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Resource and Environmental Justice Issues with Crow Butte Uranium Mining Expansion Plan

Review of the U.S. Nuclear Regulatory Commission Office of Nuclear Material Safety and Safeguards 2018 Environmental Assessment for the Marsland Expansion Area License Amendment Application, available at https://www.nrc.gov/docs/ML1810/ML18103A145.pdf.

The environmental injustice presented here is that the Crow Butte uranium mining expansion plan that is being proposed in Marsland, Nebraska, by Cameco Corporation has great potential for environmental harm that will disproportionately negatively affect the residents of the Pine Ridge Reservation. The environmental impact assessment put forth by the U.S. Nuclear Regulatory Commission and Cameco Corporation claims that there will be little environmental impact and no environmental injustice as a result of the expansion because the impacts on the Native American peoples in the vicinity of the mine will be small. Approving the Crow Butte in-situ uranium recovery expansion into Marsland, Nebraska, is an unwise use of economic resources because there is currently no need for further uranium mining and old uranium mines in the U.S. need to be restored; and is an environmental justice issue because the proposed uranium is contained in an aquifer, Indigenous groups are experiencing health problems due to uranium mining, and the Oglala Lakota people are not equipped to handle uranium contamination. This environmental injustice is important because uranium contamination is very dangerous when it reaches groundwater, but has not gained enough attention from the U.S. government to create effective legislation to prevent harm due to uranium contamination. In addition, Native American communities all over the western U.S. have been subject to health problems due to uranium contamination for almost a century, and further damage should be prevented.

Arguments:

<u>There is No Economic Need to Expand Uranium Mining</u>

The Crow Butte uranium expansion plan is an unwise use of economic resources because there is currently no need for expanding uranium mining. Nuclear energy is in decline in the United States, with operating nuclear reactors in the U.S. decreasing in number from 99 to 89 by 2025, and the remaining number could be halved by 2034. Meanwhile, only one new reactor is being proposed (Ferguson et al., 2017, 3-4). Outside the U.S., the decline in nuclear reactors is global and every country is closing reactors with the exception of China. For example, Germany is planning on closing all its reactors by 2025 (Ferguson et al., 2017, 3-4). In addition, renewable energy technology is continually improving, causing

U.S. wind power to grow over nine percent in 2017 and solar power to grow between ten and 20% every year (AWEA 2017, v; U.S. Energy Information Administration, 2018). The 2017 growth in wind is part of a long-term trend, demonstrated by the fact that wind has comprised 30% of all U.S. energy capacity additions from 2007 to 2017 (U.S. DoE, 2017a). Other countries are experiencing similar wind growth, with wind providing 48% of Denmark's energy and 30% of Ireland and Portugal's energy (U.S. DoE, 2017a). Due to advances in renewable energy, nuclear is now the most expensive power option in the U.S., costing 14.8 cents/kilowatt hour while solar costs 5c/kwh and wind costs 4.5 c/kwh (Lazard, 2017). There is simply no demand for expanding mining operations when nuclear energy is in decline.

Objection: Cameco Corporation, the owner of Crow Butte, stated that expansion plans will be developed, "as market conditions warrant" (Cameco Corporation, 2018b). They claim that they have a positive long-term outlook for the uranium industry, and that there is demand for nuclear energy as a clean and safe energy option (Cameco Corporation, 2018e).

Market conditions do not support Cameco expansions of uranium mining efforts, demonstrated by Cameco's financial struggles in recent years. Cameco has been closing other uranium mines such as McArthur River and Key Lake in Canada, which was previously the world's largest uranium operation, but has been closed indefinitely as of July 2018. Cameco has also closed the Smith Ranch-Highland mine in Wyoming, which effectively ceased production in 2016 (Cameco Corporation, 2018c; Cameco Corporation, 2018d). As a company, Cameco has been involved in expensive tax battles with both the American IRS and the Canadian CRA (Market Wired, 2017; Federal Court, 2017). These have not only cost Cameco money and time, but have illustrated tensions between the company and the American and Canadian governments. Finally, Cameco has had financial struggles recently due to low uranium demand, with a net loss of $205 million in 2017 and a calculated 36% chance of bankruptcy (Cameco Corporation, 2018a; Macroaxis, 2018). These conditions indicate that Cameco is struggling as a company and does not currently have the capacity or demand for a mine expansion, but is attempting to make up some of its financial losses with an expansion. Licensing a mine expansion to a company that is experiencing such financial difficulties is a risky decision that would reflect poorly on and be costly for the government if Cameco failed.

