On Some Absent Presences of Nuclear Extractivism: Retrofuturist Aesthetics and *Fallout* 4

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Nuclear projects are extractive. This is true for the processes that come before detonations, like mining, and, as I will argue in this contribution, those processes that extend into the long-term future. Nuclear detonations, either slow and enduring (as in power plants) or sudden and explosive (as in bombs), extract from *both* the past *and* the future, and yet cushion the present, even as material remnants of these processes accumulate all around us.[1]

On the topic of harnessing nuclear energy, Rebecca Solnit suggests that

> [t]here is something wondrous about the fact that humans have managed to make stars, and something horrible about the fact that they, or we, went to the trouble of making stars for no more interesting reason that obliterating other human beings, and the places around them. (43)

The processes entailed by, and the histories written about, this technological marvel amidst abject horror are not the main argument here. For this article, I emphasize how the nuclear renders some spaces and times expendable, and how the nuclear hence extracts from the livelihoods of people (and others) living in those marginal spaces and times. The first part of this piece will look to the nuclear as "ways of being in relation to energy, society, and the world" (Flisfeder 242), with particular attention to the violence towards people and places it entails. My main case study will be a popular computer game,

1 That the latter use (as a source of energy) came *after* the first (the bomb) is a function of applicable research funding—the military had the resources—as much, perhaps, as anything else (cf. e.g., Flisfeder or Solnit 108–144). The accumulations, as will become clear, are both the kind that will require storage (cf. e.g., Ialenti) or that are stored in the body (cf. Hecht or Williams).

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Bethesda Softworks' *Fallout 4* from 2015. The game employs an aesthetic that externalizes risk in temporal terms, that valorizes technological fixes, and at the same time—somewhat paradoxically—implies that nuclear fallout is containable. The marginalization of risk—historically and still today relegated to colonies —is now and has always been relegated to the future. Despite the best attempts at containment and relegation, nuclear technologies and interventions always have worked to collapse sovereignty, spatial regimes of power and even time, and continue to do so today.

Absent Presents, Absent Presences: Elsewhere & Elsewhen

Extractive relations are present in all manner of (material) relations. For Macarena Gómez-Barris, "the extractive global economy" is the system "installed by colonial capitalism in the 1500s and that converted natural resources such as silver, water, timber, rubber, and petroleum into global commodities" (xvi). In the Américas, according to Gómez-Barris, extractivism is embroiled in capitalism and colonialism, that is, in "thefts, borrowings, and forced removals, violently reorganizing social life as well as the land by thieving resources from Indigenous and Afro-descendent territories" (xvii). Whilst in the context of the Américas (and elsewhere), extraction is intricately connected to capitalism and is imbricated in histories of enslaving people, extractivist mindsets also gird non-capitalist relations, as the example of nuclear entanglements in the former U.S.S.R. illustrate (see the work of Kate Brown for more on this, in particular *Plutopia*).

Nuclear energy relies on specific raw materials, quite literally extracted from the earth, as well as on the extractions figured through complex enrichment projects, through sustained experimentation, and, of course, on human labor. For Anaïs Maurer and Rebecca H. Hogue, the extractive relations of nuclear energy are not unrelated to others: "If you live in the United States," they write, "there is a one in five probability that your light is powered by uranium mined on stolen Indigenous land in Australia, Canada, Kazakhstan, Russia, and the continental United States" (29). The extractive relations do not end there, however. Extraction, in nuclear relations, is not simply the removal of minerals—for example uranium—from lands around the world. It is also evident in what is normally called 'tests' and 'test-sites.' As Solnit reminds us, the U.S. Department of Energy also lists the explosions above Hiroshima and Nagasaki as tests (138–39). Whilst Solnit prefers the term 'rehearsals' to

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suggest that they "were full-scale explosions in the real world, with all the attendant effects" (5), to emphasize cumulative approximation of war, I think 'detonations' might better stress the explosive and material dimensions of these acts.

