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Chapter 5

A 'Necessary Sacrifice:' Industrialization and American Indian Lands

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The understanding of society as autonomous from nature is a distinctive idea of industrialization. It represents a paradigm shift that has utterly altered social relations and, as we are now learning, natural order as well. One writer has summarized the shift in the following manner: "the idea of nature as animate and living, where species seek to realize their own natural ends, has been replaced by the idea of . . . mechanical nature . . . The modern mind has come to view nature as nothing more than matter-in-motion, whether planets, projectiles, or even animals" (Oelschlaeger, 1991: 77). In this construction, society is portrayed as standing outside of, rather than within, nature. The animate character of society is assumed to be self-provided, with nature merely representing the inanimate context of social development. In this regard, industrialization is not only a technological or economic phenomenon, but a cultural and political orientation as well.

The historical requirements of industrialization have institutionalized a development structure in which the physical environment is valued either for its raw materials or for its ability to absorb industrial wastes. Within the logic of industrial society, value derives from the "efficiencies" gained for production and use through the transformation of materials found in nature into items of market exchange. This process is not socially or ecologically neutral, instead producing environmental degradation and social inequality as necessarily functional elements.

It is important to recognize that while the outward form of this process has taken on various guises over time, the underlying needs

of the system have remained constant. The earliest phases of the industrial era required mainly the raw 'inputs' of nature, i.e., the deposits of coal, iron ore, petroleum, and other resources available to those societies up to the challenge of acquiring and exploiting them. As industrial society expanded its reach and power, however, individual mines, estuaries, and other discreet 'parts' of nature proved to be insufficient. Instead, the sacrifice of entire landscapes and ecosystems became necessary. Various regions of the world became scrap heaps, serving to remind society that progress entailed certain costs that, while significant, were necessary for the realization of a greater social good. Costs were, of course, not limited to the degradation of water bodies, the atmosphere, or landscapes; social conditions and structures were also included in the calculus of profit and loss.

The appetite of industrial society for development grew from 'resource use' to alteration of what had hitherto been considered permanent processes and structures of nature. In this respect, contemporary industrial transformation both embodies and supersedes its ecological antecedents. Acidification of the rains, for instance, is an outcome of typical industrial processes of extraction and exploitation, i.e., the mining and use of coal, petroleum and other fossil fuels. Yet, it also reflects a scale of industrial activity in which an elemental process upon which all organic life—the evapo-transpiration cycle—is altered to suit industrial needs. While breathtaking in its scope and reach, acid rain, with its attendant possibilities for widespread forest, soil, and freshwater degradation, is simply the latest stage in an historical process of industrial development.

The indigenous cultures of North America offer a point of departure for an analysis of the industrial conception of social and ecological relations. A common view promulgated by European cultures is that indigenous peoples wandered "perpetually in scattered bands, grubbing out marginal subsistence from hunting and gathering without developing serious appreciation of art, science, mathematics, governance, and so on" (Churchill, 1986: 15). In this view, it was the obligation of European culture to civilize the indigenous. This cultural stereotype set in motion European efforts at assimilation, which, in part, centered on the education of indigenous communities regarding the principles and practices of capitalism. Policies of removal and relocation to reservations, allotment, and reorganization are taken to represent variations on one or the other of these efforts.

In North America, the industrialization of the continent involved not only the spread of mechanical modes of production, but also a cultural assault on the nature-society relations that had organized American Indian communities for centuries prior to European invasion. This cultural assault had an explicit ecological strategy—to spoil the free gifts of land, water, fire, and animals to the point where Indian life itself is endangered. The 'civilization' stereotype used by Europeans to justify this cultural assault expresses the racism that informed North American industrialization. But a full understanding of the takeover of the continent by a machine culture and a surplus-based political economy requires parallel attention to the ecological strategy that implemented North American 'civilization.' Indeed, we suggest that the cultural and ecological elements of industrial civilization of the continent are expressions of a common process—the industrialization of society *and* nature. U.S. policies of the last two hundred years toward American Indians and the ecologies that these communities stewarded into the contemporary era are used to illustrate a consistent and continuing attempt by an evolving industrial civilization to pursue the logic of its expansion at the expense of Indian culture and ecology. It is our conclusion that U.S. exploitation of Indian communities and the continent's ecology over the last two hundred years are expectable outcomes of essentially two 'faces' of the same phenomenon—the industrialization of reality (physical, social, political, cultural, and ecological).

Mining Indian America

According to Mumford, a machine culture rooted in European tradition and transplanted to the New World, became the foundation for a uniquely modern worldview. Mechanization, capitalism and a carbon power base combined to form a pattern of developmental relations that equated improvement of the human condition with the expanding production and consumption of goods (Mumford, 1934: 105):

> Happiness was the true end of man, and it consisted in achieving the greatest good for the greatest number . . . The quantity of happiness, and ultimately the perfection of human institutions, could be reckoned roughly by the amount of goods a society was capable of producing: expanding wants: expanding markets: or expanding body of consumers. The machine made this possible and guaranteed its success. To cry enough or to call a limit was treason. Happiness and expanding production were one.

