禁足之境：
演进的自然遗产与衰败的灾难遗迹

FORBIDDEN GROUND:
EVOLUTIONARY NATURAL LEGACY AND DECAYING DISASTER HERITAGE

陈煦斌 香港大学助理研究员
Xubin CHEN Research Assistant, The University of Hong Kong

- 1. 切尔诺贝利放射性生态保护区2066愿景
- 1. 2066 Vision of Chernobyl Radio-ecological Biosphere

摘要

当代纪念性构筑物侧重于突出建筑形态和象征意义，而忽略了它们所处的场地和环境。本研究认为景观过程和人类活动的交织能够提供一种更具批判性的纪念方式。这些过程涵盖土地、水体、植物和其他景观元素，以及人类对某一事件的认知与记忆。景观不是一个静止的场景，而是会通过物质转移随时间和空间更迭而持续进化。因此，针对某一事件的纪念性景观经历了从古典美学到相对美学，再到系统美学的持续发展过程，并最终揭示了蕴藏其中的经济、社会政治和生态价值。通过就不同的时间尺度、复杂的物质属性和未来的不确定性提出一系列设计策略和方法，该项目试图模拟和呈现那些有潜力改变场地的环境生态和社会政治生态的自然模式。项目以世界历史上规模最大的技术性灾难之一——发生于1986年的切尔诺贝利核事故为对象，提出自2016年起50年的规划愿景。以事故场地为出发点，该项目旨在纪念这一严重事件并对各类政治假设和复杂现实作出有效回应。

关键词

切尔诺贝利；核辐射；政局变幻；物质转移；植物修复；时间演变

ABSTRACT

Contemporary monuments tend to foreground architectural form and symbolic significance, rather than the land and the ground on which they rest. This thesis argues that the combination of landscape processes and human operations offers a more critical way to construct a monument to an event. These processes involve earth, water, plants, and other landscape elements, as well as the senses and memories of humans in relation to an event. Landscape is not a static, idyllic scene, but is constantly evolving over time and space through material migrations. Therefore, an event's monumental landscape continually evolves from a classical to a relative to a systematic aesthetic, which ultimately unveils its economic, sociopolitical and ecological values. Proceeding from a set of design strategies and interventions that deal with integrated timescales, complex materials, and uncertain futures, this project seeks to simulate and manifest natural patterns that have the potential to change the environmental and sociopolitical ecology of a place. It proposes a series of 50-year landscape scenarios since 2016 for the development of the Chernobyl accident of 1986 site, which was confronted with one of the largest-scale technogenic disasters in the world history. With this site as a point of departure, the project serves to memorialize the event and respond productively to various political hypotheses and complex realities.

KEY WORDS

Chernobyl; Nuclear Radiation; Political Ambiguity; Material Migration; Phytoremediation; Time Process

整理 陆小璇 王颖

EDITED BY Xiaoxuan LU Ying WANG

2. 切尔诺贝利的主要节点。人们只能按照指定的路线参观这些主要节点。
2. Key nodes in Chernobyl. People are restricted along with designated route for visiting the key spots.

历史：兵家必争的要塞棋子

对于切尔诺贝利的记载最早可见于一套1193年的地图集，它曾是基辅罗斯的一部分，如今是北乌克兰地区已知的人类最古老的聚居场所。它位于第聂伯河与普里皮亚季河的支流沿岸，这两条河流流经乌克兰，最终注入黑海。在13世纪，它是隶属立陶宛大公国的一个村庄；到16世纪初，这座村庄被作为封地赠予一名皇家骑兵队队长。1569年，切尔诺贝利被并入波兰王国，并于1793年成为俄罗斯帝国的附属国。20世纪以前，这里的居民主要包括来自乌克兰和波兰的农民，以及大量犹太人，他们亦推动了犹太教哈西德教派和东正教在切尔诺贝利的传播。

自大北方战争之始至俄国内战结束，切尔诺贝利一直是布尔什维克党派与乌克兰反复交战之地，并先后被波兰军队和苏联红军占领。自1921年起，它被并入乌克兰苏维埃社会主义共和国。在第二次世界大战中，切尔诺贝利被纳粹德军占领，大量犹太人被杀害。二战结束后，切尔诺贝利再次归入苏联直至1991年苏联解体。

1970年，苏联意图建立核电站并展现“和平利用核能”的美好景象。而后，选址于切尔诺贝利镇北部15km的切尔诺贝利核电站开始规划与兴建^[1]。在建设核电站的同时，一个距核电站3km的名为普里皮亚季的模范城市也随之诞生，为科研人员、其他劳工及家属共计5万余人提供了安身之所。当时，切尔诺贝利核电站和这两个城镇一度成为了苏联先进生产力的代表。

