

**Ele Carpenter,
The Nuclear Anthropocene,
Summary of presentation for Conference Proceedings.**

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The discussion of the Anthropocene is a growing concern within environmental studies, art and cultural theory, which situates nuclear culture within global deep time phenomena. The Anthropocene is a term used to describe the emergence of a human geologic era: where human activity is changing the climate and geology of the planet. The term is currently under review by the Subcommission on Quaternary Stratigraphy (SQS).ⁱ The concept of the Nuclear Anthropocene refers to the way in which nuclear fission released man-made radionuclides into the environment through fallout, providing a radiological time-stamp of the start of the nuclear age in the 1940s. In this century, the deep storage of radioactive waste will create a new geologic layer 500 meters below ground for hundreds of thousands of years. Radionuclides are also used to mark and measure flows in ocean currents, illuminate our intestines, and as a time-stamp of the formation of the earth. Uranium is as old as the earth, and its half-life provides us with the geo-radiological information for dating the planet at 4.5 billion years.

'Nuclear Culture'ⁱⁱ is the overarching title for my curatorial research into contemporary visual art and nuclear culture, a necessarily long-term and intergenerational research project. The short-term research includes writing, field trips, presentations, symposia and small-scale exhibitions (over 3-4 years). The intermediate term research includes larger exhibitions and publications (over 4-6 years). In the longer term it aims to create contexts for commissioning artists to be involved in the stakeholder consultation processes, nuclear markers and archives, (over the next 5-40 years and beyond).

The curatorial research process brings together people from different professional and disciplinary backgrounds to share their expertise and knowledge, and potentially develop collaborative research partnerships. Nuclear Culture encounters take place between artists, scientists, engineers, geologists, radiation protection officers, and the nuclear humanities. Some of the feedback from participants reflects on how working with people from different disciplines provides space to: think differently; to take care over language; to understand how we are misunderstood. The process provides an opportunity to deconstruct transferable metaphors; establish shared philosophical concepts; and deal with disciplinary alienation, and problems of negation.

This paper focuses on the curatorial context for commissioning, developing partnerships and theoretical frameworks. The curatorial research is multilayered to investigate how cultural knowledge around contemporary nuclear is formed, commissioned and disseminated, and how artists and curators might take part in this process. Attempting to identify the points at which nuclear discourse is entering the public domain through an increasing visibility of accidents, archives and public consultation.

Perhaps relevant to the discussion is Heidegger's theory of the broken tool; that we only become aware of our tools when they don't work. In the 21st C the nuclear industry is

undergoing a process of decommissioning and waste management, and as a result is shifting into public view, perhaps even public responsibility for the first time. The industry is starting to consolidate its archives, and consider the relationship between public site markers and public archives. Once the nuclear archives move into the public domain, they can include multiple narratives, in short they do not need to singularly celebrate nuclear heritage, they can include forms of dissent and protest.

At the same time the humanities is experiencing a renewed interest in 'Nuclear Studies' or 'Nuclear Humanities' within literature, archeology, anthropology, linguistics, philosophy, cultural theory, and slowly - arthistory. As part of the curatorial research process I'm trying to articulate how the visual arts can contribute to the nuclear humanities, where the work opens up new modes of conceptualization. Through European research networks I've found sociologists and philosophers working alongside the nuclear industry on the challenges of siting, building and monitoring geological repositories for high level radioactive waste. They are instrumental in conceptualizing the field. There is something attractive about the speculative philosophy, deep time scales, deferred responsibility, elaborate mythologies, and future folklore; but these underground vaults of hot vitrified waste are really being planned and built.

The general feeling seems to be that science has run-out of language and skills to solve the next set of problems. In the age of the Anthropocene 'people' or 'publics' no longer have a utopian belief in science; so more complex cultural strategies are required to make sense of the continuing present, and understand how to communicate over long time frames and across generations. In today's industry, the emphasis on sustainability and intergenerational equity means that we have to solve the problems of today and not leave them for future generations; we have to keep resources intact for the future.