The United States Has a Poor Uranium Remediation Record

The Crow Butte uranium expansion plan is an unwise use of resources because the U.S. has struggled to restore uranium mines in the past. Old uranium mines have yet to be restored, with the U.S. currently containing 4,225 known abandoned and unrestored uranium mines that it purchased and the EPA only having enough funds to begin assessing, but not cleaning, 219 of the 523 abandoned uranium mines on Navajo Nation alone (U.S. DoE, 2017b; U.S. EPA, 2018b). Currently, there are only 11 active uranium recovery sites in the United States, making abandoned and unrestored mines 99.7% of the total uranium mines in the U.S. (U.S. NRC, 2018b). This proportion further illustrates the dramatic decrease in mining activity throughout recent history. In addition, no federal legislation exists regarding the responsibilities of companies in restoring their completed uranium mines. The Atomic Energy Act does not extend to uranium mining process, only the refining process (U.S. EPA, 2018c). As a result, restoration is designated as the responsibility of the individual states, Bureau of Land Management, and companies (U.S. EPA, 2018c). In this case, the states will not have consistent legislation and companies will attempt to close mines with as little remediation as possible. In 2018, the EPA decided not to pass an Obama-era regulation proposal requiring hard rock mining operations, including uranium operations, to prove that they have the funds to clean up their mines before the EPA licenses them. Without this legislation, mining companies can go bankrupt or simply abandon their mines, leaving the federal government no choice but to use taxpayer money to stop any contaminants from leaking out of the mines (U.S. EPA, 2018a).

Objection: In the expansion environmental impact assessment, the U.S. Nuclear Regulatory Commission states that Nebraska legislation requires that, "any mineral exploration hole activities affecting land resources of the State shall ensure restoration to a condition consistent with the land use existing prior to the exploration" and that surface reclamation such as "revegetation and recontouring" will occur (U.S. NRC, 2018a, 4-1, 4-5).

Current regulations are not enough to ensure proper restoration because federal legislation is non-existent and state legislation is vague and sparse. The Marsland expansion's proximity to South Dakota opens up the potential for contamination across state lines. If contamination from Marsland leaves Nebraska, the consequences will be Crow Butte's responsibility, as other states cannot regulate mines that are not within their boundaries (Cameco Corporation, 2018f; National Research Council, 2012, 227). In addition, Cameco has not yet remediated any of its three U.S. uranium mines and the lack of federal legislature on uranium cleanup has caused the federal government to be uninvolved in this process, leaving it up to state legislation (U.S. EPA, 2018c). When contamination crosses state lines, the legislation could be mismatched and cause bureaucratic issues with enforcing cleanup. In addition, the "revegetation and recontouring" mentioned in the Nebraska restoration law is not an urgent restoration step like addressing water contamination, and the environmental impact assessment does not address aquifer or water contamination because the impact is predicted to be "small" (U.S. NRC, 2018a, 4-5). Finally, the "land use existing prior to the exploration" referenced in the environmental impact statement in this case is land unused for any human purpose, so the end restoration goal here is very vague (U.S. NRC, 2018a, 4-5). Both federal and state legislation do not effectively prevent uranium contamination or ensure restoration.

Contamination of the Ogallala Aquifer

The Crow Butte uranium expansion plan is an environmental justice issue because the proposed uranium is contained within an aquifer, which is a part of the greater Ogallala Aquifer. Because the uranium is contained within an aquifer, it creates the risk of uranium contamination of neighboring aquifers due to the aquifer bordering faults (U.S. NRC, 2018a, 3-10, 3-14). In this location, the risks of contamination in this aquifer are threefold: secondary porosity in the form of joints and faults, thinning and pinching confining layers of non-porous rock, and perforations made by improperly cased or capped wells (LaGarry, 2018, 2). In addition, the environmental impact assessment refers to the geology of the aquifer by the wrong stratigraphic name, calling it the Basal Chadron Sandstone Formation, rather than Chamberlain Pass Formation, indicating the statement's fundamental misunderstanding of the area's geology (U.S. NRC, 2018a, 3-34; LaGarry, 2018, 4). An environmental impact statement must demonstrate knowledge of the geology of the area to effectively assess the risks associated with undertaking a new project.