自1991年乌克兰独立后，其东西部间的

内部冲突不断，欧盟、乌克兰和俄罗斯之间的关系也日趋紧张。一方面，东部使用俄语的国民期望维持与俄罗斯的紧密联系，尤其是顿巴斯和克里米亚地区的人民，他们更想脱离乌克兰的统治而加入俄罗斯联邦。另一方面，乌克兰西部的国民则谋求与欧洲建立紧密联系并加入欧盟。自2004年起，橙色革命及乌克兰亲欧盟示威（2013年）等重大的政治运动接连发生。这些冲突也反映了在西欧和俄罗斯的政治角力中乌克兰所扮演的重要角色。

事故：创巨痛深的人为灾难

发生于1986年4月25日的切尔诺贝利核事故始于一核试验。这次试验主要为响应苏联全国不间断供电的宏大政策。26日清晨，一连串的爆炸导致4号核反应堆被摧毁，重达1 000吨的金属和水泥覆盖物倒塌，两名操作员当场身亡。普里皮亚季的消防员赶至事故现场，在对于实际风险毫不知情的情况下，消防员们彻夜扑火。由于暴露于辐射之中，一部分消防员在接下来的几周内相继死亡。大火持续了近10天，大量的放射性核素扩散在空气中，包括锶-90、碘-131和铯-137^[2]。这些核素构成放射性云团，弥漫至整个欧洲大陆。到1986年5月，核电站方圆30km范围内的近12万名居民被疏散。这一区域从此成为了切尔诺贝利禁区（图2）。

在疏散人群的同时，对于场地的主要清理和清洗工作也一并进行，共持续两个月时间。参与其中的救援人员和清理人员多达24万人，包括核电站的操作员和工人、消防

员、军人等，他们被派往指定区域协助降低由爆炸引发的灾害。时至今日，切尔诺贝利已不仅仅是一个土壤被污染的地方，我们很难简单地以遭受辐射的病理灾民和死难人数去衡量这场灾难的后果。毫无疑问，这片场地对于人类乃至整个世界都具有重要意义。对于大多数人而言，当提及切尔诺贝利一词，他们很容易联想到罹患癌症儿童的悲惨故事和各种有关变异生物的传说。前苏联总书记甚至表示，或许正是切尔诺贝利事故导致了苏联的解体，因为这次事件暴露了苏联的官僚主义、政治腐败以及对公众安全和权利的漠视。

场地：危机四伏的野生天堂

由于放射性污染物严重超标，这场事故的核心区域已被永久禁止居住。当前场地中主要的放射性物质是基于钚-238、钚-239、钚-240的衰变而产生的铯-137和锶-90，而这些钚的同位素直到2056年才能衰退至尽。未来人类是否可能回迁至这块场地将主要取决于这些元素的含量。在事故发生之前，该区域中林地占比近半，其中80%是松柏林，包括苏格兰松（*Pinus sylvestris*）和挪威云杉（*Picea abies*），其余20%是落叶林，包括银桦（*Betula pendula*）、欧洲山杨（*Populus tremula*）和英国橡树（*Quercus robur*）。事故发生后，污染物扩散路径周边的林地由于在数天内吸收了大量的核辐射，树木颜色变红、变暗，因而被称为“红色森林”^[3]，随后这些树木被砍伐、销毁。但令人意想不到的是，这片因被放射性物质污染

而废弃的土地，经过时间的洗礼，变成了生物多样性的独特庇护所。科学家在此发现了红狐狸（*Vulpes vulpes*）、欧洲獾（*Meles meles*）等稀有物种，以及50余种哺乳类动物^[4]。尽管哺乳类动物可以在辐射下生存，但其骨骼还是遭受了污染（图3）。

然而，灾后30年间，管理该地区的官员们的台下交易十分盛行。禁区管理局对于切尔诺贝利的非法伐木睁一只眼闭一只眼，以从中获利。为减少辐射影响，政府砍伐并烧毁了一部分“红色森林”及周边区域中的树木，但这同时也为伐木工人非法砍伐和贩卖木材创造了机会。此外，假借销毁受污染木材之名，大量健康的松树被砍伐并贩卖到罗马尼亚，再倒卖至欧洲各地。从非法伐木到家具和木材加工，罗马尼亚已形成了系统化的网络。尽管目前尚未有数据明确指出切尔诺贝利周边非法伐木的获利数额，但依据联合国欧洲经济委员会的报告可大致估得每年获利约17万欧元。