The Nuclear Culture project emerged from the intergenerational inheritance of Greenham Common Women's Peace Camp (1981-1991); and the invitation of my mother, a life-long peace campaigner against nuclear weapons, and current member of the SDP-AG advisory group. The advisory group includes nuclear engineers, NGO's, regional government councillors, nuclear regulators, and the Environment Agency to advise the MOD on the dismantling of 27 laid up rusting submarines. So when the Advisory Group raised an interest in inviting artists to respond to the dismantling process, they invited me to give a presentation to the group. From my initial enquiries, it was clear that there were many assumptions about what an artist might do. These ranged from satirical cartoon, documenting the process, running community workshops, creating a public monument, and making artwork for a gallery exhibition. There was an interest in an artistic outcome, but no sense that the production of new work might involve them as individuals or as a group. However, it seemed clear that the MOD were familiar with the idea of a proposal, and that propositions were important even if unrealized. This openness enabled a good discussion of how working with artists would be an intellectual project, could raise ethical questions, and may or may not fulfill their expectations. I then gave a short presentation to the AG about some of the ways in which artists interrogate language through deconstructing rhetoric, and the role of the human within material and energy networks, through the work of Rod Dickenson, Hito Steyerl, Nick Crowe & Ian Rawlinson. The response was a mixture of perplexed curiosity and genuine engagement with the way in which the artworks dealt with complex ideas. In principle the group agreed that they would be interested in hearing more about my research and receiving specific proposals from artists. I decided to work with several groups of artists that I knew well, and were committed for the long term: Nick Crowe & Ian Rawlinson, Lise Autogena, Jon Thomson & Alison Craighead. In addition artists Susan Schuppli, Karen Kramer and David Mabb are also taking part. Everyone has a connection with Goldsmiths College, starting to foster a practice-based research culture around art and nuclear concerns within the college.

The first stage of the project involved organizing a series of field trips to nuclear sites with the artists during 2012-13. We went to the Aldermaston Women's Peace Camp; HMS Courageous, decommissioned nuclear submarine in Plymouth; and the low level waste storages site, LLW Ltd, at Drigg in Cumbria. The aim was to explore the material tangibility of the sites and their diverse communities of knowledge and experience. In July 2014 I worked with the Arts Catalyst and S-Air in Japan to invite a group of artists and curators to take part in the Actinium exhibition, field trips and forum. Artists Susan Schuppli, Karen Kramer, Jon Thomson & Alison Craighead traveled with Arts Catalyst Director Nicola Triscott and Producer Gillean Dickie, S-Air Programme Director Kyoko Tachibana and myself. Working closely with artists in Japan we visited the Horonobe Underground Research Laboratory for high-level waste storage; the Tomari NPP Visitor Center, on Hokkaido; and travelled to Sendai, Fukushima City, the town of Soma and throughout Fukushima Prefecture and exclusion zones along the east coast.

Several countries have built test laboratories to research the geology and test technologies for geological disposal of high level radioactive waste. In the Horonobe area of Hokkaido our group met with Farmer Kuse, visited his cows and ate their delicious ice-cream. Like many farmers, Kuse wants his children to inherit the farm, and feels that if radioactive waste is stored under the farmland it could present a danger to his grandchildren and great-grandchildren. The CIEGO underground laboratory in Bure, Northern France is carrying out similar tests, but plans to build the actual repository in the region. I went on a trip to the Bure site in September 2014, as part of the conference on Constructing Memory organized by Andra, the French agency for radioactive waste disposal. At the conference I presented a poster for an artists proposal by Thomson & Craighead. The conference exhibition also included artist Cecile Massart and the Cumbrian Alchemy project, who are also involved in the Nuclear Culture project. The presentation of artist's work in this context offered a huge potential, but without curatorial knowledge, lacked the capacity to articulate how the work contributed to the intellectual discourse of the conference.