Maurer and Hogue also note that the first five countries to develop atomic bombs *all* undertook initial detonations ('tests') on indigenous land, and, crucially, recognize that this constitutes placing indigenous peoples under attack (31–32). "Unlike other forms of imperialism," they argue, "nuclear imperialisms are not only interested in occupying another given territory simply to exploit its resources or merely to pollute it. They annihilate their chosen sites of empire" (33). One of their interlocutors in that piece, antinuclear activist Chantal T. Spitz, presses this point with more urgency: "Nuclear countries do not develop and experiment their weapons of death on their own soils but on their colonies' soils. Nuclear is happening because colonies exist" (qtd. in Maurer/Hogue 26). Sometimes these colonies are far away, sometimes much closer; sometimes they are explicit colonies, sometimes they are unceded lands.

Consequently, nuclear relations do not pattern evenly across the globe (although the Pacific [Rim] figures prominently). Isao Hashimoto's video "Time-lapse Map of All 2053 Nuclear Explosions 1945—1998" uses pared down computer generated images to map the detonations through this time period and across the globe. After the initial detonations in Japan, the scale shifts to include the entirety of the globe. Each nuclear 'player'—and the aesthetics are more than a little reminiscent of early computer games—is given a different color upon 'entry' to the 'game,' and the acceleration of detonations proceeds. Minor lapses in intensity of detonations following international treaties (e.g., around 1958) become evident, visually and sonically, by contrast to the accumulation of color and noise that otherwise accompanies each detonation. Through the use of color, the relations between the respective nuclear powers and their preferred sites of detonation are rendered more visible, as is the case with Peter Atwood's static image ("Nuclear Detonations 1945–2019"). The colonial relations[2] that gird these detonation structures would come into their own if the centers of each power were specifically mapped alongside with the use of color to map in the respective empires.

2 Both Hashimoto and Atwood employ pink to represent the United Kingdom's detonations and thus reference the relations of empire by taking advantage of that particular color reference.

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Mapping the testing sites across an (imagined) background of relations of empire then emerges as an extended exercise in mapping colonialism: Kazakhstan's relations to the Soviet Union come to echo Australia's relations to the U.K., and also what New Mexico (and, later, the Marshall Islands) were and continue to be to the U.S. and what Algeria and Polynesia were and continue to be to France. Each of these relations depicts in and of itself a center-periphery relation. Most critically, imagined atop a map of empire, the detonations are far away from their respective centers of power. The risk—the fallout[3]—of detonations is played down and literally marginalized by being staged on the (respective) geographical margins of the so-called first world. To be sure, these margins are, for other people(s), livelihoods and ancestral lands, not marginal at all.

This marginalization of risk is concomitant with an externalization of resource extraction and other exploitative practices. Several terms have been developed to trace this idea. Georg Borgström's "ghost acreage" points to the externalized lands (and, by extension, lives) that feed the wealthy; Kenneth Pomeranz similarly explores the idea of "ghost acres" and "ghost acreage" as an extractive relation emerging with industrialization (275–83). Borgström's and Pomeranz' terms emerge in thinking about the production of food, with some peoples of the present profiting from other peoples' present lack. Val Plumwood proposes the term 'shadow places' for thinking through the "*material conditions (including ecological conditions) that support or enable our lives*" (her italics), which, she argues, the valorization of place has often neglected to consider: "An ecological re-conception of dwelling has to include a justice perspective and be able to recognise the shadow places, not just the ones we love, admire or find nice to look at" (n. p.). Stefan Lessenich, in the *Externalisierungsgesellschaft* (externalization society, analog, perhaps, to Ulrich Beck's *Risikogesellschaft* which has been translated as risk society), makes a similar point: He observes that to be 'doing well,' one is 'doing above average,' and that this necessarily entails that there are others who are 'doing below average' (cf. e.g., 24). Of particular interest for this essay is the way he evokes a temporal dimension (as well as the spatial externalization common to the above-mentioned critics):

3 Joseph Masco, in *The Future of Fallout, and Other Episodes in Radioactive World-Making*, asserts: "Attending to fallout draws attention to emerging forms of violence across the Global North and South divide while challenging the temporal logics of settler colonialism and postcoloniality" (Masco 18).