Objection: Cameco Corporation claims, "in all its years of operation, Crow Butte has never polluted a neighbor's well or contaminated waters downstream" (Cameco Corporation, 2018b). In addition, Cameco is, "committed to discharging water responsibly in the areas we operate to ensure that risks to the receiving environment comply with and move beyond legal and other requirements" (Cameco Corporation, 2016).

Cameco has not claimed responsibility for contamination at Crow Butte, but private well testing has indicated that the levels of uranium above EPA standards found in Pine Ridge Reservation groundwater is sourced from decades of mining at Crow Butte because the reservation is downstream of the mine, the secondary porosity of the surrounding rock allows for movement of contaminants, and there is a physical pull of water from the mine to the reservation (U.S. NRC, 2015, 4; USGS, 2014, 1). In addition, Crow Butte has violated regulations in the past, such as when they were forced to pay Lancaster County, Nebraska, $50,000 for releasing drilling water above the ground every day from 2003 to 2006,

possibly contaminating surface or groundwater in the area (State of Nebraska, 2008, 1-4). The fine was paid and the releasing practices were stopped, but remediation practices were not put in place, even though the release occurred for three years and took two more years to address. Cameco has also contaminated water in other sites the past, for example in Port Hope, Ontario, where 1.7 million cubic meters of arsenic and uranium contaminants were leaked from Cameco's nuclear conversion facility and reached Lake Ontario (French, 2008; Cameco Corporation, 2010, 62-63; Pitkanen, 2017, 99). This history of contamination and evasion of restoration efforts makes claims that Cameco does not contaminate water unreliable.

Native Americans are Experiencing Health Issues due to Uranium Contamination

The Crow Butte uranium expansion plan is an environmental justice issue because Indigenous groups such as the Navajo are experiencing health issues due to uranium mining such as decreased autoimmune function, lung cancer, kidney disease, decreased reproductive function, and bone cancer, the effects of which are not limited to mine workers, but extend to people living near old mines. Some Navajo communities have high uranium levels in 27% of studied people's urine, while the U.S. average is 5% (U.S. EPA, 2014, 1-2; Arnold, 2014, A44). Health costs due to uranium miner deaths were estimated to be between $22.4 million and $165.8 million annually from 1955 and 1990 (Jones, 2014, 291). Today, as cancer and other health problems afflict contaminated people, the annual cost contuse to be in the millions of dollars. Lakota women on the Pine Ridge Reservation are experiencing reproduction issues stemming from previous uranium mining. While there has always been poverty at Pine Ridge, the reproductive issues did not begin until uranium contamination was documented (Hoover et al., 2012, 1646). These health issues will continue to be prevalent if these people are subjected to more uranium contamination.

Objection: The mining which is currently affecting the Pine Ridge Reservation is primarily from defense-related mines commissioned by the U.S. government during the Cold War (Jarding, 2010, 21). At the Geological Society of America 2011 Annual Meeting, it was reported that water with uranium content up to 60 ppb in surface water and up to 40 ppb in groundwater was found at Pine Ridge (EPA limit 30 ppb), but the GSA suspected that the uranium was occurring in water naturally (Botzum et al., 2011, 125).

There is not sufficient evidence of safety to allow the Marsland expansion because it is impossible for Crow Butte to report if it has already caused contamination because Cameco subsurface testing at the site has not occurred since before mining began (U.S. NRC, 2013, 1). The lack of recent subsurface testing may be a result of Cameco's reluctance to officially find contamination, as it would be expensive to deal with, as demonstrated when they have committed past contamination crimes. Therefore, only private well testing in the surrounding area can be used to determine contamination, since Cameco will not perform its own testing. In addition, Native Americans in the Northern Plains region experience a 40% higher cancer mortality rate than the general population and these effects could last for more than 1,000 more years and should not be subjected to more risk (Hoover et al., 2012, 1646). Additional contamination should not be risked because the effects of uranium contamination are widespread due to its ability to travel with groundwater and long-lasting, with uranium half-life being 245,000,000 years (Dewar, 2013, 470; Cheng et al., 2000, 28). These effects would be devastating to Indigenous peoples who must stay in one location on their reservation to preserve their cultural identity. As a result, moving away from contaminated water is not an option for many affected people.

