



COUNTRY PROFILES

US Uranium Mining and Exploration

UPDATED WEDNESDAY, 18 DECEMBER 2024

Uranium mining in the USA today is undertaken by few companies on a relatively small scale. Uranium exploration is undertaken by many companies, often going over areas that were mined in the 1950s-80s.

Most US uranium-producing states are 'agreement states' vis à vis the Nuclear Regulatory Commission (NRC) and have authority to issue permits and regulate uranium mining and milling. The NRC's role is then minimal. In February 2015 Wyoming, the major uranium production state, passed legislation to make it an agreement state, along with all the other uranium-producing states. The NRC agreed to this in 2018. Five of the six operating uranium recovery facilities previously under NRC oversight are in Wyoming. Under a 2010 agreement the NRC collaborates with the federal Bureau of Land Management (BLM) on environmental assessment of mine proposals. A majority of US uranium production comes from Wyoming's Powder River Basin.

However, land access is partly controlled by the US government, and in 2011 the Interior Secretary issued an order banning new hardrock uranium mining in about 4000 square km of land in Arizona for 20 years, which sterilized 145,000 tU of known resources according to the Nuclear Energy Institute (NEI) and also much prospective ground. The industry contends that uranium exploration and mining here would not compromise the Grand Canyon watershed. The land is not within the Grand Canyon National Park or the buffer zone protecting the national park. The industry contends that the land withdrawal is not justified by information in the Interior Department's environmental assessment, and is an "arbitrary agency action" under the Administrative

Procedure Act, and that it fails to comply with the National Environmental Policy Act by failing to take the “hard look” at the withdrawal’s consequences that the US Supreme Court required in a unanimous 1989 decision. In March 2013 a US District Court judge declined to overturn the mining ban, and in October 2014 the US District Court affirmed the ban (see [Nuclear Energy Institute comment](#)). This was then appealed, and in December 2017 the US Court of Appeals for the Ninth Circuit upheld the earlier decisions.

In January 2015 the Environment Protection Agency (EPA) proposed new health and environmental protection standards for uranium extraction including tighter groundwater quality and monitoring standards, under the Uranium Mill Tailings Radiation Control Act of 1978. The proposed standards address the increased use of ISL for uranium recovery in the USA. The proposed rule describes how ISL facilities are to characterize groundwater chemistry before commencing uranium mining. The rule would also require compliance with whichever standard is most stringent from the Safe Drinking Water Act, the Resource Conservation and Recovery Act, or the Uranium Mill Tailings Radiation Control Act for each of 13 groundwater constituents: arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, nitrate, molybdenum, radium, total uranium, and gross alpha particle activity. The final post-mining water quality would need to match the original, and be monitored for 30 years by the operator unless chemistry was satisfactory and stable over three years. The final standards will be administered by the NRC.

US Uranium Production, tonnes U

Company	ISL operations, hard rock mill	2013	2014	2015	2016	2017	2018
Cameco	Smith Ranch - Highland, WY	646	815	556	358	118	0
Cameco	Crow Butte, NE	272	227	152	89	29	0
Uranium One	Willow Creek, WY	362	217	45	23	38	0
Ur-Energy	Lost Creek, WY	51	211	280 drummed	216 drummed	98 drummed	110 drum

Company	ISL operations, hard rock mill	2013	2014	2015	2016	2017	2018
				(301 captured)	(207 captured)	(102 captured)	(116 capti
Peninsula/Strata	Lance, WY (Ross unit)	0	0	0	49	44 drummed	55
UEC	Hobson - La Palangana, TX		10	4	0	0	0
EFRC (Uranerz)	Nichols Ranch, WY	0	77	105 (66 after acquisition)	129	100	54
EFRC (Mestena U)	Alta Mesa, TX	?	0	0	0	0	0
EFRC	White Mesa mill + third party	388	362	114	262	138.5 + 365.5	136 163
Total		1796	1919	1256	1126	931	564

* Willow Creek figure by subtraction from EIA total, pending company report.

Mining and exploration projects

Conventional (non-ISL) uranium mining is resuming in the USA after some years (though Cotter Corporation produced 38 tonnes U through its 400 t/day Cañon City mill, Colorado in 2005).

In 2016 the EIA estimated that US uranium resources were 25,400 tU recoverable at \$78/kgU, 64,000 tU at \$130/kgU and 139,500 tU at \$260/kg. Estimated reserves for mines in production were 6167 tU at <\$130/kg. The resource data is consistent with slightly older data in the 2016 edition of the 'Red Book'.

The following outlines active exploration endeavours and production. Most of this is in areas previously mined in five Midwestern states and southern Texas. In 2017 the US Geological Survey pointed to an estimated 15,000 tU in calcrete in the

Southern High Plains, from eastern New Mexico across north Texas to Oklahoma. This is the first uranium-bearing calcrete identified in the USA (cf. Australia and Namibia) and it is relatively shallow.

Energy Fuels – EFRC

Energy Fuels Resources Corporation (EFRC, a Colorado-based subsidiary of Energy Fuels Inc of Toronto) is the largest US uranium mining company (after Cameco). In April 2012 EFRC agreed to take over all Denison Mines' US assets and operations, including the White Mesa mill, in a C\$106 million merger. In August 2013 Energy Fuels took over Strathmore Minerals in a C\$29 million deal. Korea Electric Power Co. (KEPCO) was the largest shareholder in both companies. It supported the takeovers and held 9.6% of the expanded EFRC company (as well as retaining equity in Denison). KEPCO's long-term offtake agreement with Denison Mines was assigned to EFRC as part of the June 2012 takeover of Denison's US assets. In December 2013 EFRC entered into a strategic relationship with KEPCO as its largest shareholder, focused on development of the Wyoming projects and uranium supply. At the end of 2016 KEPCO equity in EFRC was transferred to KHNPCanada Energy Ltd.