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> In this conjunction [intergenerational equity/justice], we find the evocation of 'our children and children's children' in whose interest we forego nuclear power (at the same time as offering energy monopolists compensation), we limit our individual travel (at the same time as exporting more cars), and amortize debt (at the same time as exploiting the social assets of the classes who otherwise own nothing). (30, translation mine)[4]

The appeal to 'our children and children's children,' even if Lessenich distances himself from it, invokes a prevalent form of sentimentality.[5]

The nuclear collapses simple relations of externalization: Whilst the testing is pushed *outwards* to the boundaries for the technocrats of the respective imperial powers, this is not the direction of the radioactive interference in bodies. In *Slow Violence and the Environmentalism of the Poor*, Rob Nixon notes that "[c]hemical and radiological violence, for example, is driven *inwards*, somatized into cellular dramas of mutation that—particularly in the bodies of the poor—remain largely unobserved, undiagnosed, and untreated" (6, my emphasis). In "Interscalar Vehicles for an African Anthropocene," Gabrielle Hecht similarly notes the difficulties for Gabonese laborers in acquiring diagnosis, medical attention, or compensation (even as French laborers were able to), compounded by the lack of knowledge of the 'baseline' exposure in the Oklo uranium mine. Here, too, the effects are marginalized through the politics of the colony. As Nixon notes, "industrial particulates and effluents live on in the environmental elements we inhabit and in our very bodies, which epidemiologically and ecologically are never our simple contemporaries" (8).

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4 "Da [bei Generationsgerechtigkeit] geht es dann um »unsere Kinder und Kindeskinder«, in deren Interesse »wir« unter anderem auf die Atomkraft verzichten (dafür allerdings die Energiemonopolisten entschädigen), unseren Individualverkehr beschränken (dafür aber mehr Autos exportieren) und die Staatsschulden tilgen (dafür aber an das Sozialvermögen der ansonsten nichtbesitzenden Schichten ran) müssten." (Lessenich 30)

5 Interpellations to think of the coming generations such as this are often articulated in this particular way—that is, invoking children and grandchildren. As Naomi Klein points out in "The Right to Regenerate" (in *This Changes Everything*), her personal experiences with fertility issues led to resistance to these kinds of invocations: "[I]f I was going through a particularly difficult infertility episode, just showing up to a gathering of environmentalists could be an emotional minefield. The worst part were the ceaseless invocations of our responsibilities to 'our children' and 'our grandchildren.' […] [W]here did that leave those of us who did not, or could not, have children? Was it even possible to be a real environmentalist if you didn't have kids?" (423)

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In such cases, the inhabitants are rendered 'uninhabitants.' This is a term that Robert Nixon finds in Rebecca Solnit, and that Solnit draws from an interview with Janet Gordon (Nixon; Solnit, especially 154–55), predated, amongst others, by Terry Tempest Williams in her memoir *Refuge* (287). The term derived from the phrase "virtually uninhabited," which of course means that the lands *are* inhabited: The near-negative relation is tenuous, resting on the qualifier 'virtually.' The fallout—which, following Joseph Masco is inherent in the systems which give rise to it (i.e., it is not accidental), and which "formally links human actions, technological capabilities, atmospheres, and ecologies in a new configuration of contamination" (Masco 20)—produces instabilities. Cellular volatilities giving rise to cancer; intergenerational volatilities leading to infertilities and genetic variations; all in excess of baseline rates.

Nuclear imperialisms are not just *simply* extractive; they are also annihilative. And this extends, crucially, to thinking about extraction as it extends into the future. Masco brings the multiple valencies of the term 'fallout' to think about the future dimensions of nuclear entanglements. Fallout, he writes, is a term which "involves individual actions and lived consequences" that is "understood primarily retrospectively but lived in the future anterior" because, most crucially, "[f]allout comes after the event" designating "an unexpected supplement to an event, a precipitation that is in motion, causing a kind of long-term and unexpected damage" (19). Masco couples nuclear weapons with climate destruction—twinned threats that play out keenly in the (nuclear) Pacific (see for instance DeLoughrey)—as "industrially manufactured problems that […] colonize the future" (5).