除此之外，禁区中有近22.9km²的区域

被冷却池的水体覆盖。事故发生后，大量放射性物质在冷却池中沉降下来。通过从普里皮亚季河泵水，使冷却池中的水位一直维持在适宜的高度。据报道，当地政府将会在未来8年内停止向冷却池中泵水，以终止其运作。这意味着存积着大量放射性物质的池底将会暴露在外。

在能源方面，俄罗斯政府为乌克兰提供了大部分核电站设备，且深度涉足乌克兰的核燃料循环进程，加之俄罗斯垄断了核燃料的供给，其在与乌克兰核能公司议价时一直处于优势地位。乌克兰的核工业创建于20世纪70年代，是苏联核计划的一部分。1991年苏联解体后，乌俄关系在核能问题上相对稳定。然而，自2013年底乌克兰爆发亲欧盟示威起，两国关系日趋紧张。一方面，莫斯科政府声称将视乌克兰的进一步行动而决定是否停止供应核燃料和回收核废料。另一方面，随着与西欧核能监管机构及公司愈加频繁和积极的合作，未来基辅政府必然会更加倾向于与欧盟在相关领域展开合作。同时，

3. 1986年切尔诺贝利的生态状况——放射性物质、植被与流域。

3. Ecological contexts of Chernobyl — radiation, flora and watershed in 1986.

欧盟也期望基辅政府能够在其核工业上拥有更多话语权和主导权，以结束长期以来掣肘于俄罗斯的窘境（图4）。

愿景：切尔诺贝利的崭新未来

透过景观设计的视角，为修复辐射损害、揭示切尔诺贝利蕴藏的自然与政治力量，该项目旨在设计一个演进的景观系统，以战略性地整合时间尺度和发展进程。这些景观期望应对不断变化、发展的动态过程和复杂关系，而非描绘静态的风景意象。项目的设计策略包含政局变幻、物质修复和景观指代，它们可应用于由当前政治形势衍生的三个可能存在的不同尺度的愿景中。由于发展进程的不确定性，这些景观系统尚未完全落实，但辐射水平的下降程度可作为环境影响的评价指标之一（图5）。

愿景一：能源设备（洲际尺度）

切尔诺贝利禁区是处理核废料和建设太阳能发电厂的理想场地。一方面，这里已遭到严重污染，在未来100年内无法供人类居住；另一方面，该地地势平坦，春夏阳光充足。因此，在第一种愿景中，我们假设乌克兰成功加入欧盟，切尔诺贝利将成为欧洲大陆的能源设施。一般而言，建立一个永久的核废料处置场需30~40年时间，而建立一个临时的中低放射性核废料处置场，并在地表回植树木进行修复则需3~10年时间^[5]。到2066年，当核废料处置场和太阳能发电厂建成后，该区域可处理乌克兰及欧洲更大范围内的放射性核废料。在另外三个国家级太阳能发电厂的协助下，这里将为乌克兰提供15%的所需电力（图6）。

愿景二：平等疆域（区域尺度）

切尔诺贝利禁区位于波利西亚生态走廊的东端，如果能在该区域开辟环境保护基地，禁区将成为连接波利西亚地区和俄罗斯的重要枢纽。因此，在第二种愿景中，我们构想禁区成为了由乌克兰和白俄罗斯共同管理的生物圈和新的放射性生态保护区。该预

景将在火烧后的荒芜地块种植更多的松柏和其他植物，以实现植物修复和轮作^[6]。为有效封存具有高放射性的区域，我们将营造一组由水池和苗圃形成的斑块，其主要通过构建冷却池和降低水位来调整地形。而若想生成半成熟森林以吸附放射性物质及建立湿地栖息地以提高生物多样性，将耗费至少60年的时间。此外，该愿景亦为场地的修复提供了最基本的保障。到2056年，在森林覆盖地区，平均辐射水平可降低至0.1μSv/hr（图7）。

愿景三：军事基地（局地尺度）

在冷战时期，苏联在附近场地中建造了一个名为“俄罗斯啄木鸟”的大型雷达系统，并将其伪装为儿童营地，以监测美国的军事动向。而当地用于灾后清理工作的工具和军事设备已被埋存于现场。将来，一旦欧盟走向极右主义和保守主义，甚至分裂，这个区域可以协同俄罗斯再次发挥军事作用。在第三种愿景中，经过50年的土壤修复后，切尔诺贝利禁区将转变为军事用地。废弃铁路和公路的重建、军营和军械库的建造等工作都将相继展开。禁区周边早前为填平临时核废料处置场，形成了起伏的地形，这片独立的已被清理“干净”的区域可用作军事训练场（图8）。