The Oglala Lakota People are not Equipped to Handle Contamination

The Crow Butte uranium expansion plan is an environmental justice issue because the Oglala Lakota people of the area surrounding the proposed expansion area are not equipped to handle uranium contamination. Pine Ridge Reservation is the poorest reservation in the United States with a poverty level of 41.7% in 2016 (U.S. Census Bureau, 2016). It is also located in the poorest county of the U.S. and has

had an unemployment rate exceeding 70% since the 1980s (Pickering, 2000, 149). The health needs at Pine Ridge are met by one small hospital and two small clinics, and Oglala Lakota County is ranked 59th for overall health outcomes, 60th for quality of life, and 55th for clinical care of 60 South Dakota counties (University of Wisconsin, 2018). Finally, Native American tribes in the U.S. are sovereign nations, so the Oglala Lakota people in Pine Ridge are not protected by the same environmental laws to which the states are subject (BIA, 2018).

Objection: The NRC in the expansion environmental impact assessment concluded that the expansion, "would not result in disproportionately high or adverse impacts on minority or low-income residents on the Pine Ridge Indian Reservation" and that, "the overall impacts on environmental justice would be small" (U.S. NRC, 2018a, 4-45).

The environmental justice portion of the environmental impact assessment did not adequately assess the potential impacts to vulnerable populations because only risks to populations within a four-mile radius of the expansion site were assessed and the aquifer that could be contaminated, the Ogallala Aquifer, extends throughout Nebraska and into South Dakota and six other states, underlying 174,000 square miles of land (U.S. NRC, 2018a, 4-44; USDA, 2018; USGS, 2007). Therefore, the effects will far exceed the four-mile boundary addressed in the environmental impact statement. In addition, all types of uranium mining emit radiation, of which there is no safe dose, and other byproducts such as heavy metals, so no matter how small the contamination, there will be negative effects (Jarding, 2010, 4). In-situ mining pollutes groundwater by definition, which allows contamination to travel as far as the aquifer extends (Jarding, 2010, 12; LaGarry, 2016, 6). Additionally, the environmental justice issues with the Crow Butte mine are not only health-related, but also cultural, with the NRC failing to properly consult with the Oglala Lakota Tribe when renewing Crow Butte licenses, even though it sits on ancestral Tribe lands (U.S. NRC, 2016, 4). Finally, Cameco has deferred groundwater cleanup at its mine sites in 2009, 2010, 2012, 2013, and 2018, including a ten-year extension on groundwater restoration at Crow Butte in 2016, despite potential contamination's ability to continue spreading over the ten-year timeframe (U.S. NRC, 2017, 1-2). While Cameco continues to defer cleanup, the people of Pine Ridge will continue to experience the health consequences they have been subject to since the 1960s. It would not make sense to defer cleanup if there was no contamination to cleanup. Therefore, this indicates that Cameco is aware that remediation will be necessary and wishes to put off the cost to the future.

Citations:

American Wind Energy Association. 2017. Wind Energy Facts at a Glance. Available at https://www.awea.org/wind-101/basics-of-wind-energy/wind-facts-at-a-glance. Last accessed October 16, 2018.

Arnold, Carrie. 2014. Once upon a mine: the legacy of Uranium on the Navajo. *Environmental Health Perspectives* 122 (2): A44.

Botzum, Catherine J., Ejnik, John W., Converse, Kathryn, LaGarry, Hannan E., Bhattacharyya, Prajukti. 2011. Uranium Contamination in Drinking Water in Pine Ridge Reservation, Southwestern South Dakota. *Geological Society of America Abstracts with Programs* 5 (43): 125.

Bureau of Indian Affairs. 2018. Frequently Asked Questions. Available at https://www.bia.gov/frequently-asked-questions. Last accessed October 19, 2018.

Cameco Corporation. 2010. Annual Information Form. Available at https://www.sec.gov/Archives/edgar/data/1009001/000095012310030961/o60848exv99w1.htm. Last accessed October 19, 2018.

Cameco Corporation. 2016. 2016 Sustainable Development Report. Available at https://www.cameco.com/sustainable_development/2016/clean-environment/. Last accessed October 19, 2018.

Cameco Corporation. 2018a. Cameco Reports Fourth Quarter and 2017 Financial Results. Available at https://www.cameco.com/media/news/cameco-reports-fourth-quarter-and-2017-financial-results. Last accessed October 17, 2018.

Cameco Corporation. 2018b. Crow Butte. Available at https://www.camecoresources.com/business/crow-butte. Last accessed September 20, 2018.

Cameco Corporation. 2018c. McArthur River/Key Lake. Available at https://www.cameco.com/businesses/uranium-operations/suspended/mcarthur-river-key-lake. Last accessed October 16, 2018.