In June 2015 EFRC completed its \$150 million takeover of Uranerz Energy Corp. Its takeover of Mestena Uranium was finalised in mid-2016.



White Mesa Mill (Energy Fuels)

EFRC claims a licensed capacity of over 4400 tU per year, and says it has the capability – with improved uranium prices and the receipt of additional permits – to produce about half of that on a sustained basis. However, in 2016 it produced 129 tU from Nichols Ranch and 262 tU through the White Mesa mill, including 164 tU from the Pinenut project. In 2017 it produced 100 tU from Nichols Ranch and 504 tU through White Mesa.

EFRC has a number of mines in Utah and Colorado that contain substantial high-grade vanadium resources, including the Whirlwind Mine and the La Sal Complex straddling the Utah-Colorado border about 120 km north of White Mesa, and where it has received government approvals for an expansion.

Uranerz Energy Corp, which became part of Energy Fuels in mid-2015, received an NRC materials licence for its Nichols Ranch ISL operation in the Powder River Basin of Wyoming in July 2011, and its final state approval in October 2012. Production commenced in April 2014, with loaded resin being trucked to Cameco's Smith Ranch plant for recovery, under a toll processing agreement. The initial plant capacity is 300 tU/yr. EFRC built its own elution plant, which was commissioned and licensed early in 2016.

EFRC has NI 43-101 compliant resources of 6060 tU at about 0.1% U in seven Uranerz deposits, including measured and indicated resources of 1137 tU for Nichols Ranch itself, 860 tU for Hank, and 1100 tU for West North-Butte. The company added the contiguous Jane Dough permit area, with 1052 tU, to the Nichols Ranch project, and this was fully permitted by the NRC in March 2017. It will be followed by Hank as a satellite operation, and the BLM issued approval for this in mid-2015. The Uranerz North Reno Creek property east of Nichols Ranch was sold by EFRC to UEC in 2017 for \$5.4 million, with 1650 tU measured and indicated resources at 0.048 %U grade.

EFRC's main pending development projects in 2015 were Sheep Mountain WY, Roca Honda NM, and Bullfrog in the Henry Mountains complex of Utah. Other EFRC mines would "remain on standby until [market] conditions improve." However, in 2016 Canyon mine (now Pinyon Plain mine) in Arizona was being promoted as an early prospective start-up – see below.

The White Mesa mill in southeastern Utah (near 'Four Corners'), had been operated by Denison Mines for its own and purchased ore (the

company advertised its ore-buying programme), as well as doing some toll milling. The mill was built in 1980 and refurbished in 2007, with versatile licensed capacity of about 3000 tU/yr. It has produced over 17,000 tU from 125 different mines and over 20,000 t vanadium to 2019, with two types of feed: from Colorado Plateau, carnotite in sandstone; and from Arizona Strip breccia pipes, fine grain uraninite. It has an alternate feed circuit to process “other uranium-bearing materials, such as remediation wastes and those derived from uranium conversion and other metal processing,” which may be very high grade. Treatment of these may be separate, or blended in the primary leach circuit, and it has recovered over 550 tU from such sources since 2005. In addition it calcines UO₄ from Nichols Ranch. Some ore is hauled over 1000 km to the mill.

White Mesa also has a vanadium co-product recovery circuit, unused since 2013, but recommissioned and which restarted production in 2019. In the short term, EFRC expects to produce about 100 tonnes of vanadium pentoxide (V₂O₅) per month from uranium tailings from the La Sal mines. Beyond that, vanadium has potential as co-product from the company’s La Sal complex and Whirlwind mines on the Utah-Colorado border.

White Mesa produced 21% of US uranium over 2011-15. It produced 476 tU over 15 months to the end of 2013, with 700 t of vanadium oxide.* Some of its feed in 2013 came from Cameco’s Blind River tailings in Ontario. Production in 2014 was 362 tU, and 114 tU in 2015, of which 28 tonnes was toll processed for a third party. The company closed the mill in late 2015 on account of market conditions, while stockpiling feed to meet sales commitments in 2016. Production of 262 tU in 2016 was expected to come from stockpiled Pinenut ore (177 tU), stockpiled alternate feed materials (64 tU) and recovery from tailings pond returns (10 tU). Production in 2017 was 138.5 tU from EFRC’s existing tailings there and 365.5 tU from alternate feed materials on a toll processing basis, total 504 tU which is 54% of the US total for the year.

* During 2013 the White Mesa mill processed 18,370 t of Arizona 1 ore, 2,052 t of Pinenut ore, 11,181 t of Daneros ore, 41,782 t of Pandora ore, 40,669 tons of Beaver ore, and 8,894 t of purchased ore to produce 388 tU.

In 2020 EFRC arranged to import about 2000 tonnes of uranium-bearing material from Silmet, a rare earths processing plant in Estonia, for White Mesa. The material is tailings from tantalum-

niobium recovery, with uranium grade equivalent to US high-grade ores. In March 2020, EFRC joined Canadian-based Neo Performance Materials to launch a US-European rare earth elements (REE) initiative to produce value-added REE products from natural monazite sands, a by-product of heavy mineral sands mined in southeastern USA, especially Georgia. In March 2021 EFRC commenced production of a mixed rare earth carbonate extracted from natural monazite sands at the White Mesa mill. A portion of this REE carbonate production is shipped to Neo's REE separations facility in Sillamae, Estonia (Silmet). Neo then processes the REE carbonate into separated REE materials for use in permanent magnets and other REE-based advanced materials. EFRC retains the uranium recovered from the monazite sands. It is aiming to source 15,000 tonnes of monazite per year, which would utilize 2% of White Mesa's capacity and supply half of US demand for REE. US monazite contains about 55% REE, and about 22% of this is neodymium and praseodymium (light REE) and 8% heavy REE including dysprosium and terbium.

