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## **Dynamics of nonknowledge-knowledge production in extractive activities**

Julianna Colonna

### Short abstract

This proposition examines the analytical use of nonknowledge-knowledge production to increase understanding of power relations in extractive activities. The analysis is capable of shedding light on the creation of new subjectivities related to the characteristics of a territory and its vocation.

### Long abstract

Nonknowledge production – directly connected to knowledge production (Ravetz 1987, Böschen and Wehling 2010) – can be understood as a quiet and subtle tactic (Frederiksen and Himley 2020) to maintain and expand extractive activities, an instrument (Foucault, 1991) that reflects power relations and produces new subjectivities (Frederiksen and Himley 2020).

Nonknowledge is something one does not know, regardless of reasons, implications, or the theoretical possibility of “overcoming” this gap (Böschen et al. 2006). Industrial secrets and monopoly of knowledge production are examples present in extraction projects, such as the underground exploitation in the Industrial site of Lacq, in the French Southwest rural region, industrialized since the ‘50s.

I argue that the dynamics of nonknowledge-knowledge production have transformed two subjectivities. Firstly, the non-permanent territory characteristics gained a vertical interest (Braun 2000, Elden 2013) from a dismissed tiny and dangerous reserve of gas once to an area with sufficient gas to be safely explored. Secondly, the region vocation, a rural area with an after-gas plan in the ‘50s, to an industrial site able to adapt itself to expand extraction in time and incorporate the climate action. This was possible through a combination of slight gas exploration and underground storage where undesirable wastes, carbon among them, can be definitively stored theoretically.

The analysis of the nonknowledge-knowledge dynamic shows how unequal power relations (Henry 2017) are “systematically inscribed” (Jas 2015) in them. And how they reinforce these two subjectivities, allowing extraction to spread in time and deeper territories.

## **Introduction**

The capacity of extracting and thus possessing a material is directly related to power if one considers that the extractive activity needs access to the material in question, the resources to exploit it, the accord of those related to the material, or the ability/possibility of coercing or persuading them.

When studying modalities of power in extractive activities, Frederiksen and Himley (2020) use Allen's work to present five different ways power can be exerted from a top-down perspective, meaning that these modalities are usually used by the extractive companies or the State to expand exploitation.

They argue that authority, coercion, and domination, despite attracting more attention from media and scientific research, are less used nowadays than “quitter” instruments such as manipulation, seduction, and persuasion. They also highlight how these quitter modalities of power are relevant to subject formation.

As Frederiksen and Himley (2020) specify, the taxonomy proposed by Allen and used by them is not definitive. Drawing on their work and hoping to contribute to the understanding of other quiet instruments of power, this paper sheds new light on what I argue can be understood as another quiet and subtle tactic of power: nonknowledge.

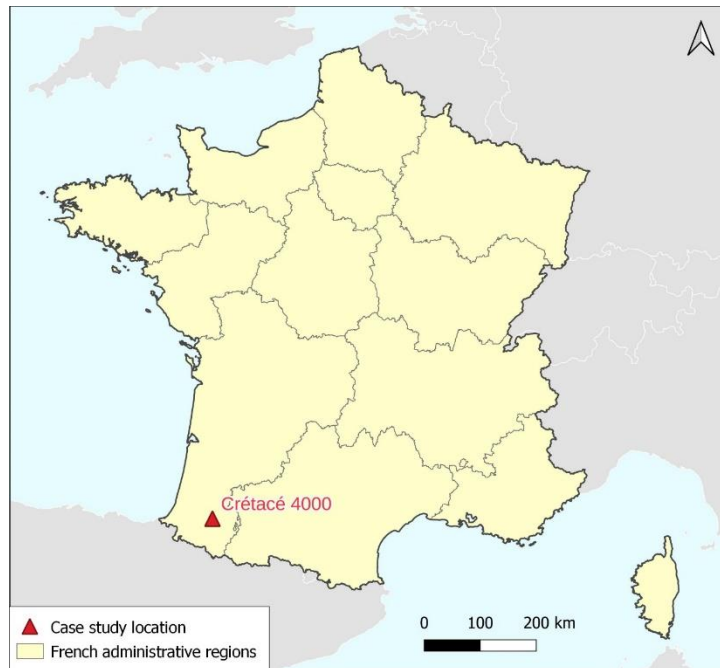
Nonknowledge is something one does not know, regardless of reasons, implications, or the theoretical possibility of “overcoming” this gap (Böschén et al. 2006). Nonknowledge production is always directly connected to knowledge production (Ravetz 1987, Böschén and Wehling 2010), creating what I call a dynamic of nonknowledge-knowledge production.