Alongside the field trips and conference presentations, I've been working with the Arts Catalyst to organize a series of symposia bringing together artists and nuclear professionals and stakeholders to share and discuss their work. Despite many artists working with nuclear sites and concerns, I felt very strongly that we needed to instigate a debate about the contemporaneity of the nuclear age. Not as a modern age of the 20th Century, but an ever-present concern in which we all live and work. So that we conceptualise the nuclear not simply as a form of industrial heritage, but with an awareness that we are living in the modernist construct, and can rethink the frames through which we articulate the future. In 2013 we organized the Nuclear Culture Symposium and Film Programme, with members of the SDP-AG. Then in 2014 the Panning for Atomic Gold symposia explored ongoing work by the Artists in the Atomic exhibition, and the NC programme with contributions from Radiation Protection Officer Shelly Mobbs, and Cold War literary theorist Dan Grausam. The Actinium Exhibition, Sapporo Japan, 2014, included a day forum and roundtable discussions with artists, a lawyer and geologist involved in the campaign to prevent the re-opening of NPP's in Japan. All of these events include multi-disciplinary round table discussions to share knowledge and experience, and discuss language. The debates take place around a re-construction of James Acord's Round Table, which he built in his Hanford Studio in 1999 to bring environmentalists and nuclear engineers together to discuss the clean up of the Hanford site.

There are several European inter-disciplinary research networks exploring the social and cultural aspects of long term waste siting, monitoring and storage. AI attended the Modern Conference at the EU Commission along with artist Nick Crowe in 2013; and in 2014 I gave

a presentation at the InSOTEC, Berlin seminar, along with Lise Autogena and Cecile Massart. These research programmes deal with the relationship between the social and technical challenges of long term geological storage of high level radioactive waste. There is much interest in how artists might contribute to the cultural challenges of geo storage, but little understanding of where the value of the work lies, or the process and costs of commissioning contemporary art.

Within visual art-history there are many precedents, and much contemporary expertise in this field. In his keynote lecture at the Fluid Encounters Conference, Gediminas Urbonas demonstrated how artists have always found ways to work with the engineers and scientists of their time. Including the E.A.T. Experiments in Art and Technology in New York 1966, and the Artists Placement Group's work in the UK throughout the 1960's, 70's and 80's; and more recently the Arts Catalyst programme established in 1994; and the Cern artists residency programme curated by Ariane Koek, another Keynote speaker.

There is now an EU directive that every nuclear nation should have a strategy for building geological storage sites. But the nuclear industry, scientists and engineers don't have the skills, knowledge or resources for the complex process of persuading local communities to volunteer to host a Geological Disposal Facility (GDF) in their community, or mark it for future generations. These challenges are addressed through professionals in public consultation and public mediation, and each country is adopting a different model.

There is an opportunity for visual artists to be involved in these processes, and contribute to the discourse, but first a case needs to be made of the critical integrity of art and what it can and can't bring to this multi-disciplinary table. When working on interdisciplinary projects, it can be easier not to talk about art, but to share ideas. But that leaves us with many problems about how we articulate the value of art and curating, as well as the value of science.

Contemporary art practices are engaged with the conditions of contemporaneity: articulating the present, or the continuing present; creating complex forms of meaning within our contemporary and emerging culture; establishing mechanisms for how objects, performances, actions and ideas are archived and reinvented through the generations.

Curatorial knowledge can contribute to the cultural discourse surrounding geological repositories by providing ways of thinking about the challenges from different cultural, material, historical and metaphorical perspectives. Contemporary artistic practices deal with the complexity of visual language and how it is so easily misunderstood, misconstrued and instrumentalized. For example the common misnomer that 'art speaks for itself' reveals the process by which site markers will quickly become redundant as nostalgic examples of 21st Century public art without the nuances of relational practice.

Curatorial programmes, such as the Arts Catalyst, facilitate collaborations between art and science, bringing together different disciplines, providing space to think differently outside the usual frames of reference, and to take care over language, translation and meaning across industry/ public sector partnerships. As nuclear materials enter public circulation, so does their representation. Inviting artists and curators to the table, provides the opportunity to deconstruct assumptions about transferable metaphors, shared philosophical concepts, and new forms of folklore and mythology.

Arthistory, along with religion, has one of the most effective forms of cultural archiving, preserving records, knowledge and memory through museum collections and curatorial study. Therefore it is vital that cultural institutions need to be involved in the commissioning and dissemination of the cultural artefacts, performances, sound

recording, actions and events which artists are developing formally and informally in response to geologic waste storage and decommissioned nuclear power plants. The commissioning of visual arts needs to include partnerships with curators and cultural institutions to develop tangible, conceptual and speculative propositions, allowing artists to interrogate language through deconstructing rhetoric, and the role of the human within material and energy networks.