In the transformation of the "good life into the *goods* life" (Mumford, 1934: 105, italics in original), both human institutions

and the natural environment were reorganized in accordance with the pervasive principle of quantification and the goals of material.

The emerging industrial order that Mumford described in the 1930s was indeed able to produce goods at an unsurpassed rate. But this surplus production exacted a price for its result: a pattern of unequal development accompanied by widespread environmental degradation. In the new social order, society and nature were simultaneously drawn into a process of industrialization in which the ultimate end in all aspects of life was to produce. Indeed, a defining feature of industrial culture is that there can never be enough. As one writer has noted (Daly, 1991), industrial civilization has no rational understanding of an optimal limit for economic growth—it is utterly incapable of stopping industrial expansion. The environment offers a seemingly endless supply of natural resources for industrial growth: land, timber, minerals, metals, and a variety of energy sources all valued for their ability to increase industrial production. As the machine culture spread, the world was divided in two parts, machine areas and non-machine areas, areas of production and areas of supply. According to Mumford, 'advanced' societies were seen as those that were organized in compliance with the quantification principle, exploiting nature's endowments and transforming them into industrial products (1934). But this political economy depended upon the expansion and reproduction of unequal development, such that no place or culture was immune to the central imperative of exploitation.

This beginning of industrialization is dominated by the products and operations of the mine (Mumford, 1961: 158):

> The animus of mining affected the entire economic and social organism: this dominant mode of exploitation became the pattern for subordinate forms of industry. The reckless, get-rich-quick, devil-take-the-hindmost attitude of mining rushes spread everywhere: the bonanza farms of the Middle West in the United States were exploited as if they were mines, and the forests were gutted out and mined in the same fashion as the minerals that lay in their hills … And the damage to form and civilization through wasteful expenditure remained, whether or not the source of energy disappeared.

The establishment of territorial colonialism over American Indian communities occurred in this earliest stage, as industrial mining—not only of minerals, but timber, soils, and water—propelled the European takeover of the continent. The incompatibility of the machine culture with the land-based tradition of American Indians was readily apparent (Ulysses S. Grant, quoted in Takaki, 1979: 171):

> The building of railroads, and the access thereby given to all the agricultural and mineral regions of the country, is rapidly bringing civilized settlements into contact with all tribes of Indians. No matter what ought to be the relations between such settlements and the aborigines, the fact is they do not harmonize well, and one or the other has to give way in the end.

Initial European relations with American Indians were established through formal treaties between tribes and the U.S. government, the aim of which was to secure land and resources in exchange for both money and social services (education, health, welfare, etc.) The lands left in Indian hands as part of treaty agreements were designated as tribal reservations. The establishment of reservations served dual purposes during this period. On the one hand, Indian tribes were effectively removed from the possibility of controlling any of the continent's vast resources. At the same time, reservations provided the means for U.S. efforts to manage and "educate" Indians in the habits of industrial society. A central feature of Indian policy during this period was assimilation: "[Indians] would be required to learn and practice the arts of industry until at least one generation had been placed on a course of self-improvement" (Takaki, 1979: 187).

The needs of industrial society soon outgrew this mode of Indian/non-Indian relations. European population and economic growth in the 19th century occurred on an unprecedented scale, creating an insatiable demand for exploitable resources. The pressures of growth combined with other trends to heighten non-Indian demands for land. These complementary trends included burgeoning settlements in eastern urban areas, expansion of the railroad across the continent and the opening of canals and waterways and new developments in agricultural technology, which enabled the cultivation of greater farm acreage. As well, the industrializing economy required ever-greater amounts of timber as both fuel and building material, and access to minerals and energy for increased industrial production. All of these conditions translated into a heightened conflict between the needs of the surplus economy and Indian sovereignty.

Forced migration of eastern Indian tribes was officially enstated with the Indian Removal Act of 1830 to address the conflict of industrial and Indian ecology. Indian communities stood in the way of industrial progress and Indian tenure of lands had to be removed. In his analysis of this period, Barsh (1988) suggests that the impetus behind the policy of Indian removal was largely to restart the nation's economic engine during periods of recession. Railroad companies and timber and mining industries were the principal

recipients of tribal land cessions. As an official of the Missouri, Kansas and Texas Railroad explained to the U.S. Congress at the time, "[Y]ou, then, Gentlemen must hold the scales fairly and equally between the parties before you—the railroad on the one hand, and the Indians on the other" (quoted in Takaki, 1979: 174). The centrality of the railroad system to the industrializing nation assured the proper response.

By 1840, 420 million acres of land, or 22% of the continental area was secured from Indian tribes for an average of 7.4 cents an acre (Barsh, 1988: 819). The Indian treaties had served their purpose and it was now possible to turn to new strategies of industrialization. And while U.S. Congress unilaterally ended the era of treaty making in 1871, the westward expansion of the industrial political economy ensued. The U.S. government strengthened its assimilationist strategy by instituting an aggressive land and minerals acquisition policy. The General Allotment Act of 1887, also known as the Dawes Act after its sponsor Senator Henry Dawes, furthered the assimilation strategy by dividing sections of communal tribal lands into individual parcels and distributing them as private property to tribal members. Significant parts of the communal lands, which remained after allocation to tribal members, were sold by the federal government. The Dawes Act was publicly justified as an effort to further the Indian cause by instituting a system of private property and individual initiative. As Commissioner of Indian Affairs T. Hartley Crawford stated (quoted in Takaki, 1979: 189):

> Unless some system is marked out by which there shall be a separate allotment of land to each individual … you will look in vain for any general casting off of savagism. Common property and civilization cannot co-exist.