At the same 'time': The duration of nuclear detonations itself (barely) occupies a relation to experienced time. As Masco argues, "all the nuclear detonations in human history—the 2,100 or so nuclear events that constitute an unprecedented human intervention into the biosphere, remaking both geological and human time—do not collectively add up to a single second of linear time" (285). This folding of extensive durations of fallout into events of such short duration that we might barely register them is also a recognition that relations of time and space are complicated by nuclear energy, as the quantum physics upon which nuclear entanglements are based might already suggest (cf. also Barad).

Cheryll Glotfelty, amongst others, has accordingly suggested that the aftereffects of nuclear detonations have been purposefully relegated to the future: "As the United States invested in nuclear power, little thought was given to what to do with the radioactive waste produced as a by-product of nuclear

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fission, the assumption being that new technology would arise to deal with the waste" (198). The reliance on a speculative, future technological fix is one that is not particular to nuclear incursions: Similar examples include geo-engineering fixes for climate change; faith in plastic-eating bacteria for plastic waste;[6] and, for most of the West, the narration of the early stages of the SARS-CoV-19 pandemic as a 'waiting-for-the-vaccine,' where the possibility of a vaccine was a *given*. As energy safety enters the political climate of Europe in 2022, and in a political climate given to considerations of climate *change* in other places (e.g., in Australia, with respect to coal extraction regimes), the future dimension of nuclear energies is somehow, again, conveniently bracketed out of considerations. Nuclear power(s) extract(s) not only from the 'ghost acres' or 'shadow places,' those marginalized places; its externalization is not only spatial but is, crucially, temporal. The elsewhere of nuclear power(s) thus becomes also an 'elsewhen.'

Mediating Futures in *Fallout 4*

This 'elsewhen' of nuclear extraction is projected onto the future. As Maurer and Hogue observe, "mainstream nuclear discourse has predominantly been interested in the future—specifically, a speculative, totalizing future dependent on the existence of nuclear war" (27). The future imagined in *Fallout 4*, indeed, in all of the games that comprise the *Fallout* series, which I now address, is predicated on a hollowing out of the nuclear present, and dependent on extractions from other times and places.

Attending to the future requires imagination. Our repertoires for the future are images in the speculative mode. This is the remit of SF, of postapocalyptic, utopian/dystopian, fantasy and other narratives and cultural artifacts that depart from more realist modes, of which computer games (set in the future) are one. Particularly the narrative and dramatic moments of some games establish relations to the future by explicitly telling and staging the story; the use of graphic representation and sound tracks embed these imaginations in representative forms; and the role of the player acts as a bridge between the

6 As Max Liboiron points out, plastic-eating bacteria would also eat the plastic we find useful: the buttons on my computer and my glasses, or as they suggest "the plastics in bridges, airplanes, automobiles, pacemakers, and buildings. Everyday infrastructure would be crumbling around us, like a B horror movie" (103).

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imaginary worlds represented, especially in the reception of shooter games in broader media contexts, troubles any easy distinction between the social intra- and inter-game worlds.

Fallout 4, released in 2015, is the fourth release in Bethesda Softworks' *Fallout* series. To date, it is the most recent release in the main titles segment of the *Fallout* line, though some spin-offs have been launched in the meantime. *Fallout 4* is primarily set around 200 years after a set of nuclear detonations have blasted the world. The player adopts an avatar who can partake in a number of quests—ostensibly to rescue their kidnapped son[7]—and/or can play around in the postapocalyptic landscape around Boston, Massachusetts, U.S.A.