EFRC has several mines in the Uravan Mineral Belt on the Colorado Plateau (straddling the Utah-Colorado border) containing 2100 tU in placer deposits plus vanadium co-product (Uravan = uranium + vanadium). These La Sal Complex mines about 100 km northeast of the White Mesa mill comprise La Sal, Beaver and Pandora which are mature operating mines with extensive interconnected underground workings. The Rim mine is also here. In October 2012 EFRC said it would place Beaver and La Sal on standby, pending uranium market improvement and would finish mining at Pandora by mid-year due to depleted resources. EFRC's nearby Energy Queen mine in Utah was refurbished for 2008 reopening, and is licensed but not operating. EFRC is investigating whether to selectively target high-grade vanadium for mining in the La Sal complex.

EFRC's Henry Mountains deposits in Utah including Tony M, Southwest and Bullfrog have 4900 tU as indicated resources at over 0.2% and inferred resources of 3100 tU, both NI 43-101 compliant. All these are some 120 km west of the White Mesa mill. Denison began production from the Tony M mine in 2007, but late in 2008 put it on care and maintenance. The company was intending to spend \$35 million on the adjacent new Bullfrog mine, but it was put on hold in 2008.

EFRC's Daneros mine in southeastern Utah was the main asset of White Canyon Uranium which Denison bought for \$57

million in 2011. It has been mined since December 2009 and ore was trucked 100 km to the White Mesa mill for treatment and recovery of U₃O₈ product. Ore produced during the development phase was sold to Denison, and from there a three-year toll treatment agreement came into effect. JORC-compliant resource figures of 447 tU in 0.22%U ore were quoted in August 2010, and production is planned to be 227 tU/yr. In October 2012 EFRC put Daneros on standby, pending uranium market improvement.

In 2021 Vancouver-based Consolidated Uranium bought the Daneros mine, along with Tony M, Rim, and some Colorado properties. All are close to the White Mesa mill which will treat ore on a toll basis. As part of the purchase deal, EFRC acquired a 19.9% stake in Consolidated Uranium. In June 2023 work began to reopen the Tony M mine in the light of strong market conditions.

Denison also had four old mines in the Arizona Strip of north central Arizona, along with some new deposits there, though all these are some 500 km southwest from the White Mesa mill and some may be impacted by the Bureau of Land Management decision to stall developments near the Grand Canyon. The Arizona One underground mine resumed production in 2009, but known resources were depleted early in 2014, so it closed. Denison had applied for licences for its nearby Pinenut and EZ mines. Pinenut was mined in the 1980s and produced 200 tU then, with a shaft 410 m deep. EFRC brought the mine into production in 2013 but closed it in mid-2015 pending uranium price improvement. Ore from both mines was milled at White Mesa, as will be for that from Pinyon Plain/Canyon.

In Arizona, the Pinyon Plain mine, formerly Canyon mine, which was originally licensed in 1986 and fully permitted, has 936 tU as measured and indicated resources at 0.75%U (NI 43-101 compliant), with 5400 t copper at average grade 4.93%, increased by drilling undertaken into 2017. The development was on hold pending resolution of a dispute with the US Forest Service, and then pending an aquifer protection permit from Arizona Department of Environmental Quality. The surface facilities are complete along with shaft sinking to 443 metres. Ore will be trucked to the White Mesa mill. The mine is now prospectively EFRC's prime producer. Copper is a likely significant co-product, and metallurgical tests to optimize its recovery continued into 2018. Canyon will be the ninth breccia pipe deposit mined for uranium.

In 2015 EFRC subsidiary EFR Arizona Strip acquired the Wate deposit from Vane Minerals and Anfield Resources. It is a high-grade breccia pipe deposit like Pinenut, Pinyon Plain/Canyon and Arizona One mines. The company expected a mining licence by mid-2017 and anticipates processing production from Wate at its White Mesa mill. The deposit has 432 tU at an average grade of 0.67%U (NI 43-101 compliant) inferred resources. Also in Arizona, the EZ mine is subject to land use restrictions by the Bureau of Land Management (BLM). It has 810 tU as inferred resources.

EFRC's Sheep Mountain, Wyoming deposit has 11,700 tU measured and indicated resources at 0.1%U, including 7100 probable reserves. In 2009, Titan Uranium Inc bought Uranium One's 50% interest in it, and it then transferred to EFRC in a 2012 merger with Titan. Underground development took place in the 1970s. Titan undertook a prefeasibility study on mining the Congo open pit and underground, with heap leaching recovery, to produce 580 tU/yr. EFRC has updated this preliminary feasibility study for the whole project, and proposed development was in conjunction with Gas Hills, only 45 km north. The BLM was preparing an EIS for the project, with approval expected in mid-2016. The state mine permit for major expansion was issued in July 2015.

Strathmore had been working towards bringing its Gas Hills properties in central Wyoming into production, possibly in conjunction with Juniper Ridge, or with EFRC's Sheep Mountain nearby, or both. In mid-2017 these two deposits were acquired by URZ Energy Corp.