While civility may have served as the official explanation for the Dawes Act, the result was to transfer 90 million acres of Indian land and its resources to non-Indian holdings for development. By the end of the 19th century, American Indians had lost half of their lands by U.S. policy design (Kelley, 1979: 32). The shrinking of Indian culture through assimilation and Indian ecology ("common property") through industrial takeover went hand in hand. The ideological passage from a commons idea of nature to a mining idea, and from industrial civilization to Indian ghettoes as official policy—this is the seamless path from industrial culture to industrial ecology in its early expression in the U.S.

As the demands of industrial society continued to grow, policies regarding the disposition of American Indian lands changed.

Mineral leasing was inaugurated and presidential executive orders were used to remove certain lands from Indian control (Kelley, 1979: 31-33). Manufacturing was becoming the leading economic sector in the U.S. economy, and correspondingly, the demand for coal, oil, and other minerals was growing rapidly. The mineral abundance that lay on Indian lands was known since the 19th century, and knowledge of its existence influenced the character of subsequent Indian policies.

In 1891, "[b]ecause the minerals were going to waste from the dominant society's perspective, Congress authorized mineral leasing of tribal and allotted lands" (Ambler, 1990: 37). The authorizing or leasing agent was not the tribe itself, but rather responsibility was placed within the federal government through the construction of a trusteeship role. The idea of trusteeship was, of course, extraordinary (and offensive) on a number of levels. The racism embedded in the idea is obvious. But it should be noted that official U.S. policy not only presumed the inferiority of American Indian culture, it also asserted the superiority of European ecological beliefs that justified mining, industrial-scale agriculture, massive canal and dam based redesign of watersheds, and colossus-sized urban agglomerations of people and machines. The repeated complaint of the U.S. government and its industrial elite was not only that Indians were un-European, but that their ideas about the land and its biology contradicted the core conceptual underpinnings of industrialists.

U.S. trustee policy unleashed a flurry of mining activity in Indian country and set the course for development on Indian lands. As early as 1894, the Oklahoma Territory was producing approximately 130 million barrels of oil per year,[1] and 39 corporations were extracting an average of 1.5 million tons of coal per year in the Choctaw Nation alone (Ambler, 1990: 35). Indeed, the wealth of minerals and energy resources, which lay underneath much of existing Indian reservations, and the battle for control of them, became the foundation for what eventually resulted in the separation in U.S. law of land surface rights and mineral rights. The stakes of this conflict did not escape the tribes or the U.S. government: as Interior Secretary Carl Schurz suggested in 1881, "there is nothing more dangerous to an Indian reservation than a rich mine" (quoted in Ambler, 1990: 32).

The Indian Reorganization Act of 1934 formally ended the period of allotment and assimilation. Section I of the Act stipulated that "no land on any Indian reservation . . . shall be allotted in severally to any Indian" (Prucha, 1990: 222). A principal component of the Act

[1]The Ambler volume incorrectly reports the Territory's production as 130 *billion* barrels in 1894.

was the reorganization of tribal governments, which hereafter were to be the only "officially" recognized governing bodies of American Indian tribes. These newly formed tribal councils would be responsible for "economic planning, mineral lease negotiating and approval and other governmental commitments" (LaDuke, 1983: 10).

The organizational form of these tribal governments was drawn, not from tribal tradition or custom, but by Congressional directive. A primary accomplishment of this reorganization was to standardize American Indian governance structures, and specifically, as Churchill notes, to "replicate corporate directorates" (Churchill, 1986: 16). In addition, the U.S. Department of Interior retained ultimate authority over Indian development policies, ensuring that tribal governments would not interfere with industrial exploitation on shrinking Indian lands.

While the 1934 Indian Reorganization Act is commonly described as heralding an era of self-determination for Indian communities, in fact the impact of the newly dictated economic and technological institutions on Indian tribes was devastating. The authorization of a national Bureau of Indian Affairs (BIA) preempted Indian political development and created the tools for state suppression of Indian dissent, down to the community level. In this phase, Indian ecology and culture were disrupted on a scale that has endangered Indian life itself.

Sensing this result, U.S. policy in the 1950s terminated federal Indian tribal status. This effort continued through the 1960s when termination as a formal policy was rolled back, in part because of growing non-Indian embarrassment. The end of termination, however, has not put a halt to the acquisition of Indian resources. New forms of exploitation continue and involve 'royalty agreements' negotiated by trustee agents of the U.S. government on behalf of tribes and approved by the tribal councils created under the 1934 Act. The grossly deficient level of compensation realized under these agreements is well documented. Between 1959 and 1975, for example, the Navajo Nation received approximately 15 cents per ton on coal sales of approximately 2.6 billion tons. During the same period, more than 300 million barrels of oil were taken out of Navajo lands and sold for $2 billion as crude oil and $100 billion as refined products. For this, the Navajo Nation received approximately $700 million in royalties, bonuses, and rents from the energy companies (Steiner, 1983: 35). The pattern of abusive agreements has changed little since the 1950s. In the mid-1980s, for instance, Indians were receiving 3.4% of market value for their uranium, 6% for oil, 11.3% for natural gas, and about 2% for coal.

