DIIS POLICY BRIEF

Governing Uranium in China: Unclear Legislation

March 2014

The ongoing expansion of nuclear power in China's energy system is challenging the Chinese government's ability to carry out effective oversight. China needs to balance this development with improved front-end transparency, security and regulation.

Mark Hibbs, MHibbs@ceip.org
Tamara Patton Schell, patton@sipri.org

Now and for the foreseeable future, the centerpiece of global deployment of nuclear power generation technology will be the People's Republic of China. In 2000 China was operating three power reactors. Today, it has 20 reactors on the grid, with another 28 under construction. By 2020 China will have 60 gigawatts of nuclear capacity online and 30 gigawatts under construction. This is equivalent to ninety 1000 megawatt power reactors – a number of units exceeded only by the United States.

To fuel its ever-growing reactor population, China will need a lot more uranium. Annual requirements will jump from about 4,000 tonnes currently to 10,000–15,000 tonnes in 2020. China is responding by producing more uranium domestically, buying more uranium on the international market, and investing heavily in overseas uranium properties. According to market sources, China is importing uranium at a rate that is several times greater than its reactors can consume. At the same time, during the last three decades China has indigenized most design engineering and manufacture capabilities for nuclear power plants, has been making increasing claims to own the intellectual property for the installations it is building, is operating reactors based on widely differing technologies, and is embarking on a closed fuel cycle based on plutonium fuels.

RECOMMENDATIONS

- Clarify and solidify the lines of authority of key regulators and explain to domestic and international stakeholders how policies are implemented in China.
- Capitalize on the emerging culture of domestic competition, encourage major state-owned enterprises to demonstrate their responsibility and conclude foreign and domestic contracts backed by government-to-government arrangements setting forth obligations.
- Clarify existing legislation, particularly related to the legal status of uranium ore concentrates.
- Be vigilant in managing the expansion-related risk to further demonstrate China's commitment to nonproliferation, by developing and implementing regulations concerning imports and domestic expansion, especially regarding the entry of new actors and the accountability of firms versus units.
- Strengthen the human resource base and adequately fund regulators to ensure that they can compete with industry firms for knowledgeable and experienced personnel.

BALANCING URANIUM EXPANSION WITH REGULATORY CAPACITY

These developments have put China's nuclear oversight system under great pressure. China created a nuclear safety regulatory body in 1984, but during the last two decades its resources have been dwarfed by appropriations spent on the buildup of China's nuclear power industry. As a result, the challenge China currently faces is the expansion of a team of professional regulators. Institutionally, lines of authority in some areas appear unclear, in part because organizations in the nuclear program have traditionally hosted both regulatory functions and management decision-making functions. Chinese experts have reported that the challenge of transferring these regulatory functions to the regulators has proved extremely difficult and that China has not adopted regulations expressly tailored to civilian, as opposed to military, applications.

China does have regulations in place designed to supervise, control, and contain the flow of uranium within its nuclear energy program. The Chinese system may be effective, but on the basis of research for this project it was not possible to know how effective controls are and how they are implemented. One important challenge is a lack of clarity about what uranium materials are captured by Chinese regulations. Other main challenges are lack of clarity about which organizations perform oversight, and where the critical interfaces are between several agencies which, according to Chinese regulations, are assigned responsibilities. It is not certain that China maintains continuity of safety and security design from start to finish of international transports.

Because China has entered the competition for uranium resources comparatively late, the political risks China will face in its future quest for nuclear fuel will be greater than for established producers and buyers. This fact should encourage China to thoroughly examine, review, and where necessary improve the effectiveness of its uranium governance system.

SOLIDIFY THE AUTHORITY OF REGULATORS

Since the 1980s China has taken important and positive steps toward constructing and solidifying important nuclear agencies, including those with regulatory responsibility. They are placed under the State Council of Ministers, putting them de facto under central and civil government control. Difficulties remain however, related to both the hierarchical nature of China's bureaucracy and the coexistence of numerous agencies with various regulatory responsibilities.

A key uncertainty is whether smaller, lower-ranked, regulatory agencies can exert effective authority over China's powerful state-owned enterprises (SOEs), which are responsible for implementing the bulk of China's uranium procurement strategy. Under the current structure, SOEs have vice-ministerial status on par with China's most important regulatory bodies, the National Nuclear Safety Administration (NNSA) and the China Atomic Energy Agency (CAEA). Especially given China's premium on economic performance, it is not clear that agencies charged with regulating the uranium sector can exert effective authority over SOEs in all cases. During most of its history since 1984 the NNSA was a relatively weak agency reporting to the Ministry of Environment. Its authority would be significantly strengthened were China to act upon recommendations voiced in 2011 by a State Council advisory body to establish NNSA as an independent ministerial agency under the State Council.

During the 2000s, China established the State-owned Assets Supervision and Advisory Commission (SASAC) as an umbrella organization to supervise important SOEs, also in the nuclear fuel sector. The formation of SASAC represents a consolidation of power by the State Council, but little is publicly known about SASAC's oversight over these companies; some reports suggest SASAC is not effective, which might be a consequence of having to manage over 100 different SOEs, with each having to adhere to a different set of regulations.