Within both references, this paper aims to identify power modalities in a case study of unusual underground exploitation in the Southwest of France, called Crétacé 4000. Situated in the industrial site of Lacq, Crétacé exploitation consists of the injection of liquid by-products from the extractive and chemical industries present in the industrial site. In the next sections, I will describe that the legal term used to designate these by-products is also a matter of power.

The extractive industry is not recent in the Lacq region, being present since 1949, nevertheless, it is the capacity to adapt and expand extractive activities through the last decades that interests me. It is relevant because, differently from the focus of Frederiksen and Himley (2020) on new projects, the expansion, in this case, means diversifying the type of extractive activity developed and making exploitation last.

## Crétacé 4000

C4000, as Crétacé may be called, is part of an industrial site of Lacq, a city in the Atlantic Pyrenees department, as we can see in Figure 1. Lacq and adjacent municipalities are part of the traditional province of France, known as the Béarn.



Map with the location of Crétacé 4000 – case study  
Source: Julianna Colonna and Alice Nikolli, 2022

C4000 explores since 1957 a partially depleted gas reservoir localized in a geological stratum from the Cretaceous period, around 4000 meters under the surface – from where it gets its name “Crétacé 4000”. A schema is presented in Figure 2.

The geological repository is deeply linked to gas and oil exploitation, the oil being discovered at the end of the 40s, and the gas at beginning of the 50s. C400 first consisted only in the re-injection of sulfured water, which is associated with the gas in the underground. Worldwide, in other gas exploitation projects, the re-injection of these effluents is an ordinary activity.

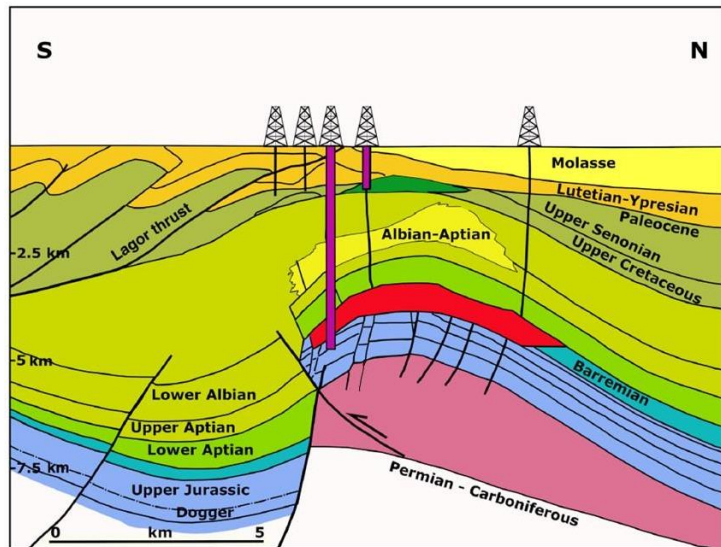


Figure 2: Schematic cross-section of the Lacq anticline structure; (dark [green] zone), the shallow oil reservoir; (deep dark [red] zone), the gas reservoir.  
Source: (Grasso et al. 2021)

Since 1974, the innovation, in the C4000 case, is the injection of other by-products from industries situated on the Lacq industrial site as definitive storage, sometimes called ‘underground treatment’. These by-products, according to the companies which had been using or used C4000, are liquids that could not receive a surface treatment without compromising the economic viability of their activities.

The interesting point about the extraction related to C4000 is that, although not extracting anything from the underground to be used on the surface, Crétacé and other underground storage are regulated by the Mine Code in France. So, as put by Schellenberger “geological storage is a new model of mining but it represents an “inverted” mine.

For the monitoring of this activity, a Local Monitoring Committee (LMC) was implemented in 2002. As stated by the LMC Rules of Procedure of 2014, until 2016 the Committee had to meet once per semester, in 2016 with a revision of the Rules of Procedure, the LMC has to meet once per year. The Committee composition did not change since the first Rules of Procedure in 2014 and it includes the industries which benefit from the Crétacé exploitation, local administrative representants as Majors, civil society organizations of professionals or environmental NGOs (Non-Governmental Organizations), Trade Union representants and the National State represented by Regional Department of Environment, Planning, and Housing (RDEPH). The composition was used to identify actors for the interviews.