Kota Takeuchi

In post Fukushima Japan, artist Kota Takeuchiⁱⁱⁱ reconfigures different forms of cultural and physical exposure to radiation through digital technologies that enable tracking and syndication of data, capturing and filtering imagery through multiple platforms and spaces. Takeuchi's work is, in part, a process of trying to understand the moment of exposure, and how it can be captured and recaptured overtime through the slippages between different modes of production (film, painting, social media, performance, sculpture). He is interested in how information networks are interrupted, looped, mapped, slowed down for reflection on how things are made, how stories are told, and how knowledge is consolidated.

Takeuchi has made a series of works exploring the nature of the site marker, questioning whether these stones are really markers for the future, or monuments of the past 'Take Stone Monuments Twice, 2013' references the book 'Economic History in the Modern Age of Iwaki' (Ichiro Saito, 1976) which provides a guide to site markers in the prefecture. Many of these stones mark historical high-water lines' from previous Tsunami's, which were either lost or over-looked by subsequent generations. His work 'Bookmark, 2013' raises important questions about the relationship between intergenerational culture, abstraction and material history.

Thomson & Craighead

Artists Jon Thomson & Alison Craighead investigate understanding of geological and planetary time through the relationship between live data and the material world^{iv}. They are working with curator Ele Carpenter and the Arts Catalyst in London to create an artwork titled 'Temporary Index'. They intend to work in partnership with radioactive waste storage sites across Europe to build a series of live decay-rate counters, markers of time as well as place. The artwork will utilise a range of live and pre-recorded data feeds which can be embedded in specific sites, syndicated online, presented in an art gallery, preserved in a museum collection, and included in nuclear archives.

The artwork will investigate how data can be presented publically through a series of numeric counters which countdown the probabilistic decay of radioactive materials in seconds. An example of one counter could be a bottle of sludge containing plutonium discovered in 2004 during the cleanup of the Hanford nuclear site in Washington State, USA. Another example might be ion exchange resins and filter materials used to clean water at Sellafield and stored at the Low Level Waste Repository, Cumbria, UK. Whatever the items identified (and this will be a complex process requiring collaboration with experts in the field), it is important that a wide range of short and long term waste products are used to represent diverse timescales that produce a rich constellation of data. The design of the counter will demonstrate how human measurement of time is a process of linguistic and pictorial language.

In 2015-16 Thomson & Craighead will be working with the BildMuseet and HUMlab at Umea University, Sweden, to create a series of counters annotated with the waste item's provenance. The result will be an array of counters for simultaneous exhibition, where they become animated objects of contemplation; representations of time that far outstrip the human life cycle and provide us with a glimpse into the vast time scales that define the

universe in which we live in, but which also represent a future limit of humanity's temporal sphere of influence.

Cécile Massart

Artist Cécile Massart has been researching radioactive waste sites around the world for over 20 years^v. Her drawings, films, books and exhibitions investigate the formal aspects of modernist architecture of the sites, exploring how this 21st century archeological stratum is being inscribed in the landscape. By working with nuclear agencies in Belgium and France she has an in-depth understanding of the semiotic and future-archeological challenges in marking waste sites across the generations, and the need for continuing responsibility.

Cécile Massart proposes new ways of thinking about the cultural work of marking sites for the long term future. Existing markers easily become monuments of the past, rather than markers of the future. In many circumstances the message enscribed on static markers has already been demonstrated as redundant over just one generation. As a contemporary artist and Massart has identified the need for each generation to work with its own cultural terms of reference to mark sites, not simply through the long-term totemic marker but by engaging diverse stakeholder groups of experts and communities to learn about the site and mark it for the next generation.