结语

切尔诺贝利不仅是一个土壤和栖息地遭受严重污染的场地，它也见证了一场夺取无数人性命的灾难。本文基于不断变化的过程提出自2016年起50年的规划愿景。此外，本方案并非一个最终成形的结果，它可根据不同的可能性进行灵活调整。不论是将场地改造为能量场或放射性生态保护区，该方案都将作为一种开放性的设计策略框架，为我们对禁区未来发展的思考提供思路（图1）。LAF

注释

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The History: Battleground and a Chess Piece

First mapped in an atlas of 1193, Chernobyl is the oldest known settlement in present-day northern Ukraine, and was originally part of the territory of Kievan Rus. It is located along the bank of a tributary of the Dnieper River and the Pripjat River, which flow through continental Ukraine into the Black Sea. In the 13th century, it was a village of the Grand Duchy of Lithuania. In the early 16th century, Chernobyl was granted as a fiefdom to a captain of royal cavalry. In 1569, Chernobyl was transferred to the Kingdom

of Poland and then annexed by the Russian Empire in 1793. Prior to the 20th century, Chernobyl was inhabited by Ukrainian and Polish farmers, and a relatively large number of Jewish people, who comprised a major movement of Hasidic Judaism and then Eastern Orthodoxy.

From the beginning of the Great Northern War to the end of the Russian Civil War, Chernobyl was fought over by the Bolsheviks and Ukrainians, then later by the Polish Army and the Red Army. From 1921, it was incorporated into the Ukrainian SSR. In World War II, Chernobyl was occupied by the German Army, leading to a mass

4.

西欧、乌克兰和俄罗斯的经济联系——非法伐木与核燃料产业循环路线图。
5.

2066年战略总平面图。该规划整合叠加了基于放射性污染分布特征的三种预案，即能源设备、放射性生态保护区与军事基地。
4.

Economic connections between West Europe, Ukraine and Russia — illegal logging and nuclear fuel circle routes map.
5.

Strategic masterplan. The 2066 masterplan is the overlapping of three scenarios' layer, including energy device, radio-ecological biosphere and military site based and projected on the distribution of contamination.

murder of the Jewish community during the Nazi occupation. After the war, it was incorporated into the Soviet Union again until the fall of the USSR.

In 1970, the Soviet Union intended to build up and present an image of a “peaceful use of nuclear energy,” and the Chernobyl Nuclear Power Plant was planned and constructed 15 km north of Chernobyl town^[1]. In addition to building a nuclear power plant, a model city called Pripyat was built 3 km away from the plant to address the scientists, researchers, and other employees with their families, consisting of a total population of 50,000 people. During that time, both Chernobyl Nuclear Power Plant and the two towns were the most advanced and well-developed facilities in the Soviet Union.

After the fall of the Soviet Union in 1991, conflicts between eastern and western Ukraine surfaced after the nation gained independence; the relationship between the European Union, Ukraine, and Russia became a highly contested issue. People in eastern Ukraine, who primarily speak Russian, wanted to maintain a strong connection with Russia, particularly in Donbass and Crimea, where people were eager to leave Ukraine and join the Russian Federation. On the other hand, people in western Ukraine sought to develop close interactions with Europe and join the European Union. Significant political movements began in 2004 with the Orange Revolution and later the Euromaidan in 2013. These conflicts have shown how Ukraine plays an important role in the political disputes between Western Europe and Russia.

The Accident: A Technogenic Disaster

On April 25, 1986, the Chernobyl disaster began as a nuclear experiment. The test was part of a broader Soviet policy that strived to achieve an uninterrupted supply of

electricity. During the early morning of the 26th, reactor No.4 was destroyed by a series of explosions, tearing off its 1000-ton steel and concrete cover and killing two plant operators. Firefighters from nearby Pripyat were immediately called to the scene. Unaware of the actual risk, firefighters fought the blaze through the night. Some died within weeks due to radiation exposure. The fire went on for ten days, infecting the air with radionuclides such as strontium-90, iodine-131, and caesium-137, which were delivered at extremely high doses that spread across continental Europe in the form of radioactive clouds^[2]. By May 1986, about 120 thousand people were evacuated within a 30 km radius of the plant. This area came to be known as the Chernobyl Exclusion Zone (Fig. 2).