## **Methodology**

This paper is based on current investigations for my Ph.D. in sociology. The case study presented here has been studied since December 2021. The first research activities were unsystematic and non-exhaustive readings of the local press about Crétacé 4000 and scientific papers, which allowed me to identify relevant actors and controversies, the context, and the history of the exploitation.

The study of Crétacé exploitation led me to look at the industrial basin of Lacq and its context in the region, which is developed in the first part of this study and has much resonance with the types of power tactics described by Frederiksen and Himley. The second part explores more features of C4000 itself and to do so, complementary literature of nonknowledge is proposed. I went through all the 30 minutes of meetings held by the LMC between 2002 and 2022 and associated documents such as the industry's reports, law texts related to Crétacé – such as the French Mining Code, and decrees from the Pyrenees Atlantic Department.

From May 2022, 9 semi-directive interviews were made with actors with some kind of linkage to the exploitation. The questions and subjects were adapted to each interviewee, including professional history and current professional occupation, the local history and the effects of industrialization, personal connection with Crétacé 4000, and the LMC operation. I conducted interviews with seismologists, a public servant for the public environmental organ, industry employees (site manager and Security-Environmental chief), an environmental NGO delegate, a former LMC president, and an industry association delegate. Interviews lasted an average of 87 minutes, ranging from 50 minutes to 130. A total of 790 interview minutes are being transcribed in French. In addition to that, I also held informal conversations about the C4000 thematic with 4 people, law specialists, a seismologist, and an informal meeting with the same public servant for the public environmental organ. These interactions totalized 222 minutes. All interviews and conversations were in French, which was the first language of all the research participants, besides me, my first language is Portuguese.

I am aware that not being French nor a native French speaker affects the relationship I can establish with participants and our communication. To allow fact-check and reevaluate my understandings, Interview questions were focused on past events, and not on interviewees' analyses, and all interview audios were registered.

Although being part of research that is still in progress, the results found so far enable the identification of nonknowledge as a relevant aspect to analyze power relations in addition to those in the Frederiksen and Himley (2020) paper.

### **Extractive Industry and subjectivities in the Lacq Region**

When looking at the extractive industry context and specifically at Crétacé 4000 distinct tactics of power may be identified to understand how the industries installed themselves, how feelings and understandings about the exploitation evolved within the local community, and so on. In this paper, I highlight three of them and their impacts.

#### *Seduction and Persuasion*

Of the three quiet modalities of power described by Frederiksen and Himley, my analyses show that so far, the most striking ones for the Lacq case are surely seduction and persuasion, which are inextricably intertwined.

Lacq region can be characterized as a peripheral region, a conglomerate of 61 municipalities that had 53.184 inhabitants in 2018 (Insee 2018). The two biggest cities, Toulouse and Bordeaux, are more than 200 kilometers distant from Lacq – the main municipality where the industrial site is located.

Before the arrival of extractive industries, the region was essentially rural as can be seen in Figure 3, an aerial photograph from April 1938 of where is today the industrial site.



Figure 3: 1938's aerial view of the area before the construction of the Industrial Site of Lacq  
Source: Géoportail, 1938.

The evolution that can be seen in Figure 4 is completely linked to the beginning of gas and oil exploitation in the 50s. One could argue that anything that could increase job opportunities, community incomes, and municipal tax collection should be enough to understand how extractive industries can establish in a territory. However, it must be said that the origin and development of the Lacq industrial site were not free of complications.

The beginning of the gas exploitation was disturbed by an accident between 1951 to 1952. After the oil discovery, specialists knew that deeply more oil or gas could be present, so the drilling was carried on.



Figure 4: 2021's aerial view of the area of the Industrial Site of Lacq  
Source: Google Earth, 2022

On December 19, 1951, the gas was found but leaked without control and broke the derrick, releasing into the atmosphere hydrogen sulfide ( $H_2S$ ), toxic and colorless gas with a strong odor of rotten eggs. The immediate solution, to avoid intoxication, is to lead the gas to a torch and burn it.

Between 150,000 to 300,000  $m^3$  of gas leaked and were burned every day. On January 30, 1952, the work to stop the leakage begins to progress – without stopping it though – after Myron Kinley, a North American pioneer in fighting oil well fires, came to France to help the attempt. It is only on February 24, 1952, that the drill is dynamited and closed with cement.



The accident allowed them not only to observe the dangerousness pressure of this gas but also how corrosive it was. At the time, the metals used to produce pipes could not resist the corrosion caused by the chemical characteristics of the Lacq gas. Kinley left France advising to “forget this gas field, it’s a bomb, reseal your boreholes, sow grass in and graze them with cows” (Laurent 2013: 19).