In New Mexico, Strathmore submitted a mining permit application in October 2009 for Roca Honda (then 60%-owned, with Sumitomo 40%) in the Grants mineral district. Original plans assumed that a new mill would be built, but the White Mesa mill about 180 km away in southeastern Utah is likely to be used. In June 2015 EFRC bought URI's partly-developed Roca Honda mineral properties adjacent to EFRC's (ex Strathmore) Roca Honda and then in 2016 bought out Sumitomo's 40% share for \$6.3 million, giving it full ownership. The company hopes to complete permitting in 2017 and has signed an agreement to buy Sumitomo's 40% share, giving it full ownership. Total measured and indicated resources are 6500 tU grading 0.41%U and inferred resources of 4300 tU grading 0.40%U (Feb 2016). Production potential is about 1100 tU/yr over nine years. The company hopes to complete permitting in 2017.

The merged company also has other projects in the Grants mineral district of New Mexico, including: Marquez with 3500 tU as

indicated resource, Dalton Pass with ISL potential and 1000 tU measured & indicated resource, and Nose Rock, deep in hard rock with 1160 tU measured & indicated resource. All these are NI 43-101 compliant. In November 2015 EFRC sold Marquez, Nose Rock and other small deposits in Arizona and Utah to Vancouver-based enCore Energy Corp.

Other EFRC Uravan mines operating in 2007-08 but then closed include Topaz, West Sunday and Sunday/St. Jude in the Sunday complex in Colorado. There are no plans to bring the other mine there, Van 4, into production. EFRC reopened the refurbished Whirlwind mine (including Packrat and Bonanza) following Bureau of Land Management and state approval, but put it on standby in 2009. It had 425 tU measured and indicated resources and 770 tU inferred resources. These properties were sold to Western Uranium & Vanadium Corp in 2014.

EFRC in March 2011 had received a Colorado state licence to build the new 330 tU/yr Pinon Ridge mill for ore from its northern Arizona mines, plus possible toll treatment, but this was overturned on appeal in June 2012, pending a further public hearing. The state's radioactive materials licence was reissued in April 2013, but plans were then put on hold, with the licence held in abeyance from 2014, and the project was sold to Western Uranium Corp. The company had been seeking \$140 million finance for the mill, which would also produce 1700 t/yr of vanadium oxide.

In June 2016 EFRC took over Mestena Uranium LLC, a private Texas company. Its Alta Mesa ISL plant in southern Texas was operating to the end of 2013 but is now on standby. It has about 385 tU/yr capacity and is understood to be a low-cost producer which could be brought on line as a third production centre for EFRC within six months. EFRC announced NI 43-101 compliant measured and indicated resources of 1390 tU and inferred resources of 6460 tU.

Production commenced at Pinyon Plain, La Sal and Pandora mines in December 2023 in the light of strong market conditions.

Western Uranium & Vanadium Corp.

In July 2014 Western Uranium Corp (formerly Homeland Uranium; since 2018 Western Uranium & Vanadium Corp) agreed to buy from EFRC some of its non-core assets including eight mining properties along the Colorado-Utah border and the licence for the Pinon Ridge mill (see above) for \$33 million. The former comprise the fully-

permitted Sunday complex, the Sage and Van 4 mines, the Wilhunt, San Rafael, Farmer Girl, Dun and the Yellow Cat projects. EFRC will get a royalty of \$3 per tonne on Pinion Ridge mill throughput, and one percent of sales. The mill was then held by Pinon Ridge Resources Corporation (PRRC), associated with Western Uranium, but in April 2018 the state revoked the licence. PRRC was reported to be deciding whether to appeal this or to apply for a new licence. In November 2019 the Colorado Court of Appeals ordered the Van 4 mine, inactive since 1989, to be closed and directed the company, Pinon Ridge Mining LLC, a Western Uranium subsidiary, to comply with reclamation requirements. Other 'zombie' mines inactive for more than a decade may be subject to similar orders.

In mid-2015 Western Uranium & Vanadium announced NI 43-101 compliant measured and indicated resources of 390 tU at 0.21%U and 735 tU inferred resources at 0.31%U for the Sunday mine complex covering the southern third of the Uravan mineral belt in Colorado. In June 2019 the company launched the Sunday Mine Complex Vanadium Project with the opening of the Sunday and St Jude mine portals to focus on high-grade vanadium ore, averaging 3.15%. When previously mined from 2007 to 2009 it yielded a 6:1 ratio of vanadium to uranium. In mid-2021 the company resumed mining activities at the Sunday complex and moved the project's operations base from the St Jude to the Sunday mine. Underground drifting to access the GMG orebody (part of the Sunday complex) commenced late in 2021.

In 2015 Western Uranium Corp took over Black Range Minerals Ltd in a \$14.5 million transaction, making it a subsidiary and acquiring the 11,500 tU Hansen and Taylor Ranch deposits in Colorado with 15,200 tU measured and indicated resources grading 0.053%U. Including inferred resources, the whole project has 35,000 tU grading 0.05%U. Hansen was licensed for mining in 1981, but stalled due to low uranium prices.

In mid-2019 the company reported 'historic' resources of about 27,000 tU, mostly at Hansen and Taylor Ranch, and 13,500 t vanadium grading 1.4-2.2%.

Black Range has a joint venture with Ablation Technologies LLC to commercialize its ablation mining technology (AMT), an ore beneficiation process. This is applicable to sandstone deposits where the uranium and vanadium occur as a patina around sand grains. It uses kinetic energy to abrade particles against one another without any chemicals, to detach the uranium and vanadium minerals. The resulting fine material is relatively high-

grade beneficiated ore comprising 85-95% of the uranium and vanadium in 10-20% of the original mass.