During the evacuation, a major liquidation and cleanup project took place

for two months. More than 240,000 salvagers and liquidators, including plant operators, workers, firefighters and military personnel, were sent to designated areas to help reduce the consequences of the explosions. To this day, Chernobyl is not only a site with polluted soil; it is hard to estimate the impact of this catastrophe by simply calculating the medical pathologies and the deaths of people in the radiation's aftermath. The site undoubtedly has vital significance for humanity and our entire world. For many, the word Chernobyl conjures heartbreaking stories of cancer-diagnosed children and tales of mutated and disfigured wildlife. The former General Secretary of the USSR even claimed that the Chernobyl accident was perhaps the reason for the collapse of USSR, which was linked to Soviet bureaucracy, political corruption, and negligence of public security and rights.

The Ground: Havens of Wildlife at Risk

The core area of the accident is closed for permanent residence because of the high levels of radioactive contamination. Today, the radioactive conditions are dominated by caesium-137 and strontium-90. The presence of these radioelements has been declining over the long term from plutonium-238, -239, -240, and these isotopes will not be overwhelmingly present by 2056. The presence of these components will determine the possibility for human re-settlement later on. Before the accident, nearly half of the zone was woodland. About 80% of this woodland was coniferous, including *Pinus sylvestris* and *Picea abies*, and the remaining 20% was deciduous, such as *Betula pendula*, *Populus tremula*, and *Quercus robur*. As a result of the disaster, an area of the woods absorbed a significant

6. 远景一：分析图展示了从1976~2076年能源设备的发展过程与变化趋势。

6. Scenario 1 Span: The diagram introduces the span of the process and changes of energy device, from the very beginning in 1976 to the projected 2076.

amount of radiation within days; all the trees turned red and dark-colored, earning the nickname of “Red Forest”^[3]. These trees were slashed down and discarded in the end. Paradoxically, this radioactive and surrendered site has turned into a unique shelter for biodiversity. Rare creatures like the red fox (*Vulpes vulpes*), European badger (*Meles meles*), and more than 50 types of mammals have been found and reported by researchers^[4]. Although, mammals can survive from the radiation, their bones and skeletons remain contaminated (Fig. 3).

However, 30 years after the accident, the under-the-table dealings of bureaucrats who manage the area are flourishing. The Exclusion Zone Management Agency has turned a blind eye to logging in Chernobyl to earn profits. The government has cut down and burned part of the Red Forest and the peripheral area to reduce the radiation, so as to let loggers clean out and sell the timber illegally. Under the guise of salvaging lumber from wildfires, healthy pines are being felled in great numbers for sale in Romania, where the wood may be resold throughout Europe. Romania has a systematic network for illegal logging and manufacturing from raw wood to furniture and timber. There is no precise report on the amount of money that has been made from illegal logging near Chernobyl. But according to reports from UNECE, it is predicted to earn about EUR 170,000 per year by the current situation.

In addition, a large area of the zone is covered by the water of a built cooling pond, with a surface area of 22.9 square kilometers. After the disaster, a large volume of radiation fell out and was preserved under the water surface of the pond. The water surface elevation in the cooling pond is controlled by pumping water from the Pripyat River. It is reported that the government will stop pumping water to the pond and decommission it in 8 years, which will lead to the radioactive bottom being exposed.

In the field of energy, the Russian government provides most of the facilities to Ukrainian nuclear power plants, and actively takes part in the Ukrainian fuel cycle. Russia exerts great pressure on price in its dealings with nuclear companies in Ukraine, because it maintains an almost monopolistic position for nuclear fuel supplied from Russia. The Ukrainian nuclear industry was established in the 1970s as part of the Soviet nuclear program. After independence in 1991, Ukrainian-Russian relations in the field of nuclear energy remained relatively stable. However, Russia and Ukraine have been locking horns since the end of 2013, as a result of Euromaidan. Moreover, Moscow has claimed that Russia would stop supplying fuels and disposal service depending on further actions of Ukraine. With the development of a busy and active collaboration with Western Europe’s nuclear regulators and companies, Kiev will surely lean towards the EU in the future. Meanwhile, Kiev is expected to have a say and greater power in terms of domestic nuclear energy industry instead of being led by Russia (Fig. 4).