The Lacq field is nevertheless not abandoned, industrial research was developed to find a resistant material to the sulfur. During the years after the gas leak accident, researchers were also trying to establish the abundance of gas in the field to foresee and plan the factory to remove the hydrogen sulfide, valorizing it in another chain – the chemical industry, where the sulfur is one of the principal raw materials. Between 1956 to 1961 wells were drilled and exploited by the treatment factories built at the same time.

The decision to keep underground exploitation, even under risky and uncertain circumstances, draws attention to the relevance of verticality in extractive territories, highlighted by authors such as Braun and Elden. The underground of Lacq was at some point dangerous and should have been kept untouchable. Despite that, varied reasons from the international and internal French context to drilling technical advances, the once dangerous reserve of gas became sufficiently safe and interesting to be exploited, creating and reinforcing the extractive subjectivity.

The national need for energy was undoubtedly one of the major reasons for this evolution. It is certainly possible to study what power tactics the French State used to keep these researchers and to succeed in this exploitation, but even so, I chose to focus on power modalities observed on a local scale.

To drill and construct, lands were needed, and the compensations offered for the land acquisition are described as a common way to persuade local communities. In addition to that, perspectives of employment creation were not trivial either and consisted also in persuasion used in the area.

Even if my research does not concentrate on the process of land acquisition Lerat (1957) indicates how this tactic was employed “The peasants, deprived of land, risk being suffocated by the big industries. It is therefore a question of resettling this rural population. Two solutions are to be considered: or, after sufficient compensation, the population resettles on the land of the neighboring hillsides (currently regions of rural depopulation, but soils of much lower quality than those of the valley, which are among the richest in Béarn, and where breeding

seems to be the only profitable activity); or the peasants become worker-peasants or even workers providing part of the labor employed by local industry” (Lerat 1957: 266).

Persuasion is also likely to be associated with well-paid salaries, benefits, and some kind of stability related to industrial jobs. In the same geographic annal from 1957, Lerat describes the attractiveness of the industrial site for “young Béarnais, [who are] attracted by high salaries, come to work from neighboring villages, from the Pau urban area and even from further afield” (Lerat 1957: 263).

To highlight the relevance of these employments during the time, data from the book about the history of Lacq gas shows that at the beginning of the 80s, worked at the site more than 2,500 persons, more than the population of Lacq, Mont, and Maslacq (Laurent 2013: 30), the biggest municipalities at the time.

The enchantment or seduction, another modality of power described by Frederiksen and Himley can be perceived in the narratives of two local interviewees which accentuates the benefits of the industrial site of Lacq, an industrial reality that seems much more appealing than other activities due to their associations with progress and modernity. “The Lacq basin is the richness” (Interview n° 7), and “the revolution of Bean” (Interview n° 6).

The discourse created by this dynamic contributes once again to the strengthening of extractive subjectivity. Transformed from a rural to industrial vocation, the territory had since the beginning of gas exploitation a plan to prevent deindustrialization. This objective is materialized, among other examples, by the constitution of the Southwest franc, a fund<sup>1</sup> created with part of the gas incomes to contribute to the economic development of the region. This development is tied-up with the extraction of gas, sulfur, and hydrogen, and with the low-cost deposit of chemical waste.

Since the extractive industry’s arrival, the territorial vocation has changed and kept within this paradigm. The Lacq basin industries that ensued based their activities on extra as well. Chemical industries were attracted due to the sulfur associated with the gas; the methane is burned and used to produce steam used by other industries; the underground is also used as theoretical eternal disposal of chemical waste.

Carbon storage projects, and so the perpetuation of an underground exploitation vocation, seem to be the future of the Lacq region. The pilot of this activity was situated in the same

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<sup>1</sup> For each m3 of extracted gas, 1 franc (approximately 0,16 USD) was deposited in this fund. This financial resource is connected to the origin of an association in 1973, today named Economic Development and Attractiveness Office of Adour Region (EDAOA). According to the EDAOA website, they dispose of 15 million euros (approximately 15,80 USD) to contribute to the economic development of the region (xx).

municipality and a bigger project between France and Spain is in preparation, named Pycaso for PYrenean Carbon Abolition through Sustainable Sequestration Operations.

### *Nonknowledge*

When looking closely at Crétacé exploitation, a different quiet instrument seemed important to be described and used. It allows us to understand not only how power is “exercised by extractive industry to gain and maintain access to land and resources” (Frederiksen and Himley 2020: 58) but also how some activities can pass almost unnoticed or at least not gain much media/opponents attention. The instrument is nonknowledge and precisely the dynamics of nonknowledge-knowledge that will produce this unnoticed exploitation.