Cameco Corporation. 2018d. Smith Ranch-Highland. Available at https://www.cameco.com/businesses/uranium-operations/suspended/smith-ranch-highland. Last accessed October 16, 2018.

Cameco Corporation. 2018e. Supply & Demand. Available at https://www.cameco.com/invest/markets/supply-demand. Last accessed October 19, 2018.

Cameco Corporation. 2018f. Uranium Operations. Available at https://www.cameco.com/businesses/uranium-operations. Last accessed October 19, 2018.

Cheng, H., Edwards, R.L., Hoff, J., Gallup, C.D., Richards, D.A., Asmerom, Y. 2000. The half-lives of uranium-234 and thorium-230. *Chemical Geology* 169 (1): 17-33.

Dewar, Dale. 2013. Uranium mining and health. *Canadian Family Physician* 59 (5): 469-471.

Federal Court. 2017. Canada (National Revenue) v. Cameco Corporation. Available at https://decisions.fct-cf.gc.ca/fc-cf/decisions/en/item/233609/index.do. Last accessed October 16, 2018.

Ferguson, Michael T., Prabhu, Aneesh, Shipman, Todd A., Pastrich, Michael. 2017. What's The Future Of The U.S. Nuclear Industry? *S&P Global Ratings.* Available at https://www.spratings.com/documents/20184/1634005/Whats+the+future+of+the+US+nuclear+industry/ba011163-b2ef-49c0-adb5-4b73b0927346. Last accessed September 20, 2018.

French, Cameron. 2008. Update 2- Cameco pollutants may be seeping into Lake Ontario. Reuters. Available at https://www.reuters.com/article/cameco-contamination/update-2-cameco-pollutants-may-be-seeping-into-lake-ontario-idUSN2142634920080521. Last accessed October 19, 2018.

Hoover, Elizabeth, Cook, Katsi, Plain, Ron, Sanchez, Kathy, Waghiyi, Vi, Miller, Pamela, Dufault, Renee, Sislin, Caitlin, Carpenter, David O. 2012. Indigenous Peoples of North America: Environmental Exposures and Reproductive Justice. *Environmental Health Perspectives* 120 (12): 1645-1649.

Jarding, Lilias Jones. 2010. Uranium Activities' Impacts on Lakota Territory. Lakota People's Law Project. Available at http://www.cleanupthemines.org/wp-content/uploads/2013/11/URANIUM-IMPACTS-IN-LAKOTA-TERRITORY.pdf. Last accessed September 20, 2018.

Jones, Benjamin. 2014. What are the health costs of uranium mining? A case study of miners in Grants, New Mexico. *International Journal of Occupational and Environmental Health* 20 (4): 289-300.

LaGarry, Hannan E. 2015. Supplemental expert opinion regarding the renewal of ISL uranium mining (Crow Butte Resources) near Crawford, Nebraska. United States Nuclear Regulatory Commission

Official Hearing Exhibit. Available at https://www.nrc.gov/docs/ML1523/ML15239B075.pdf. Last accessed September 20, 2018.

Lazard. 2017. Levelized Cost of Energy 2017. Available at https://www.lazard.com/perspective/levelized-cost-of-energy-2017/. Last accessed October 16, 2018.

Macroaxis. 2018. Cameco Probability of Bankruptcy. Available at https://www.macroaxis.com/invest/ratio/CCO.TO--Probability-Of-Bankruptcy. Last accessed October 17, 2018.

Market Wired. 2017. Cameco reports second quarter results. Available at http://www.marketwired.com/press-release/cameco-reports-second-quarter-results-tsx-cco-2227862.htm. Last accessed October 17, 2018.

National Research Council, Committee on Uranium Mining in Virginia. 2012. Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia. National Academies Press.

Pickering, Kathleen. 2000. Alternative Economic Strategies in Low-Income Rural Communities: TANF, Labor Migration, and the Case of the Pine Ridge Indian Reservation. *Rural Sociology* 65 (1): 148-167.

Pitkanen, Laura. 2017. The state comes home: Radiation and in-situ dispossession in Canada. *Political Geography* 61: 99-109.

State of Nebraska. 2008. State of Nebraska v. Crow Butte Resources Consent Decree. Available at http://www.deq.state.ne.us/Press.nsf/23e5e39594c064ee852564ae004fa010/766b857b318fc04f862577a40055d242/$FILE/Crow%20Butte%20CD.pdf. Last accessed October 19, 2018.