These royalty amounts were substantially lower than royalty rates paid to non-Indians for the same minerals (Churchill, 1986: 16).

Across the numerous policy regimes, from assimilation to self-determination to negotiation, a consistent pattern of exploitation has prevailed. American Indian tribes and lands were recognized by Euro-American culture almost exclusively in terms of commodity value. As Gedicks remarks, "[h]istorically, one of the most stable investment areas" for corporate interests "has been Indian lands" (1998: 274).

A Necessary Sacrifice: Indian America versus Nuclear America

The U.S. government's decision to pursue the development of a nuclear weapons and, later, to demonstrate a peaceful nuclear alternative through the supply of electricity, signaled a new era for Indian country. With this decision, a large segment of the Indian population was inextricably bound up with a technology capable of disrupting social and ecological relations on an unprecedented scale. As with the era of carbon power, Indian involvement was not a matter of choice, but the result of political geology: Indian communities lived atop the mineral seams of the uranium fuel needed to power the new technology and, therefore, were literally in the way of progress.

Over 60% of all known U.S. domestic deposits of uranium are on Indian lands (Churchill, 1986: 16). Most of these deposits are located on the southern edge of the Colorado Plateau, an area encompassing significant portions of Arizona, Colorado, New Mexico, Utah, and Wyoming. Parts of South Dakota also have significant resources and in 1976, a Bureau of Indian Affairs (BIA) report listed uranium as one of the many "mineral resources" on Wisconsin Indian lands. Since 1948, the mines of the Colorado Plateau have produced over 95% of the nation's uranium, first exclusively for nuclear weapons, and after 1954 for the "Atoms for Peace" commercialization program (Gilles, 1996). Until nuclear plant orders ceased in the late 1970s, 80% of the uranium mining and 100% of uranium processing took place on Indian lands (Allen, 1989: 887).

The advent of uranium mining, milling and enrichment on Indian lands ushered in an era of what Churchill and LaDuke have called "radioactive colonialism" (1986). Whereas the "old colonialism" used territorial conquest and clearance to accomplish industrial culture's aims, the new colonial era sought dominion over Indian lands to facilitate technological advance. The aim of radioactive

colonialism had less to do with maximizing the economic value of uranium ore *per se*, than with establishing a technological system of electric generation that would be "too cheap to meter" (Lewis Strauss, quoted in Byrne and Hoffman, 1996: 11). System imperatives for 'efficient' nuclear power-generated electricity would take precedence over everything, including even the survival of Indian families and the inhabitability of Indian lands.

In this stage, the assimilative and regenerative properties of a nuclear power system became paramount and were promoted over those of communities and natural environments. Technological reality needed to supersede social and natural reality. The Indian communities and natural environments originally drawn into the operations of the U.S. nuclear power system would come to depend upon the elaboration of that very system for their safety and future viability.

The first American Indian experience with the disruptive effects of nuclear technology involved the mining of uranium. While the Navajo Nation was opened for the mining of minerals in 1919 under an 1872 law, mining for uranium began in 1948 under the supervision of the U.S. Atomic Energy Commission (Chenowith, 1997: 268). The mining and fabrication of nuclear fuels in the Colorado Plateau produced a variety of hazardous byproducts to which Indian miners and workers in fuel processing plants were exposed. Indian communities adjacent to these operations were put at radioactive risk from exposure to residual ores and radioactive wastewater, which accumulated and was be stored in mill tailing ponds. Large-scale accidents involving these wastes began to occur in the 1960s and continue to the present, threatening human and biotic life on Indian lands.

On June 11, 1962, 200 tons of radioactive mill tailings washed into the Cheyenne River, an indirect source of potable water for the Pine Ridge Reservation. Eighteen years later, the Indian Health Service announced that as a result of this accident the well water at the reservation community of Slim Buttes contained gross alpha levels at least three times the national safety standard. A new well proposed to replace the old one tested at 14 times the national standard. Federal aid was needed to secure replacement water supplies. However, the BIA stipulated that the replacement water "could only be used for consumption by cattle" (Churchill and LaDuke, 1986: 59).

In July 1979 a dam that formed United Nuclear's uranium mill tailing pond at Church Rock, New Mexico, broke under pressure and released more than 100 million gallons of highly radioactive water into the Rio Puerco River. According to Churchill and LaDuke, "although United Nuclear had known of cracks within the

dam at least two months prior to the break, no repairs were made (or attempted). 1,700 Navajo people were immediately affected, their single water source contaminated beyond any conceivable limit" (1986: 58). The Church Rock spill is the largest leak of radioactive liquid in U.S. history (Gilles et al, 1990: 3).