Fallout 4 came to my attention in a seminar on Nuclear Cultures when a student recognized some of the tracks from the soundtrack to *The Atomic Café* (1982), which we discussed in class, as being also used in the computer game. We watched a short advertisement for the game in class: The proto-utopian hope of 1950s U.S. nuclear culture portrayed in some of the historical sequences of the documentary film mapped in interesting ways onto the world of the game. In addition to the soundtrack, the architectural and interior design of the computer game referenced, with little interference, the design choices of the 1950s in the U.S.A. (and elsewhere). Housing and domestic scenes of the game, as well as the billboard and other advertisements, seemed to be sutured with the postapocalyptic landscape, a kind of *The Truman Show* meets *I am Legend*, with sentimental overtones—as the trope of the kidnapped child might suggest. The documentary works through cognitive distancing and cognitive dissonance by, for instance, showing footage of Marshallese singing "You Are My Sunshine" just before showing footage of the bomb being dropped (a 'test'). In the game, such distancing emerges in the temporal marginalizations—at once referencing a past known to most of us[8] only through media and a future we cannot know.

The media used on the TV in the opening sequences of *Fallout 4* to tell stories that are, for most of us, most of the time, always medialized and mediated: war, testing, bombs, etc. For most of us, most of the time, these things happen elsewhere. The TV set that brings news of impending nuclear attack in the game acts as a portal and as a buffer. It transports images and sounds from faraway places, and, in doing so, seeks to contain these to the images and sounds

7 I am of the understanding that players can select the gender—binary—of their avatar and use the pronoun 'they' and derivatives to reflect this.

8 Well: to all of us in that particular seminar.

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presented on the set. The TV set reporting in *Fallout 4* as well as the radio announcements initially suggest the distance to the threat, and, if/when this no longer holds, its contain-ability. DeLoughrey uses the term 'isolate' to do this work, where she argues "[t]he concept of the closed system or isolate was tied closely to the colonization of islands and render[ed] them into nuclear laboratories" (172).

Contain-ability, or the 'isolate,' is a premise articulated in the opening sequences of the game, specifically through the figure of the vault salesman. A vault promises security, or at least storage (usually of things; in the game this is the body). In *Fallout 4*, this promise is only partially upheld, for the vault is breached by 'Institute' members who kidnap the protagonist's baby and kill their spouse, a sequence the protagonist is awake for but unable, for a time, to fully comprehend. The narrative of the game play is thus motivated by the sentimental topos of child separation. For Lauren Berlant, there is a particular "history of sentimentality around children that sees them as the reason to have optimism—for if nothing else, their lives are not already ruined" (171). The latter comes into its own when, later in game play, the reasoning for the capture is given: to retrieve the unspoiled DNA of the child (with the protagonist acting as a back-up repository in case of mistakes). So, whilst the vault protects the protagonist (and their family) from the effects of nuclear fallout, it is precisely this protection which renders them more vulnerable to biopiracy. Complete security, it seems, is a myth based on a faulty comprehension of containment. Against this—tenuous—premise, the world unfolds 200 years later, when the avatar is unfrozen from their 200-year hiatus.

It is possible to play *Fallout 4* by mucking around as a scavenger in a postapocalyptic future, or as, Megan Condis suggests with reference to *Mad Max* and *The Last Man on Earth*, as part of an "escapist fantas[y] about what it would be like to be entirely free of responsibility for each other, for society, for the planet" (187): The final consequences of misbehavior have already come to be—the apocalypse has come and gone. Thinking about the game in this sense is to entertain a dystopian fragmentation, where the destruction of the nuclear family through the nuclear threat ultimately sets the avatar into a world deplete of meaningful relations. However, this interpretation of the game rests, as Condis suggests, on ignoring the narrative arc. The extent to which this is upheld—by, for instance, forgoing the opportunity to collaborate with other characters of the postnuclear landscape in establishing (wait for it…) *settlements* replete with agricultural projects and energy producing machines—is the extent to which this world is purely a survival in the leftovers

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of a previous time. This kind of scavenging is a dwelling in and living through the waste of a previous time, without means of production. The absence of cooperation means the absence of production, rendering the avatar's play an entirely scavenged existence (not unlike the perpetual motion of the figures in Cormac McCarthy's *The Road*, or the TV series *The Walking Dead*), subsiding off the past's waste, in a wasted land.