This 2015 JV agreement allows Western Uranium to utilize this technology at the Hansen-Taylor Ranch Project and at other projects. The merger terms with Western require Black Range to move an ablation pilot plant to its Sunday mine underground complex in southwest Colorado, bought from EFRC in 2014. A 5 t/h ablation unit is operating there, and a 20 t/h commercial-scale one was to join it by mid-2016. The company said: "Production tests indicate that the patented mining process could substantially reduce the cost of producing uranium concentrates from both the company's mines, and potentially from other sandstone hosted deposits globally."

In late 2016 Western Mining signed an agreement with Pinon Ridge Corporation to use ablation technology at its subsidiary's mill. The technology is being evaluated by the Colorado Department of Public Health and the Environment (CDPHE) with advice from the NRC.

In October 2024 Western Uranium & Vanadium Corp acquired Pinon Ridge Corporation.

Uranium One

Toronto-based Uranium One's main interests are in ISL projects. Uranium One is wholly-owned by Russia's ARMZ, and Uranium One Holdings is responsible for all Rosatom's uranium mining outside Russia. US operations have current design capacity of 500 tU/yr and maximum potential of 1400 tU/yr. All are ISL. In November 2021 Texas-based Uranium Energy Corp agreed to buy Uranium One Americas from the Russian parent company. The total purchase price comprises \$112 million in cash and the replacement of \$19 million in reclamation bonds.

In Wyoming, Uranium One USA had production from its Willow Creek ISL project in the Powder River Basin from 2011 to 9 July 2018. The project comprises several small mines and the Irigaray mill, mostly acquired from Areva in 2009 for \$35 million. In December 2010, the NRC licensed the Irigaray mill to produce up to 960 tU/yr (it operated at 500 tU/yr in 2011), and for nearby Christensen Ranch to restart operations (it had been shut down since 2000 and restarted in January 2011). Production from its three small mines (Moore Ranch, Peterson Ranch, Nine Mile) and

from Christensen Ranch itself is from loaded resin trucked to Irigaray from satellite plants. Overall Willow Creek produced 362 tU in 2013 at a cost of \$36/lb and 217 tU in 2014. Wellfield development was put on hold in 2014 until prices improve, and production wound down in 2015, continuing at a low level and with only 9 tU produced in the first half of 2018. Willow Creek total resources (NI 43-101) are 6500 tU. The Irigaray plant also toll processes loaded resin from Peninsula's Lance project on the east side of Powder River basin, pending construction of a plant there, and in December 2016 it signed an agreement to toll process Anfield's loaded resin also, to produce about 193 tU. In January 2024 UEC decided to restart production at Christensen Ranch.

The Nuclear Regulatory Commission issued a licence to Uranium One Americas for Moore Ranch in October 2010, to start production in 2012, but development is suspended. Uranium One's additional projects in the Powder River Basin, including Ludeman, Allemand-Ross, Barge (1770 tU), Pine Tree and Ross Flats could also be developed as satellite operations with final processing through the Irigaray central plant. Uranium One has some 4000 tU as measured resources (2235 t at Moore Ranch) and 23,000 tU as indicated resources in the state. Ludeman is quoted with 4200 tU total resources (NI 43-101) and is to be an extension of the Willow Creek project. It also had plans for production from Antelope and JAB in the Great Divide Basin, but these were deferred due to endangered species concerns.

Uranium One deposits in the Great Divide Basin of Wyoming are Antelope, JAB, Twin Buttes, Crooks Creek, Bull Springs, Stewart Creek, Cyclone Rim and West JAB.

In 2016 Uranium One sold 24 Wyoming properties in the Black Hills, Powder River Basin, Great Divide Basin, Laramie Basin, Shirley Basin and Wind River Basin areas to Anfield Resources for \$6.55 million.

In 2010, Uranium One sold a number of Utah and Colorado claims and two Utah leases, including the Sage mine, to Colorado Plateau Partners (CPP), a joint venture between Energy Fuels Inc of Toronto (see EFRC above) and Royal Resources Ltd of Australia.

UEC

[Uranium Energy Corporation](#) (UEC) in November 2021 agreed to buy Uranium One Americas from the Russian parent company. This

will make the Irigaray plant in Wyoming a hub for several ISL operations in the Powder River Basin including Christensen Ranch, Reno Creek and Moore Ranch. It increases UEC's production potential to 2500 tU per year from licensed and installed capacity.

UEC in October 2009 bought the small but recently-refurbished Hobson mill in southern Texas from Uranium One (it had been shut since 1991). UEC then made Hobson the basis and hub of its Texas uranium projects. Hobson had 385 t/yr capacity, but UEC says it is now 1150 tU/yr, in 2011-12 it processed 90 tU. It recovers uranium from loaded resin trucked there from the Palangana ISL mine, to which will be added loaded resin from satellite plants at Goliad and Burke Hollow, followed by Nichols and Salvo.

Production commenced at Palangana in November 2010 – the first US ISL operation to start in five years, but there has been no production since 2015. By the end of 2011 UEC had obtained all the necessary permits to develop its Goliad ISL project, 70 km east of the Hobson mill, for production anticipated from mid2014.

Palangana has 410 tU measured and indicated resources grading 0.114%U in two orebodies and 445 tU inferred resources at 0.15%U in six others, while Goliad has 2100 tU measured & indicated resources at 0.04%U, all NI 43-101 compliant.