The Matrix: Alternative Futures in Chernobyl

To remediate the radiation and to unveil the embedded power of nature and politics in Chernobyl through a lens of landscape architecture, this project proposes to design evolutionary landscape systems that strategically integrate the time and processes of flux. These landscapes deal with dynamic, unfinished processes and interrelationships, rather than depicting static, scenic imagery. The design strategies include political ambiguity, material remediation and landscape indicators, which apply to three possible scenarios at different scales, based on the current political environment. Because of the uncertain processes and continuous changes, these

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6-2

相对辐射水平 (黑点数越多, 辐射水平越高)
Relative Radiation Level (Higher radiation level with more black dots)

相对辐射水平 (黑点数越多, 辐射水平越高)
Relative Radiation Level (Higher radiation level with more black dots)

systems are not finalized, but decreases in radiation levels could be one of the evaluation indexes of environmental impact (Fig. 5).

Scenario 1: Energy Device (Continental Scale)

The Exclusion Zone is an ideal and reasonable place both for nuclear waste disposal and solar energy fields. It is heavily polluted, cannot accommodate humans for about 100 years, and its location rests in a broad and flat terrain with abundant sunshine in the spring and summer. Therefore, the first scenario is that the zone can become an energy device for continental Europe when Ukraine successfully joins the EU. Normally, it takes thirty to forty years to establish a permanent radiation nuclear waste dump, and three to ten years to build a temporary dump for low-to-medium radioactive waste and planting trees on top to re-cover the place^[5]. By the establishment of nuclear disposal and solar energy fields in 2066, the zone can be the radiation waste destination to serve domestic demands and also Europe more broadly. Furthermore, it can contribute 15% of electricity for Ukraine together with another three national solar parks (Fig. 6).

Scenario 2: Egalitarian Territory (Regional Scale)

The Exclusion Zone is located in the east end of the Polesia ecological corridor, and it will become a junction point for connections between the Polesia region and Russia when an environmental reserve state is established. Hence, the second scenario is that the Exclusion Zone becomes a biosphere and new radio-ecological state managed by Ukraine and Belarus. In this scenario, more coniferous trees and plants are planted in burned-down and bare areas for phytoremediation and rotation^[6]. A patchwork of ponds and nurseries will be formed to preserve higher radioactive areas

by changing landforms through cooling pond basins and descending water levels. It takes at least 60 years to establish a semi-mature forest for radiation remediation and wetland habitats to increase in biodiversity. Besides, this scenario is a foundation and fundamental work for the site recovery. By 2056, the average radiation level would decrease to 0.1 μSv/hr in forestation area (Fig. 7).

Scenario 3: Military Base (Local Scale)

A massive radar system called Duga-3 was built nearby and shrouded as a children’s camp during the Cold War era by the USSR to monitor the United States. A number of machines and military devices used for liquidation were buried and stored in fire stations. In the future, the zone will play a role in military competition again through collaborations with Russia, when the EU goes far-right and conservative, and perhaps even collapses. In the third scenario, the site will become a military site in 50 years after soil reclamation. It would involve the reconstruction of abandoned railways, roads, construction of soldiers’ settlements and weapons warehouses. And separated, peripheral “clean” areas can become training sites based on undulant landform, where offered soil for backfill of temporary nuclear dump in early years (Fig. 8).

Conclusion

Chernobyl is not only a site with polluted soil and contaminated habitats, it is also a tragedy that cost thousands of lives. This design is based on the processes that should be implemented until 2066. The proposal is not aimed at a complete, static result, but leaves the possibilities for transformations. The proposal either for the development of an energy field, or radio-ecological biosphere, can be framed as an open-ended design strategy, providing an idea of how we might understand the future development of the area (Fig.1). **LAF**

7. 预景二：分析图介绍了放射性生态保护区的发展过程与变化趋势，展示了场地由1986年的普里皮亚季森林与兴建的冷却池，演变成为2076年的苗圃与湿地斑块的过程。

8. 预景三：分析图展示了军事用地的发展过程与变化趋势。它可被分解为三个不同功能的时期，逐层递进——从最早的为向核废料处置场提供回填土方而挖掘坑洼，再将坑洼作为旅游资源，最终这里将转变为军事训练场。
7. Scenario 2 Span: The diagram introduces the span of the process and changes of radio-ecological biosphere, representing the changes from the Pripyat Forest and establishment of cooling pond in 1986 to the patchwork of nursery and wetlands in 2076.

8. Scenario 3 Span: The diagram introduces the span of the process and changes of military site. It can be divided into three multifunctional periods, step by step, creating craters for refilled soil in waste dump, making use of craters as tourism resources, and becoming military training course in long term.

NOTE

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