University of Wisconsin. 2018. County Health Rankings and Roadmaps. Available at http://www.countyhealthrankings.org/app/south-dakota/2017/rankings/oglala-lakota/county/outcomes/overall/snapshot. Last accessed November 16, 2018.

U.S. Census Bureau. 2016. Pine Ridge CDP, South Dakota. Available at https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml?src=bkmk. Last accessed September 5, 2018.

U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. 2017a. 2017 Wind Technologies Market Report. Available at https://www.energy.gov/sites/prod/files/2018/08/f54/2017_wind_technologies_market_report_8.15.18.v2.pdf. Last accessed November 15, 2018.

U.S. Department of Energy, Office of Legacy Management. 2017b. Working Group Addresses Abandoned Uranium Mines. Available at https://www.energy.gov/lm/articles/working-group-addresses-abandoned-uranium-mines. Last accessed September 20, 2018.

U.S. Energy Information Administration. 2018. Renewables and Carbon Dioxide Emissions. Available at https://www.eia.gov/outlooks/steo/report/renew_co2.php. Last accessed September 20, 2018.

U.S. Environmental Protection Agency. 2014. Uranium and Radiation on the Navajo Nation: Your Health. Available at https://www.epa.gov/sites/production/files/2016-06/documents/atsdr_uranium_and_radiation_health_dec_2014.pdf. Last accessed September 5, 2018.

U.S. Environmental Protection Agency. 2018a. Financial Responsibility Requirements Under CERCLA Section 108(b) for Classes of Facilities in the Hardrock Mining Industry. Available at https://www.federalregister.gov/documents/2018/02/21/2017-26514/financial-responsibility-

requirements-under-cercla-section-108b-for-classes-of-facilities-in-the. Last accessed November 14, 2018.

U.S. Environmental Protection Agency. 2018b. Navajo Nation: Cleaning Up Abandoned Uranium Mines. Available at https://www.epa.gov/navajo-nation-uranium-cleanup/cleaning-abandoned-uranium-mines. Last accessed September 5, 2018.

U.S. Environmental Protection Agency. 2018c. TENORM: Uranium Mining Residuals. Available at https://www.epa.gov/radiation/tenorm-uranium-mining-residuals. Last accessed November 13, 2018.

United States Geological Survey 2007. Changes in Water Levels and Storage in the High Plains Aquifer, Predevelopment to 2005. Available at https://pubs.usgs.gov/fs/2007/3029/pdf/FS20073029.pdf. Last accessed November 15, 2018.

United States Geological Survey. 2014. Conceptual and Numerical Models of Groundwater Flow in the Ogallala and Arikaree Aquifers, Pine Ridge Indian Reservation Area, South Dakota, Water Years 1980-2009. Available at https://pubs.usgs.gov/sir/2014/5241/pdf/sir2014-5241.pdf. Last accessed November 12, 2018.

U.S. Nuclear Regulatory Commission. 2013. Expert Opinion from Dr. Louis A. Redmond of Red Feather Archeology. Available at https://www.nrc.gov/docs/ML1500/ML15006A301.pdf. Last accessed September 20, 2018.

U.S. Nuclear Regulatory Commission. 2015. Oglala Sioux Tribe's Supplemental Position Statement. Available at https://www.nrc.gov/docs/ML1512/ML15128A673.pdf. Last accessed October 17, 2018.

U.S. Nuclear Regulatory Commission. 2016. Oglala Sioux Tribe's Answer to Crow Butte's Petition for Review of the Board's Contention 1 Decision. Available at https://www.nrc.gov/docs/ML1620/ML16204A287.pdf. Last accessed September 20, 2018.

U.S. Nuclear Regulatory Commission. 2017. Request for Alternate Decommissioning (Groundwater Restoration) Schedule. Available at https://www.nrc.gov/docs/ML1701/ML17013A659.pdf. Last accessed October 19, 2018.

U.S. Nuclear Regulatory Commission. 2018a. Environmental Assessment for the Marsland Expansion Area License Amendment Application. Available at https://www.nrc.gov/docs/ML1810/ML18103A145.pdf. Last accessed September 20, 2018.

U.S. Nuclear Regulatory Commission. 2018b. Locations of Uranium Recovery Facilities. Available at https://www.nrc.gov/info-finder/materials/uranium/. Last accessed November 14, 2018.

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