Future ISL satellites are Burke Hollow, 86 km southeast of Hobson and with 2700 tU inferred resource estimate, Salvo, with 1100 tU inferred resource grading 0.07%U, then Nichols with 500 tU inferred located close to Hobson mill, and Longhorn. Salvo and Longhorn are 70-85 km from Hobson and will feed the Hobson mill. UEC claims cash cost of \$20 per pound over 2010-12 for its ISL production, excluding royalties. However, in September 2013 UEC said it would slow production at Palangana pending recovery in uranium prices, while it focuses on Goliard and Burke Hollow. UEC lodged final permit applications for Burke Hollow late in 2014, and some permits were issued in May and July 2015, December 2016 and February 2019.

UEC's Anderson project northwest of Phoenix in central west Arizona was formerly mined in 1950s to yield 12,800 tU. It has 6000 tU indicated and 960 tU inferred resources at 0.024%U accessible by open pit mining, with two-thirds as much again (mostly inferred) accessible underground (NI 43-101). UEC expects to produce 6200 tU over 14 years using heap leach and transport of loaded resin to White Mesa mill in Utah.

In 2007 UEC bought the New River, now Los Cuatros Uranium Project in central Arizona with a historic resource estimate of 5000 tU in shallow low-grade ore. Its Workman Creek deposit there has 2100 tU inferred resource at 0.073%U.

UEC has a NI 43-101 inferred resource for its Slick Rock project in western Colorado, of 4470 tU grading 0.19%U. Vanadium is also present. Several other prospects are nearby.

UEC acquired 97% of the fully-permitted Reno Creek in Wyoming's Powder River Basin from Pacific Road Resources Funds and the balance from the AUC subsidiary of Bayswater Uranium Corporation of Canada, which had a positive pre-feasibility study on mining its Reno Creek and Southwest Reno Creek deposits in Wyoming, held by its affiliate AUC. They have a NI 43-101 measured and indicated resource of 10,000 tU @ 0.035%U (Jan 2019) suitable for ISL, plus a small inferred resource. The project would have up to 18 wellfields and a central processing plant producing 330 tU/yr initially then up to 770 tU/yr as the market permits, and would take 18 months to bring online. EFRC's North Reno Creek property was sold to UEC in 2017, adding 1650 tU measured and indicated resources at 0.048 %U grade and consolidating the holdings. Reno Creek is 30 km southeast of Uranium One's Willow Creek, 50 km north of Cameco's Smith Ranch, and 130 km northeast of Casper. UEC says that North and Southwest Reno Creek can now be developed together.

In July 2015 the Wyoming Department of Environmental Quality (WDEQ) Land Quality Division issued AUC a permit to mine for the Reno Creek uranium project, producing up to 770 tU per year. In February 2017 the NRC issued an operating licence for the project at this production level, though AUC said it did not intend to proceed immediately.

Cameco

Cameco's US subsidiary Cameco Resources Inc operates the Smith Ranch-Highland mine in Wyoming's Powder River Basin and the Crow Butte mine in Nebraska, both of them ISL operations, and producing nearly 1200 tonnes U between them in 2009. The company is aiming to increase production from these mines and adjacent properties including Reynolds Ranch to 1770 tU/yr when markets improve. However, in 2016 and 2017 production was

curtailed due to market conditions. Practically no production has taken place since 2017.

Smith Ranch-Highland produced 815 tU in 2014, including North Butte, and has declined from that level since. North Butte-Brown Ranch is a satellite plant about 40 km north which started production in May 2013 in the same Powder River Basin and able to ramp up to 270 tU/yr. Licensed wellfield capacity of the whole operation is 1156 tU. Reserves total 3080 tU, plus 11,000 tU measured and indicated resources (December 2015).

Cameco also has the Gas Hills-Peach project 90 km west of Casper in Wyoming which is permitted but on hold, with 5100 tU measured and indicated resources.

Crow Butte production has declined from 272 tU in 2013, though licensed capacity is 770 tU. It has 5800 tU resources grading 0.22%U. It is in northwest Nebraska, near the borders of Wyoming and South Dakota.

URI / Westwater Resources / enCore Energy

Uranium Resources Inc (URI) began operations in 1977 in south Texas. It developed and produced over 216 tU from the Longoria and Benavides projects in the early 1980s, then 2350 tU from Kingsville Dome and Rosita through to 1999.

In south Texas, URI commenced production from its Vasquez ISL mine in 2004 at about 50 tU/yr and from Kingsville Dome in 2006. Vasquez peaked in 2006 and is now depleted (30 tU in 2007, 9 tU in 2008). Rosita restarted production in 2008 with oxygen injection but was then closed as uneconomic after 3 tU was recovered. Kingsville Dome produced 67 tU in 2008 and 19 tU in 2009. It was closed in June 2009 due to low uranium prices, and the wellfield has been remediated using reverse osmosis along with Vasquez and Rosita wellfields. The 300 tU/yr Kingsville Dome plant is being maintained on standby, with potential for accepting resin from four satellite IX plants.

URI earlier said that it did not intend to revive its Texas operations, with total reserves at Kingsville and Rosita wellfields of only 260 tU. However, in December 2013 it said that it remained “committed to developing uranium in south Texas as we aim to leverage our two processing plants in the region” – Kingsville Dome and Rosita.

Butler Ranch, also ISL and acquired in 2014, is 160 km north of the Kingsville Dome plant, and Rosita is 65 km northwest of the plant. In 2015 URI was actively evaluating Butler Ranch and Alta Mesa Este. In 2021 enCore Energy was refurbishing the Rosita processing plant with a view to completion in mid-2022.