In 1980, over 140 miles of normally dry washes in the Grants Uranium District of northern New Mexico flowed year-round with radioactive mine wastewater. The wastewater was discharged from the District's mines and milling operations (over 100 of the former and five of the latter) in lieu of containment ponds. Concentrations in this water of uranium, selenium, cadmium, lead, and other toxic materials often exceeded natural levels by 100 times. Drainage from uranium mine waste rock piles in the District included concentrations of these hazardous substances often 200 times greater than natural levels (Gilles et al, 1990: 3).

The accidents endured by these communities were only one legacy of radioactive colonialism. As American Indians have learned, contamination is a necessary and functional part of the ordinary operation of nuclear fuel production. The Kerr-McGee mine at Church Rock routinely discharged 80,000 gallons of radioactive water from its primary shaft per day, contamination that was introduced directly into local and downstream potable water supplies (Churchill and LaDuke, 1986: 58).

Even after operations cease at a specific site, the radioactive threat often continues. Thus, the Lost Orphan Mine in the Grand Canyon continued to emit 26,280 millirems of radiation per year after it closed in 1969. This compares with normal background emissions for the area of 150 millirems per year, which is itself somewhat higher than the national average (Gilles et al, 1990: 4). The nuclear industry has also left in its wake thousands of abandoned mines, tons of unprotected and unsecured mine waste and millions of gallons of waste liquid in largely untreated mill tailing ponds (Gilles, 1991: 3):

> 40 years of mining, milling, and transporting uranium ore on the Colorado Plateau, along with the testing of more than 900 nuclear weapons above and below ground since 1952, have brought radioactive contamination to the Plateau's water, air, and soil. Since the 1950s, thousands of unregulated uranium mines that supplied the mills have been abandoned on federally and privately owned lands, on pueblo lands, and on lands belonging to the Navajo, the Utes, the Paiutes, and the Hopi—along with hundreds of thousands of tons of radioactive uranium mill tailings.

The long-term burden associated with this legacy is now becoming clear. Since as early as 1975, groundwater contamination at

numerous New Mexico mill tailing dumpsites has been evident. Two sites—Homestake-Milan and United Nuclear's Church Rock—have shown severe enough groundwater damage to merit listing on the U.S. Environmental Protection Agency's (EPA) Superfund National Priority List, a nationwide list of the most severely polluted lands in the country. EPA investigations near the Homestake-Milan site demonstrated dramatically increased levels of uranium, radium, chloride, molybdenum, nitrate and selenium. The 1975 analyses of groundwater in residential drinking water wells downstream of the mill showed selenium concentrations up to 3.42 mg/l—more than 300 times the maximum recommended for drinking water (Robinson, 1998). Extensive groundwater contamination at the UNC-Church Rock was first detected in 1979, soon after the mill reopened following repair of the dam wall. Significant levels of chloride, sulfate, nitrate, radium, and thorium were among the many elevated constituents detected in either alluvial or bedrock aquifer systems. Both sites have undergone groundwater restoration for at least twenty years, long after demolition of the mill facilities and closure of surface reclamation of the tailings piles. It is anticipated that remedial treatment will be required well into the 21st century (Robinson, 1998).

The health effects of uranium-related activity on local communities have also been substantial, affecting both those who directly participated in the extractive and milling process and those who did not. For example, 38 of the 150 Navajo miners who worked in the Ship Rock shaft between 1952 and 1970 had died of radiation induced lung cancer by 1980. Another 95 had contracted serious respiratory ailments and cancers by that year (Churchill, 1986: 27-28). But the threat to human health spans well beyond the experience of Indian mine workers. Indian communities throughout the Colorado Plateau are routinely at risk from the simple, necessary act of drinking water. As Donald Fixico states, "[I]n a cyclic manner, mining has come back to harm Native Americans yet again, for radiation from uranium mines has contaminated Indian miners and the drinking water where they live" (1998: 200). The U.S. government has been slow to act even on the most obvious and direct human harm from its commitment to nuclear power—the diseases and loss of life suffered by Indian miners. Despite the fact that in nearly every other occupation associated with the nuclear cycle, Congress long ago imposed health and safety standards. As Peter Eichstaedt notes, "[N]early two decades after the mining began and only after deaths began to mount among the miners did

the government impose radiation exposure standards on the uranium mines—in spite of relentless opposition from mining companies" (1994: xvi). Finally, in 1990 Congress recognized the extraordinary threat to Indian miners' lives caused by the national commitment to nuclear power. In passing the Radiation Exposure Compensation Act (RECA) the Congress declared that (U.S. Congress, 1990):

> The Congress finds that . . . radiation released in underground uranium mines that were providing uranium for the sole use and benefit of the nuclear weapons program of the United States Government exposed miners to massive doses of radiation that produced an epidemic of lung cancer and respiratory diseases among the miners . . . Congress recognizes that the lives and the health of uranium miners and of innocent citizens . . . were sacrificed to the national security interests of the United States, and Congress apologizes to these citizens and their families on behalf of the Nation.

Yet, RECA is at best a partial response to the legacy of radioactive colonialism. First, RECA has been selectively applied. While more than 2,700 harmed Navajo miners and their relatives have registered with the tribe's Office of Uranium Workers, only 242 have received compensation under the Act. One reason that less than 10% have received any assistance is the proof-of-employment requirement under the program. Unfortunately 'old timers' among the Navajo miners did not save check stubs or other documents to demonstrate that they had worked in the uranium mines and, as a result, are ineligible for compensation.

