity of the production allowing for annual or quarterly inspection depending on the breadth of permit requirement.