During the last three decades China has gone through several major reorganizations of its nuclear bureaucracy, including consolidations, reorientations and the creation of new agencies. With some of these changes occurring in isolation, lines of responsibility amongst regulators as well as industry actors are blurred. The result is difficulties with both overlapping responsibilities and regulatory coordination between the different instruments. Although CAEA comes closest, China does not have a primary regulatory authority with a "final say" on both domestic and international nuclear affairs.

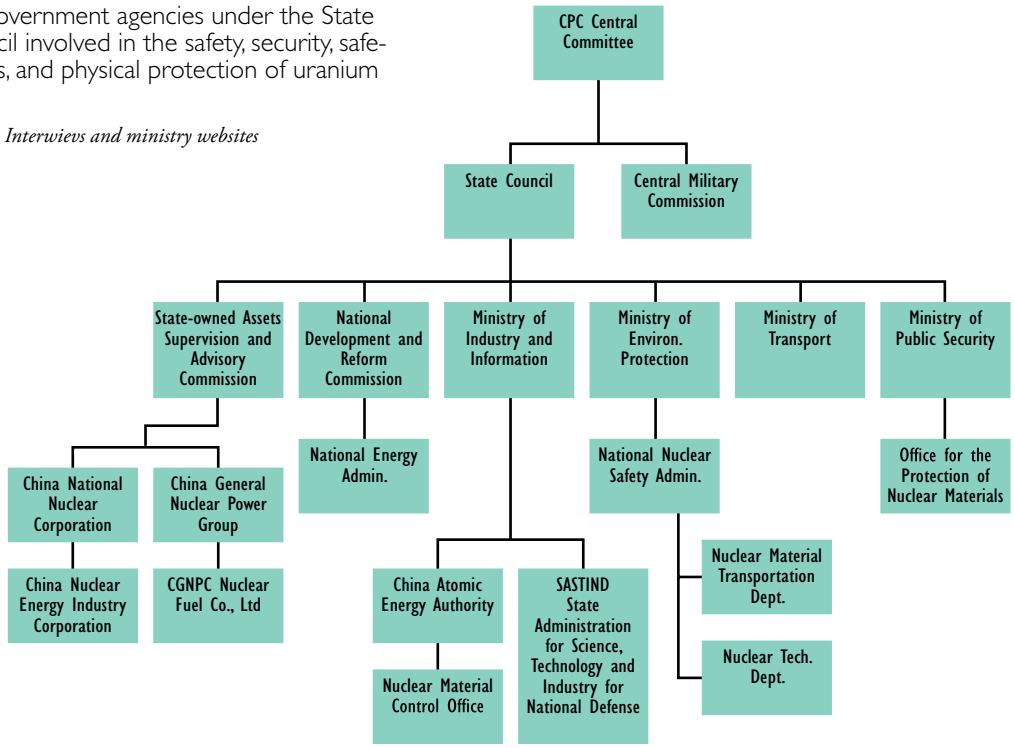
The lack of coordination between the different responsible organizations leaves important questions about how existing regulatory gaps would be identified and managed. A clearer and more strategic division of labor in terms of oversight and monitoring, as well as increased coordination among relevant agencies, could improve the existing system without reinventing it. Such a regulatory structure could be formally streamlined and strengthened through the creation of a national atomic law, which is currently under consideration and discussion in China.

UTILIZE THE EMERGING CULTURE OF DOMESTIC COMPETITION

Recent moves by the China General Nuclear Power Group (CGN) reflect a recent strategic ambition by China to challenge the longstanding nuclear monopoly of the China National Nuclear Corporation (CNNC), including over uranium procurement and exploration. Given likely in-

Key government agencies under the State Council involved in the safety, security, safeguards, and physical protection of uranium

Sources: Interwievs and ministry websites



creasing competition between CNNC and CGN, both within China and overseas, this process could be exploited to develop a beneficial culture of "competitive compliance" where both key SOEs aim to demonstrate their responsibility and accountability to win increased support from the Chinese government as well as from international actors. A challenge is the unclear implementation of existing regulations by the SOEs, as well as ambiguity in the mechanisms that regulatory agencies use to ensure the SOEs' compliance, such as inspection frequency and form verification. In particular, it remains unclear how the SOEs themselves ensure compliance by their subsidiaries and contractors, both within China and overseas. To deal with this, inspecting agencies could be encouraged to publish a summary of the results of annual inspections to the greatest extent allowed by national security and commercial proprietary concerns. Even if these reports are not made public, an internal reporting system shared by the relevant government agencies could help establish a stronger culture of oversight, information sharing and compliance.