Second, the law addresses the loss of miners' lives but not the harmful effects suffered by their children. This is despite the fact that the children in uranium-based Indian communities are experiencing some of the highest levels of birth defects and physical traumas in the U.S. In a study conducted for the period 1969-70, the Navajo communities of Cameron and Grey were found to have rates for several defects and traumas that were five times the national average. A 1981 study, the last population-wide epidemiological research conducted in the uranium mining area of New Mexico, indicated that children growing up near the uranium mining towns of Shiprock, Farmington, and the Grants Uranium Belt had developed ovarian and testicular cancers at 15 times the national average and bone cancers at five times the national average (Gilles, 1991: 6; see also Wones, et al, 1995).

RECA also fails to account for other types of losses that can be associated with uranium activity. For instance, animal studies in the Grants Uranium District conducted throughout the 1980s found an uptake of radionuclides from forage and water was observed in the

muscle and organs (e.g., liver, kidney, and bone) of livestock that grazed in Ambrosia Lake and Church Rock areas. As a result, New Mexico health authorities recommended that the meat from animals raised in Ambrosia Lake not be eaten. In addition, cattle and sheep in Church Rock had significantly higher levels of uranium deposits in muscles and in organs than non-contaminated animals grazing in a control area (Lewis, et al, 2000).

While American Indians have been long-standing victims of uranium mining and milling operations, evidence is accumulating that adverse health effects from these industrial activities have migrated to populations and areas distant from the immediate extraction or production sites. Thus, Arizona's statewide birth defect rate between 1969 and 1990 was one-third higher than the national average (Gilles, 1991: 5). Regional water supplies have also been adversely affected due to radioactive contamination of the Colorado River. For instance, studies conducted in the 1980s found that many of the beaches in the Grand Canyon were contaminated with radioactive sand as a result of unregulated dumping into the Colorado River's tributaries, including the Animus, the Dolores, and the San Juan Rivers. Farther to the north, the U.S. Department of Interior concluded that contamination in the Madison aquifer, the principal regional water supply for the Dakotas, was "well beyond the safe limit for animals. Escape by infiltration into the water table or by breakout to stream drainages could cause contamination by dangerous levels of radioactivity" (quoted in Churchill and LaDuke, 1986: 60).

The degradation of Native lands, and increasingly the contamination of adjacent regions, has led to the characterization of radioactive colonialism as the "underside of an industrialism that has no regard for people or the earth" (Johansen and Maestas, 1979: 146). In fact, the national policy debate on this issue has assured that environmental and human casualties are the necessary price for nuclear progress. In 1972, in conjunction with studies of the national energy situation performed by the Trilateral Commission, the U.S. government sought to designate certain parts of the Dakotas, Montana and Wyoming as "National Sacrifice Areas." These areas were to be formally declared uninhabitable as a consequence of uranium mining and processing and the attendant waste produced. Other areas which had not yet been rendered a threat to life were also to be designated as sacrifice areas in the recognition that continuing efficient uranium mining and milling would eventually lead to uninhabitability (Churchill and LaDuke, 1986: 62; Johansen and Maestas, 1979: 141-166). The losses of

such lands to the demands of the nuclear technology system were to be treated as a normal cost of doing business. While in law no National Sacrifice Areas have been designated, Indian lands, after being subjected to 30-40 years of uranium mining and milling, have been transformed *de facto* into dangerous and unhealthy places that for non-Indians would be considered uninhabitable.

Long-Lived Injustice

American Indians continue to experience the consequences associated with the front end of the nuclear cycle. Yet even as they attempt to deal with the effects of mining and processing of uranium, the long-lived threats associated with the back end of the nuclear cycle, i.e., the disposal and storage of nuclear waste, promise that Indian communities will endure radioactive risks as far into the future as one can imagine.

The federal government's effort to establish a permanent high-level nuclear waste storage facility has included several policy initiatives intended to respond to ongoing delays at the permanent repository targeted for Yucca Mountain, Nevada. One such response was the establishment of the Office of the Nuclear Waste Negotiator (ONWN). Authorized under the 1987 Nuclear Waste Policy Amendments Act, the Office was directed to find a "State or Indian tribe willing to host a repository or monitored retrievable storage facility at a technically qualified site on reasonable terms" (42 U.S.C. 10242). The site would provide for 'temporary' storage of high-level nuclear waste until a permanent federal repository is available. The Office is empowered to negotiate with states and Indian tribes about the feasibility of a monitored retrievable storage (MRS) facility that would provide for the 'temporary' storage of high-level nuclear waste until a permanent federal repository is in operation. While the directive for the ONWN included both state and tribal governments, there is little doubt that the primary target has been tribal governments since public resistance to nuclear waste storage virtually guaranteed that no state political authority would consider such a project. Indeed, researchers have found that the ONWN has focused almost entirely on negotiating with American Indian tribal governments to act as hosts for the nation's high-level nuclear waste (Leonard, 1997; Schrader-Frechette, 1996).