URI owned several Grants mineral belt properties in western New Mexico which hold 39,000 tU, and from which it hoped to produce 2000-3000 tU/yr from ISL. URI subsidiary Hydro Resources Inc was licensed in 1994 to mine the Crownpoint and Church Rock ISL deposits in New Mexico, and after years of opposition the licence was validated by the Nuclear Regulatory Commission in 2006 and then reactivated in 2011. URI planned to produce 385 tU/yr from Church Rock/Mancos from 2013, as the first of URI's New Mexico properties to develop, subject to further permitting.

Nose Rock, Roca Honda and West Largo/Ambrosia Lake are other URI properties in the Grants mineral belt. URI has a licence to build a processing plant in the area.

In June 2015 URI sold its partly-developed Roca Honda mineral properties adjacent to EFRC's Roca Honda project to EFRC, while retaining some royalty rights. In partial exchange it received from EFRC some claims adjacent to its Church Rock prospect. These have a historic resource estimate of 4200 tU based on a previous owner's 1979 data. URI has a licence to build a processing plant in the area. Following the takeover of Anatolia Energy, in November 2015 URI agreed to sell its Crownpoint and Church Rock properties to Laramide Resources for \$12.5 million, and this was confirmed in April 2016 by way of selling Hydro Resources Inc and finalized at the end of the year.

URI In 2007 URI sought to buy Rio Algom Mining, with uranium properties and a licensed mill site at Ambrosia Lake in New Mexico, where it planned to construct a new mill to serve the Grants mineral belt. However, the deal was aborted in mid-2008.

URI also holds the Copper Mountain leases in Wyoming, with low-grade uranium mineralization (hardrock, not ISL) which was mined to 1971.

In June 2015 URI announced a takeover of Anatolia Energy, developing the Temrezli ISL uranium mine in Turkey. This was effectively a merger; URI shareholders own about 59% of the merged company. As well as providing experienced staff, URI planned to move the Rosita processing plant to Turkey and finish

doubling its capacity to 600 tU/yr – work that was halted in 2008. The Turkish government in June 2018 expropriated all the company's leases. The projects were owned by its Turkish subsidiary Adur Madencilik Limited Sirketi, which had held exclusive rights for the exploration and development of uranium there since 2007 and had invested heavily in them. In December 2018 Westwater Resources (formerly URI) filed a request for arbitration on the matter.

In August 2017 URI changed its name to Westwater Resources (WWR) "to better reflect" its business plan to initiate lithium production "while maintaining optionality in the case of a future rising uranium price." In September 2020 the company announced that it was selling its US uranium assets to enCore Energy for \$1.95 million, and the sale was completed in January 2021.

EnCore Energy Corp (Vancouver) had bought Marquez and Nose Rock, adding to its Crownpoint and Hosta Butta deposits in New Mexico, and also other small deposits in Arizona and Utah from EFRC in November 2015. It plans to put Rosita in Texas back into production.

In September 2021 enCore Energy and Azarga Uranium Corp announced a merger.

Ur-Energy

Ur-Energy Inc (URE/URG) has total about 8500 tU as NI 43-101 indicated resources in Wyoming, and claims potential for double that. Lost Creek in the Great Divide basin has 5100 tU measured and indicated resources at 0.04 %U and 2480 tU inferred (Nov 2015), including leases taken over from Uranium One in 2012. The company plans to produce 400 tU/yr from the Lost Creek wellfields and about the same from satellite operations through to 2031. The site is close to Rio Tinto's Sweetwater mill.

Production from Lost Creek commenced in mid-2013 after construction of a 770 tU/yr mill, following NRC licensing and Bureau of Land Management approval. Production in 2013 was 51 tU and after increasing significantly it dropped back to about 110 tU in 2018. Figures are tabulated above.

In July 2014 the company announced measured and indicated resources of 3400 tU grading 0.194%U for its Shirley Basin project in Wyoming, 150 km east of Lost Creek. It was to be a satellite ISL

operation from late 2017, with recovery at Lost Creek, for operating cost of \$14.54 and total cost of \$31.26 per pound U₃O₈. The ground was previously held by Pathfinder Mines Corp which Ur-Energy acquired in 2013, and it was mined conventionally to 1992, producing 10,800 tU. Average depth to orebody is 95 metres. (URZ's Shirley Basin property is separate.)

Ur-Energy reduced production levels from 2016 in response to a "persistently weak" uranium market. In June 2023 Ur-Energy announced the successful startup of production flow from header houses 2-4 at Lost Creek.

Peninsula / Strata

Australian-based Peninsula Energy commenced production from its Lance ISL project on the east side of Wyoming's Powder River Basin early in 2016. It has JORC-compliant resources (December 2017) of 20,700 tU at 0.04%U at Lance, including 6080 tU as measured and indicated resources, held by the company's subsidiary Strata Energy Inc. The company plans a three-stage ramp-up eventually to 1150 tU/yr from three production units – Ross, Kendrick and Barber – which will delay much capital expenditure and defer most sales until after 2018. These production units will feed into a central processing plant with an expandable capacity of up to 1154 tU per year (four modules of 288 tU/yr), commencing from Ross. The plant incorporates a restoration circuit with resin ion exchange (IX) then reverse osmosis (RO) to restore water quality of barren liquor to pre-mining levels.