Past Imaginings of the Future and Future Reconfigurations of the Past

As already mentioned, the soundtrack draws on bebop hits like "Atom Bomb Baby," songs of the kind that rhyme bomb with wigwam (exoticism leaning toward racism) or describe women in terms of their hotness (not too different to the lyrics of today, though this hotness is radioactive). At the same time, the visuals recollect the buildings built to test nuclear destruction in the region of Nevada, though transplanted to the normally more verdant northeastern region of the U.S. The 'return' to the 1950s is troubled, though, by other aesthetic/worlding decisions.

In the opening sequences of *Fallout 4*, the player is introduced to the prelapsarian world, a suburban setting of the nuclear family (cf. Flisfeder), replete with robot-butler Codsworth. Codsworth speaks with a decidedly English accent, thus seemingly enacting a strange nostalgia for imperial relations, imagined in a sentimental manner that paints Codsworth as a subservient and caring servant. Codsworth, further, acts as a micro case study in what might best be called 'retro-futurism,' for the robot looks much like what I (today) imagine people of the 1950s might have imagined future robots to look like: a looping of temporal imaginings that side-steps the present (except as the time of reception). Codsworth is not the only instance of "content that highlights nostalgia, irony, and time-bending dislocation" (434) as Elizabeth Guffey and Kate C. Lemay define retrofuturism. The above mentioned suburb, as well as large mainframe computers in the vault and other locations, gas stations or truck stops called "Red Rocket" replete with large signs,[9] even the power armor, similarly seem to recollect bygone imaginations of the future. Indeed, the premise of the quest—cyrogenetic freezing in a safely contained vault unaffected by

9 The symbolism somehow also seems to fold Elon Musk's and Richard Branson's fantastical space travel into the fossil fueled futurism of the 1950s.

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broadscale societal and environmental collapse—might be more representative of a past speculative future than most imaginations of the future from the mid-2010s (when the game was released) or the early 2020s (when I am writing this piece).

In this, the game engages in a lengthy displacement of the immediate past of the game world to a more distanced future. As Joe P. L. Davidson has argued of science fiction film,

> Retrofuturism [...] refers to the conscious use of a repertoire of images of technology, architecture and design, as well as intertextual references to other cultural artefacts, that are indexed in the cultural imaginary to the futurism of the mid-twentieth century with the aim of reinterpreting, recontextualizing and reworking the meaning of yesterday's tomorrows in the present. (731)

In the context of a game that plays out in a nuclear (past-)future, this has, I argue, the effect of hollowing out the (gameplay) present. The nuclear threat is configured as a *past* potential future, which may have come into being in the future depicted by the game world, but that necessarily and absolutely bypasses the present.

Aside from the renditions of the robot-butler Codsworth, of material goods (like houses, furniture, even food packaging, and posters), and the incorporation of a 'matching' soundtrack, a similar gesture of historical reconfiguration is evident on a different level of the game, namely the groups with which the player can affiliate the avatar to complete quests. Megan Condis gives a succinct summary of the directed or narrative gameplay storylines of *Fallout* 4 in her review:

> the player [is supposed to] choose between four possible sets of allies to guide the future of the Wasteland: the Institute, who use their futuristic technology to hide underground and who have developed (and enslaved) a robot army to do their bidding in the world above; the Railroad, a ragtag group of spies dedicated to freeing synthetic humans from the clutches of the Institute; the Minutemen, an alliance of small settlements providing safe haven and protection for residents of the area; and the Brotherhood of Steel, a militaristic group who are obsessed with gathering up and hoarding all the weaponry from the world that was. To complete the game, the player must choose a faction to align with and become its leader, work-

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> ing to fulfil its chosen mission, all while seeking the whereabouts of your kidnapped son. (185)

This is ultimately another, important, way in which historical context is (awkwardly!) folded into the ludic present of *Fallout 4*, itself set in a potential future.