In approaching the tribes, the Office has been careful to present proposals as 'economic development' opportunities of largely impoverished Indian communities. It has also been very careful to downplay the long-term dangers of high-level nuclear waste. Assisting the Office in its efforts has been the U.S. Department of

Energy (DOE), which had given the National Congress of American Indians almost $1 million in grants between 1986 and 1990 to encourage tribal government participation in nuclear waste disposal schemes (see United States Senate, 1997). The Office added to this incentive package by promising $100,000 with “no strings attached” to any tribe that would agree to consider temporary waste storage. If a tribe opted to offer a temporary nuclear waste dump, the waste would be transferred after 40 years to the permanent storage slated for Yucca Mountain (Hanson, 1995).

By May 1992, the Office had allocated 20 Phase I MRS planning grants of $100,000 each to Indian communities. Nine tribes then applied for the $200,000 Phase IIa grant, which involves further site study and community education. Four applicants received the funds. These four tribes subsequently applied for the $2.8 million attached to a Phase IIb grant, at which time final preparations are to be made and serious decisions are to occur about construction design and location. The Mescalero Apache tribe, whose reservation lies in southern New Mexico, was the first to sign up for the MRS program. According to Tribal President Wendell Chino, “The Navajos make rugs, the Pueblos make pottery and the Mescaleros make money" (quoted in Hanson, 1995). Tribal Council Vice President Fred Peso went a step further by framing the issue in terms that evoked traditional values and beliefs, saying that “the Mescaleros can bear this [waste storage] responsibility because of our strong traditional values that favor protection of the Earth. We can serve as reliable, trustworthy and responsible guardians of the nation's spent fuel” (quoted in Hanson, 1995).

Despite such reassurances, the debate over the proposed facility left the community deeply divided. Following a December 1995 agreement between a 33-member coalition of nuclear utilities and the Tribal Council, strong community opposition emerged. In an attempt to placate the opposition, a January 1996 referendum was held, and in a result that stunned the Council and the nuclear industry, a strong majority of tribal members voted to halt all further negotiations with nuclear utilities over hosting the proposed private sector temporary nuclear waste storage facility. In response to this defeat, tribal leaders put forward a second referendum. Through the use of what some observers, including New Mexico Attorney General Tom Udall, took to be “strong-arm tactics,” the initial vote was overturned and a majority voted in favor of continuing negotiations with the nuclear utility companies. Subsequent to this

public debacle, the consortium of utilities behind the initiative has gradually disintegrated and opposition in other parts of New Mexico, as well as within the Mescalaro tribe, has brought the project to a standstill. However, the divisions within the community remain—a legacy of injury that cannot have been surprising to the federal government.

The setback in New Mexico has not deterred at least some in the nuclear industry from their pursuit of Indian lands as the solution to the social and ecological risks embedded in the use of their technology. Some have simply re-focused their efforts on the Ghosute tribe of Skull Valley, Utah. Even more than the Mescalaro, the Ghosute community is emblematic of the sacrifices required by Indian America in the name of industrial and nuclear progress.

The Goshutes have inhabited the Southwestern part of the United States for thousands of years. While numbering about 20,000 at their peak, today there are less than 500 Goshutes, 124 of whom belong to the Skull Valley Band and reside on the 18,000 acre Skull Valley Goshute Reservation. South of Skull Valley, on traditional Goshute territory, are the Dugway Proving Grounds where the United States government developed and tested chemical and biological weapons. In 1968 chemical agents escaped from Dugway and approximately 6,000 sheep and other animals died. At least 1,600 contaminated sheep were buried on the Reservation by the Government, where they remain today. East of Skull Valley, in the area known as Rush, is a nerve gas storage facility for the United States government, which, in turn, sits astride the world's largest nerve gas incinerator. Only recently constructed, the incinerator is designed to destroy thousands of tons of the most deadly chemicals ever fashioned by mankind. South of Skull Valley lies the Intermountain Power Project that provides coal-fired electrical power primarily for California. Air pollution from the power plant fills the skies of the western desert, deeply impacting the Skull Valley Reservation. Northwest of Skull Valley is the Envirocare Low-Level Radioactive Disposal Site that handles radioactive waste for the entire country. Also within the immediate area of the reservation are two hazardous waste incinerators and one hazardous waste landfill. Finally, north of the Reservation is the Magnesium Corporation plant, a large production facility that has been identified by the US EPA as the most polluting plant of its kind in the United States (www.skullvalleygoshutes.org). Chlorine gas releases from the plant also impact the Skull Valley Reservation. According to tribal leadership, the Skull Valley Tribal Government and people

were never once consulted during the siting process for any of these facilities (www.skullvalleygoshutes.org).

Spearheading the MRS effort in Skull Valley is Private Fuel Storage (PFS), the sole purpose of which is to develop a temporary site for the storage of spent nuclear fuel for the utility industry. PFS's members include American Electric Power, Consolidated Edison Company of New York, Dairyland Power Cooperative (Minnesota), Southern California Edison, GPU Nuclear Corporation, Xcel Energy (formerly Northern States Power), Illinois Power Company, and Southern Company. Together, these companies serve over 50 million electricity users.