Alongside the conventional static site marker, Massart proposes to build an artistic laboratory, which will be a community-based project inviting artists, scientists and local stakeholders to work together in a multidisciplinary and multicultural framework. This is an important shift from the 20th Century discourse of semiotic markers to a 21st Century engagement interdisciplinary and intergenerational cultural processes. This concept for a working lab emerges from the visual arts discourse of relational aesthetics, and an understanding of the network of objects, humans, and technologies that contribute to the long-term meaning and understanding of nuclear sites. Within curatorial practice, Massart's work needs to be developed through a relational framework, as well as the civic expectations of commissioning a public monument.

Cumbrian Alchemy

Artists Bryan McGovern Wilson (USA) and Robert Williams (Britain) have produced a beautiful archival exhibition and publication of their performative research into the relationship between Cumbria's nuclear industry, landscape, archaeology and folklore.^{vi} The installation includes a series of drawings, photographs, sculptural artefacts and public archives that explore complex and speculative relationships between objects, humans, materials, landscape and beliefs overtime. The works brings together artefacts which form a continuity of nuclear folklore, from the region's pre-nuclear history and megalithic monuments to speculative nuclear futures. Thomas Sebeok's proposal for an 'Atomic Priesthood' is performed on the Cumbrian Hills, evoking the need for powerful ritual to pass records, knowledge and memory onto future generations.

The archival drawers each contain a set of objects and documents that focus on different historical intersections between the nuclear industry and popular culture, from super-hero's to ancient monuments, and multifarious forms of nuclear heritage from industry information pamphlets to an archive of public consultation and protest. The work also incorporates visions of local scientific luminaries such as: the originator of modern atomic theory John Dalton; physicist Michael Faraday; and Sir Richard Owen, founder of the Natural History Museum, London. The archive demonstrates how informal and formal knowledge circulates through different social networks and communities of interest.

The work demonstrates how artists can create contemporary archives that reach back to the past and project into the future. The understanding of temporality and contemporaneity in the work is vital for considering how knowledge can be embedded in our past folklore as well as recognized in the present to open up new possibilities in the future. Curatorial work is needed to enable the place the Cumbrian Alchemy archive within future nuclear archives.

Conclusions

Working with other disciplines can help to broaden the horizons of the context in which we work, giving people permission to think differently, and speak about concerns that the normative culture of their field doesn't allow space for. It can help to articulate things people already know but don't have the language or support to describe. The arts and humanities can think holistically, they don't need to compartmentalize research-processes and knowledge in the same way as science and engineering. At the same time these disciplines are not homogenous, there are many arts and many sciences. But industry/research or art/science partnerships often have expectations that art might articulate what is already visible and known, whilst artists might interrogate the interplay of visibility and invisibility both materially and politically in unexpected ways.

The academic conference provides a comfort zone to think speculatively, but what happens to the knowledge? Do we really understand each other? In many ways Heidegger's theory of the broken tool doesn't make sense, because the industry observes a process of entropy and doesn't have a problem with redundancy. The concepts of deep time and the human time of the Anthropocene make sense in all disciplines, although perhaps the material networks are perceived differently. The gaps in language only become apparent through in-depth dialogue; the written text doesn't provide material for collaboration because there are too many misunderstandings in the translation of interests and rhetoric.

Art continues to increase complexity by raising rather than answering questions. Working with art and artists can open up new spaces of integrity, through an insistence on conceptual enquiry which requires multiple registers of reception and dissemination; and as such it is resistant to capture as public relations.

Several decades or centuries of curatorial work is needed for the nuclear archives to move into the public domain, and to be able to include art and politics. The first step is to establish a curatorial context for the commissioning, production and dissemination of these contemporary artworks within multiple discourses, to find new ways of embedding the complexity of radioactive waste management in our past, present and future cultures.

ⁱ <http://quaternary.stratigraphy.org/workinggroups/anthropocene/>

ⁱⁱ <http://nuclear.artscatalyst.org/>

ⁱⁱⁱ <http://kota-takeuchi.net/>

^{iv} <http://thomson-craighead.net>

^v <http://cecile-massart-lisibilite-dechets-radioactifs.com/fr/>

^{vi} Williams, R., Bryan McGovern Wilson eds. (2013) Cumbrian Alchemy. Unipress Cumbria: University of Cumbria. ISBN 978 1 869979 39 3