Samuel McCready gives two of these groups (the Minutemen and the Brotherhood) more attention in his account, noting the conflict between the two versions of understanding the world are essentially mutually exclusive. McCready thus reads the imaginations of these groups as demonstrating the contingency of historical accounts of the U.S. more broadly: The speculative future draws on specific understandings of the past, somehow nearly entirely bypassing the present. An insistence on teleology is present in the inclusion of both groups, and, at the same time, as McCready points out, "there is no [United States of] America to salvage, for either group" (30).[10] The counterfactual imaginary at work in *Fallout 4* in the re-imagination of past historical factions reconfigures sets of people from the Civil War to consolidate a sense of U.S. exceptionalism, proliferating a particularly U.S. American version of history by resuscitating it. This aspect of the game insists on the persistence of specifically U.S. American histories that continue to inhabit the post-apocalyptic worlds, suggesting—simultaneously and also counter-intuitively—that these myths, in particular of U.S. exceptionalism, are hardy enough to literally survive the end of the world.

The Minutemen, aside from referencing the New England colonial militia that went by this name, are the group most invested in topside settlement (the Institute, another group, shifts underground).[11] Missions with, and for, this group often entail the construction of housing, farm plots, and securing settlements. The relation to the nuclear embodied by this group is a reiteration of settler myths, now set in the distant future, or as Masco suggests (not specifically of *Fallout 4*): "the American modernist story of self-invention via settler colonialism, the ability to always start over somewhere else, to break with the

10 "The world of *Fallout 4* challenges players to think about what has led them here to this nuclear hellscape; this includes considering how it is that myths of progress that so often get written into history actively contributed in making a future that was less stable (and ultimately decimated) precisely because it was ideologically monolithic" (McCready 31).

11 The name might also evoke the Minuteman Project—an anti-immigration group that 'watches' the Southern border. Thanks to Axelle Germanaz for pointing this out.

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past and begin anew, to escape fallout by simply relocating to a newly exciting frontier" (39).

The Brotherhood, another group, seems to be a thinly veiled metaphor for the military-industrial complex; convinced that controlling technology and stockpiling weaponry is key to domination. In a game like this, complete domination is desirable (and how you win); and destruction is a tool towards this. Affiliating with this group means dissociating from the violent premise of the game, with its near-complete destruction of the world. It requires a selectively edited understanding of history to pursue affiliation with this group with the goal of completing the game, as their goals perpetuate the problems that the story is predicated on. The violence of the past (and future?) is met with more violence. This storyline thus awkwardly echoes many of the dissonances that characterize living in a post-colonial world in the Anthropocene, entailing the capacity to ignore the externalizations of risk outlined earlier as well as the long-term consequences of material engagements with the world in favor of living the present.

The Railroad, even in their denomination, recollect the history of people working to redress the horrors of slavery, that is, the Underground Railroad. In *Fallout 4*, racial politics give way to species considerations, bringing cyborg or posthumanist thought to the kinds of politics that are entailed in histories of exclusion, domination, and exploitation. This group's aim is to free the Synths, synthesized humans 'grown' by the Institute from the DNA of the avatar's son, and who are kept as slaves. When Synths develop (too much) free will they are subject to a radical restart, a kind of social death; the Railroad seeks to help them to freedom.

The Institute is more amorphous, and at the same time the most retrofuturistic of the groups, with the architectural and fashion choices of this faction referencing (historical) science fiction films and/or futuristic spy movies, with some fans pointing to *Forbidden Planet* (1956) and others to *2001: A Space Odysee* (1968) to trace potential influences. The sometimes 'wooden' dialogue seems, in these sequences, to be deliberately on point, a caricature of the kind of films that portray long-gone versions of by-now outdated futures. The Institute has a much cleaner aesthetic than the desolate ruins 'topside': lots of white, clean lines, sweeping staircases, sleek elevators, and verdant plants. Its retro-futurism is clinical rather than ruinous, underscoring the divides between the cultural and physical worlds the different groups of the game inhabit.