The history of the Skull Valley facility parallels that of the Mescalaro tribe. According to the project's supporters, from 1992 until 1995, the leaders of the Band carefully accumulated data and traveled to various parts of the United States and the world to examine first hand all aspects of storage of spent nuclear fuel under the MRS Program. In the words of the Tribal leadership, "[I]n view of the current hazardous waste facilities and nerve gas incinerators surrounding the Skull Valley Reservation, the Band has carefully considered a variety of economic ventures, including the storage of spent nuclear fuel. After careful consideration, the Skull Valley Band of Goshutes have leased land to a private group of electrical utilities for the temporary storage of 40,000 metric tons of spent nuclear fuel" (www.skullvalleygoshutes.org).

Again, however, opposition to the project has arisen both inside and outside the community. Utah state officials, for instance, have made no secret of their opposition. The Governor's Office has fought to keep the facility out of the state arguing that "[W]e know the citizens of Utah are behind us. We know a majority of the Legislature is behind us. We will not consider the business of this Legislature complete until we have bills to stop nuclear waste from coming to Utah" (*The Salt Lake Tribune*, February 28, 2001). The Governor seems to have been correct in his estimation: in the waning days of the 2001 legislative session, the Utah state legislature passed a bill designed to, in the words of the bill's author, "put roadblocks in the way of the project" (Associated Press, March 1, 2001). Under the bill, PFS would have to put up as much as $150 billion in cash for reparations in case of an accident before the waste could enter the state. The bill was drafted by the Governor's staff and passed by the Legislature by a vote of 60-12 (Associated Press, March 1, 2001).

Significant opposition has also arisen within the Band. In this case, however, the politics has taken on a divisive personal tone. According to LaDuke (1999: 106):

Tribal politics are tough at Ghosute, as on most other reservations. The numbers are small, so it's usually a few families or a family who end up with the most influence. When the tribe voted on whether to consider the PFS dump, half the participants walked out of the meeting. Those who remained voted in favor of the tribe.

The divisions and animosity resulting from the PFS proposal are reflected in the words of one tribal member, who observed, "it is family against family now. [The pro-PFS advocates are] punishing the people who are against them" (quoted in LaDuke, 1999: 106).

The stakes in this phase of challenge to the cultural and ecology identity of American Indian communities are profound. Legally sanctioned processes of the U.S. government now target Indian communities for what must be known inescapably—in pursuit of industrial society, governments, industry and the majority community in the U.S. plan to risk Indian life and lands permanently through the insertion of radioactive wastes into the 'everyday' of all the future days of communities who inhabit this region. The only escape is to abandon the land and, possibly, to sacrifice community life itself.

Conclusion

Occupied by technological 'inhabitants' who *normally* pose carastrophic risks (Perrow, 1984), and who threaten life-affirming uses of natural environments, American Indian lands have continually been locations of what Jacques Ellul has termed "technological invasion:" "technique can leave nothing untouched in a civilization. Everything is its concern … [I]t is a whole civilization in itself" (1964: 125-126). When the Havasupai Tribe of northern Arizona recently saw one of their most sacred sites turned into a uranium mine operated by United Nuclear Corporation (Gilles, 1991: 9), what was inconceivable in one culture-ecology relation became an unexceptional transaction of a mature industrial culture-ecology relation. In this regard Ellul's warning needs to be understood as cultural and ecological: to be modern is to risk natural environments and the human communities living in a steward relationship with them. Non-technical human cultures *and* natural ecologies are being subjected to technical invasion in the modern era.

Embedded in the conflict between Indian and non-Indian communities over the past two centuries has been the struggle for cultural and ecological identity in the face of industrialization. To a great extent, the demonstrated ability of technological society to threaten Indian cultures by transforming ecologies on which cultural identifies depend offers a concrete case of the nexus between social,

environmental and ecological injustice. The historical experience of American Indian communities is a prelude of what can be expected systemically. Rather than a story of local sacrifices of specific landscapes and communities, we may learn through Indian struggles for the land about the historical narrative of "ecological imperialism" (Crosby, 1986) that is a defining feature of contemporary industrialization.

The environmental degradation of American Indian lands and the harms imposed upon Indian people over the last 200 years are best understood as an integral part of the history and politics of U.S. industrial progress. As the ideas and institutions of technological civilization achieve worldwide hegemony, the history of Indian peoples in North America are being reproduced on a global scale (Churchill and LaDuke, 1986: 73):

> Ultimately, the Lagunas, the Shiprocks, Churchrocks, Tuba Cities, Edgemonts and Pine Ridges, which litter the American landscape, are not primarily a moral concern for non-Indian movements (although they should be). Rather, they are pragmatic examples, precursors of situations and conditions, which, within the not-so-distant future, will engulf other populations.

"[I]n the final analysis" argues LaDuke, "the survival of Native America is fundamentally about the collective survival of all human beings. The question of who gets to determine the destiny of the land, and of the people who live on it—those with the money or those who pray on it—is a question that is alive throughout society" (1999: 5). A political economy of society-nature relations that seeks to engage the issues of injustice on cultural and ecological scales will be guided by this question. Indeed, the practical value of political economy will be measured by the actions it informs in light of its consideration of this question.

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