CLARIFY EXISTING LEGISLATION

An essential element in defining regulators' authority is establishing which uranium materials are subject to oversight. Important Chinese guidelines in force since 1987 appear to exempt uranium ore and uranium ore concentrates from accounting, as well as from the authority of the NNSA. Nuclear materials within the purview of the military are also exempt from controls, leaving open the possibility that SOEs, which have responsibilities for management of nuclear material in both the civilian and military sectors, may be free to exempt materials from controls. At the same time, China's 1994 guidelines for the physical protection of nuclear materials specify that "natural uranium" is subject to the guidelines, in apparent contradiction to other sets of rules established in 1987 and in 1990. There is also uncertainty over whether uranium ore concentrate actually qualifies as "uranium ore" or if uranium ore concentrate could in some cases be considered a source material. Given that uranium ore is discounted in many key pieces of Chinese legislation, this ambiguity represents a potentially serious loophole in regulations.

RECOGNIZE EXPANSION-RELATED RISK

In coming years China will be both importing and producing more uranium, and these activities will entail certain risks. China has detailed guidelines for importing uranium from foreign sources. Little is known, however, about how effectively these rules are implemented. As none of China's uranium conversion facilities are under safeguards, the question remains as to how China works to ensure that uranium is used solely for civilian purposes. Chinese firms have underscored that, because the most attractive sources of overseas uranium are now being exploited by major firms in Australia, Canada and France, China must rely on sources which represent a greater level of commercial and political risk. On the basis of a series of bilateral understandings since 2007, China may be able to import

uranium from Kazakhstan and Namibia with few obligations attached because these states did not require a bilateral safeguards agreement. But Australia and Canada appear to require a modicum of transparency and accountability in China's uranium sector as a condition of supply of Australian and Canadian uranium, which China aims to import in large quantities in the future. China would, accordingly, be well served by policies which include effectiveness analysis, close monitoring and unannounced inspections, and internal reviews to assure that good practices and sound regulations are encouraged and followed on uranium imports and transports, especially where riskier sources are concerned. China's foreign partners cannot assist China in identifying appropriate good practices unless they have more specific information about how China implements its existing regulations.

China aims to increase its domestically-produced uranium output from about 800 tonnes per year to about 5,000 tonnes per year in 2020. Beginning in 2005, the State Council has officially encouraged opening uranium production and investment to firms in China beyond the activities of CNNC and CGN. This should prompt a review of regulations to ensure that new actors in the uranium sector will be effectively subject to oversight, since some Chinese regulations encourage industry firms themselves to develop rules and guidelines governing their uranium activities. One area that might be subject to review is current Chinese rules which assign "units," not enterprises, responsibility for violations. This possibly encourages industry firms to delegate risks to a few individuals, permitting management to assume unwarranted risk. In a similar fashion, some countries deliberately assign responsibility for violations of security rules to specific corporate officers. Some firms have however, been challenged by national regulators to find ways to encourage management to comply with regulations.

STRENGTHEN THE HUMAN RESOURCE BASE

China's leaders – especially after the Fukushima accident – are aware of these challenges to their regulatory system, and in recent years they have increased funding and provided for more staff. But China has also taken steps, which may make effective regulation more difficult, for example by providing greater competition among nuclear power industry firms where results may be measured in bottom-line results. Unless China significantly increases its human resource base for regulatory agencies and adequately funds its regulators, competition for resources will ensure that profit-making enterprises – not overseers – will snatch up most of the country's qualified and experienced personnel.

SUMMARY OF RECOMMENDATIONS

In view of the risks China's uranium industry will face in coming years, particularly concerning imports, China might carry out a peer review of its uranium regulatory system. The review should include participation of foreign industry and regulators, especially from countries with a strong interest in ensuring that imports and transport of nuclear material from foreign sources are subject to effective controls, physical protection, and sound accounting practices. A peer review could help China identify any weaknesses and loopholes in oversight coverage which, unaddressed, might be exploited by perpetrators. In addition to strengthening China's uranium governance structure, these and other related measures would support Beijing's uranium procurement aims, and demonstrate China's commitment to nuclear security and nonproliferation.

FURTHER READING

Patton Schell, Tamara: "Governing Uranium in China", *DIIS Report* 2014:03

www.world-nuclear.org/info/Country-Profiles/Countries-A-F/China--Nuclear-Power/

Xu Yi-chong, *The Politics of Nuclear Energy in China*; London: Palgrave Macmillan, 2010, chapter 7: "Fuelling the Future: The Nuclear Fuel Cycle," pp. 165–190

www.iaea.org/nuclearenergy/nuclearknowledge/schools/NEM-school/2012/Japan/PDFs/week1/3-3_Yang_ChinaNuclearEnergyDevelopment.pdf

Massot & Chen: "China and the Global Uranium Market: Prospects for Peaceful Coexistence," *The Scientific World Journal*,Volume 2013, Article ID 672060.

The opinions expressed in this policy brief are those of the authors alone and do not necessarily reflect the official opinion of the Danish Institute for International Studies.

DIIS · DANISH INSTITUTE FOR INTERNATIONAL STUDIES
Østbanegade 117, DK-2100 Copenhagen, Denmark · tel: +45 32 69 87 87 · Fax: +45 32 69 87 00 · e-mail: diis@diis.dk · www.diis.dk