I argue that numerous pieces of evidence of this dynamic may be enumerated, in this paper I will go through three of them.

The first point is the legal definition of what is injected into the geological cavity of Crétacé. In legal terms, this kind of activity – injection of liquid industrial effluents in deep geological cavities – is contemplated in French law since 1973, under the 64-1245 Law from 16 December 1964 relating to the regime and distribution of waters and the fight against their pollution.

Despite the legal framework, the approval of the European directive for the protection of underground waters in 1979 and evolutions in the French directives and common law, made the C4000 injection less stable in law terms (Schellenberger 2014). What led to an amendment in the 30 July 2003 Law, about the prevention of natural and technological risks, which authorizes definitively the exploitation of Crétacé 4000.

Despite the legal framework which authorizes the activity itself, in 2010, a judicial decision settled to apply the General Tax on Polluting Activities<sup>2</sup> (GTPA) on C4000. The matter was discussed in the French National Assembly during the 2012 Budget Law session in December 2011. Another amendment permitted the Crétacé to keep its exploitation without the payment of the GTPA. As pointed out by Schellenberger (2014), French law has never considered these effluents, from Crétacé or others, as an activity of pollutants elimination.

The consequences of this legal framework contribute to reinforcing nonknowledge production. It is reinforced because these unwanted waters cannot be part of a societal effort to manage, treat or deal with waste. Actually, for example, they are not part of the Waste Management Plan

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<sup>2</sup> The *Taxe Générale des Activités Polluantes* (TGAP) in French.

of Nouvelle-Aquitaine, meaning that they are out of public policies. One could even say that in the ontological plan, the pollutant activity stops existing when the law does not recognize it.

In addition to these legal circumstances, the second point is related to the Committee created to monitor C4000. The LMC is not a space of discussion or “controversy formulation” (Interviewee 4). In all the meetings, those who expose information are the industrial representatives. The others participants ask questions, that are not always answered or taken into account. For example, during the 2022’s meeting, the NGO representative asked about a possible future conflict of interest between the injection of the river water into C4000 and the context of climate change and the scarcity of water. This question is related to the fact that in 2020, more than 30.000m<sup>3</sup> of water coming from the nearest river, “*le gave de Pau*” were injected in C4000 due to the need to keep pressure and decrease the effluent’s injection. Between 2014 and 2020 more than 215,000 m<sup>3</sup> of river water was injected. No answer was given to the NGO representative or debate was made about the question.

The third and last piece of evidence that I would like to point out is about data protection and the refusal to share data without a confidentiality clause. Seismologists’ interviews affirmed that they have trayed to access injection and seismology data to study and publish scientific papers about induced seismicity. These requests were submitted to a confidentiality clause signature or were rejected. A part of this data is available in the five-year report which the public administration publishes on its website every five years.

## **Conclusion**

The taxonomy on which Frederiksen and Himley based their review showed to be useful, but as they recognized, not complete. The dynamics of nonknowledge-knowledge production seem to be another relevant aspect to be considered when analyzing extractive power.

Drawing on the exposed, two main points deserve to be highlighted.

The first one is the ability that actors engaged in the underground exploitation in Lacq have to make the industrial site evolve without changing the extractive underground vocation. The industrial development from gas/oil exploitation to a chemical industry dependent on underground storage, to a possible carbon storage in the future. This evolution is a result of power modalities exposed here, that can be usefully analyzed with the theoretical framework proposed by nonknowledge studies and Frederiksen and Himley (2020).

Through these modalities, the Lacq Industrial Site has spread its extractive activities twice: over time because the extractive industry was able to keep the site working even if with adaptations.

And has spread verticality, when has differentiated the types of underground exploitation, however, keeping it an extractive activity.

The second one is the mentioned effects of the nonknowledge condition created by the already exposed characteristics of C4000 exploitation: the legal framework that does not consider the effluents as pollution, the LMC configuration that creates a unidirectional knowledge sharing, and the appeal to confidentiality that restraint scientists to produce knowledge about local seismicity.

The aspects that allowed this configuration were not exhaustively pointed out or analyzed, although, the importance of nonknowledge-knowledge analysis resides in the fact that it shows how unequal power relations (Henry 2017) are “systematically inscribed” (Jas 2015) in law, participatory mechanisms and legal rights to industrial confidentiality.

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