At the same time, the ravaged topside world suggests there are limits to this exceptionalism. Pointing out the insertion of imagined bygone advertise-

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ments and billboards into the landscape of postnuclear destruction, McCready argues that "juxtaposition of happy consumer culture with total annihilation serves as its own critique of the kinds of excess that are at least in part responsible for the destruction that has been wrought" (25). For McCready, the counterfactual premise of *Fallout 4* reveals, amongst other things, the shortcomings of consumer culture to buttress individuals against destruction. The image he includes in his article "Playing the Past and Alternative Futures" shows a dull and rusting vending machine with two bright posters plastered on it, next to a "moldy box of illegible files" (25) and a fully articulated human skeleton.[12] *Fallout 4*, he argues, "reveals the tenuousness of the historical trajectory that proceeded from that mid-century moment until the present in its own altered futurescape, and makes a powerful claim against totalizing and revisionist attempts to reconstruct an ordered version of events" (26). In my interpretation, I turn to the very specific ways in which the phrase "the present in its own altered futurescape" (ibid.) skips over the player's present: the ways in which the game recognizes and represents the almost entirely absent presence of nuclear threat. Almost entirely, because one of the detonations is indeed shown, though its duration is comparable, if not shorter, than the countdown presented soon after that accompanies the avatar into their cyrogenetic freeze. Both are a-temporal events compressing radical interventions into the future's liveability (collectively, individually) into a manner of seconds, in a link back to Masco's observation about the accumulative duration of all nuclear detonations.

A Brief Conclusion

Fallout 4 excavates the present and all kinds of presences to locate 'the' nuclear in the past, in the future, in the past's imagination of the future ... anywhere but the here and now. In doing so, the game replicates fantasies of contain-ability;

12 The existence of fully articulated human skeletons and skeletal trees bereft of signs of life are not necessarily fanciful; they can be seen as indicative of the extent to which the critters that usually do the work of decomposition are not compatible with high levels of radiation. Kate Brown observes some scientists working in the larger region of Chernobyl as theorizing that "microbes, worms, larvae, and insects that normally break down organic matter were unable to work well in high levels of contamination (over 50 microsieverts)." (205)

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not a strong claim for a game predicated on the existence of a vault impermeable to nuclear fallout but not, it seems, so foreign to the military-industrial complex that probably built it in the first place. With its sentimental cues to the nuclear family (locating the kidnapped son is crucial to the narrative, particularly at the outset), and the 'innocent' aesthetics of the 1950s, both in the 'simply retro' and the retro-futuristic modes, the locus of the avatar is cushioned against the ravages of the world. And, yes, games tend to do this: We can, after all, repeatedly save gameplay and resume before some catastrophic decision or unforeseen consequence. This cushioning is, however, clearly predicated on an externalization of risk and, crucially, an extraction *from* the future. The liveability of the future is irrevocably based on our capacity to act ethically towards human, cyborg, and other livelihoods, both of our present and not.

The extent to which the liveability of 'our' current lives is also the un-liveability of other's current lives, and many people's future lives, is one of nuclear culture's entanglements in the present. Debates about energy crises have brought attention back to nuclear power. In Germany, this is a debate that also arises from Russia's invasion of Ukraine, with its various impacts on energy policy: A center (Russia) seeking to reassert itself in a (former) periphery (Ukraine) is not a speculative meandering around past problems, but transforms into a debate about the sustainability of energy production. The re-entry of Chernobyl to medialized debates concerning the potential weaponization of nuclear facilities, along with the reactors at the Zaporizhzhia plant, alarmingly show how tenuous the stability of nuclear generation can be. And, in France, the drying up of the Loire River in the summer of 2022 has been met with concern: The river and its tributaries provide water for the cooling of several nuclear facilities producing electricity (cf. Crellin). Lines of argumentation that render coal dirty and nuclear somehow clean neglect such very real (future) material impacts. With climate change, the future is closer than it once perhaps appeared. Nuclear energy has and continues to extract from the margins; and one of these margins is temporal: the—our—future.

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