A state permit to mine was issued in November 2012. From the NRC, the company received a source materials licence (SML), and a final supplemental environmental impact statement (SEIS) for both the plant and Ross wellfield in March-April 2014. The NRC authorised operation of the Ross wellfield in November 2015. Stage 1 of production involves trucking loaded resin 90 km west to Uranium One's Irigaray plant for elution. Stage 2 will increase the ion exchange capacity and bring the elution, precipitation, drying, and packaging processes in-house with the new central plant. The Kendrick, Richards and Barber production units to the south of Ross will be brought on line with amendments to Ross licences, the Barber wellfield and satellite plant being part of stage 3 ramp-up. A deep disposal well has been drilled to 2600 metres to a sandstone aquifer with low water quality. Vanadium may be a by-product – 2237 t V₂O₅ resources are identified for Ross and Kendrick.

In October 2017 the company announced that it was seeking an amendment to its licence so that it could use "low-pH recovery solution" (acid leaching) instead of alkaline at Lance, as tests had shown a huge increase in recovery, which had proved to be minimal with alkaline leaching, the comparative figures being 95% instead of 35%. The change would make it the only current ISL operation in the USA with acid leach. Alkaline leaching continued pending licence amendment. Field trials of acid leaching commenced in December 2018 and in November 2019 the state environment department approved the change. The company said that its survival depended on the change.

In July 2015 Peninsula agreed to buy the nearby Hauber project from Aldershot Resources. This will likely become a satellite operation for Lance. Homestake produced 1000 tU in 1950-60s from Hauber, and in 2011 Bayswater Uranium was farming into the project. Aldershot quotes only about 250 tU resources NI 43-101 compliant, but estimates 1400 tU.

In March 2016 Peninsula announced a long-term sales contract over 2020-30 for 1540 tU with a major European utility, with a provision to increase this to half of the Lance project's production from 2026. It already has sales contracts for 3045 tU with US and European utilities. Its first product was delivered in May 2016, and 2016 production was 49 tU.

Uranium production was stopped at Lance in July 2019. In November 2022 Peninsula Energy decided to resume operations. Production was initially expected in the first quarter of 2023, but later delayed until the end of 2024.

Azarga Uranium

Azarga Uranium Corp (formerly Powertech Uranium Corp) is proposing to develop Dewey Burdock in South Dakota – very close to the Wyoming border. It has 5500 tU measured resources averaging 0.11%U and 1100 tU indicated resources averaging 0.06%, amenable to ISR and NI 43-101 compliant (Nov 2018). Some 410 tU further measured non-ISR resources grading 0.048%U are above the water table. The company has applied to develop Dewey-Burdock, and a preliminary economic assessment in 2014 suggested 3700 tU ISL production over 11 years, with \$27 million capital investment. The company has a full NRC operating

licence, having overcome some local opposition. The project in 2018 still required some EPA and state approvals.

Azarga also has the Centennial project in northern Colorado close to the Wyoming border, with 4000 tU indicated resources in 0.08% ore, and 400 tU indicated resources at its Aladdin project in Wyoming, 130 km northwest of Dewey Burdock. And in the same geology. It also has the JB project in the Uravan District, straddling the Colorado and Utah border.

In 2018 Azarga merged with URZ Energy (formerly Summit Point Uranium Corp), focused on Wyoming ISL prospects, notably the Gas Hills and Juniper Ridge deposits and the Shirley Basin project all in Wyoming acquired in 2016 from EFRC (and previously held by Strathmore). Gas Hills has 4140 tU at 0.077%U as measured and indicated resources, 72% of which are amenable to ISL, and Juniper Ridge 2315 tU at 0.05%U indicated (NI 43-101 compliant). Strathmore had been working towards bringing its Gas Hills properties in central Wyoming into production. Uranium is in roll-front sandstone deposits, some amenable to ISL and some to open pit mining. Juniper Ridge would be developed in conjunction with Gas Hills, though it is 150 km south, straddling the Colorado border, and had been mined intermittently from 1954 to 1966. EFRC envisaged open pit mining and heap leach.

In September 2021 enCore Energy and Azarga Uranium Corp announced a merger.

Anfield Energy

Vancouver-based Anfield Energy has 1780 tU at 0.25%U as measured and indicated resources at Velvet-Wood in Utah, the Frank M project in Utah, and a 50% interest in the Wate deposit in Arizona (432 tU), with EFRC. In June 2016 it reported a preliminary economic assessment of the licensed Velvet-Wood project using heap leach or vat leach methods with an average output of 243 tU per year, for a total production of 1770 tU over a seven-year mine life. Under both scenarios, total capital expenditure is about \$46 million, with direct operating costs of around \$11 per pound. Other conventional mining properties are in Colorado.

Anfield's 'key asset' is the 1000 t/day Shootaring Canyon mill in Utah, which it bought, with some small stockpiles there, from Uranium One. Uranium One in 2007 had bought the mill* in southeast Utah with associated properties in four contiguous states

for \$50 million plus royalties, from US Energy. In October 2014 the Utah regulator agreed to transfer the licence to Anfield Resources and to give it a year to apply for licence renewal with necessary upgrading. This process was under way through to 2018, with consideration of installing a vanadium circuit for Velvet-Wood ore. All Anfield's conventional uranium properties are within 200 km of the Shootaring mill.

* US Energy had been planning to bring the mill back into production at a cost of \$31 million. It was built in 1980 and then closed in 1982 and put on care and maintenance. (Uranium One had also secured the right to buy Rio Tinto's 3000 t/day Sweetwater uranium mill and associated uranium properties in south-central Wyoming for \$110 million, but in January 2007 Rio Tinto cancelled the deal.) In October 2013 Uranium One agreed to sell the Shootaring Canyon mill for \$10 million to Black Range Minerals and also enter into a joint venture arrangement for all Uranium One's associated 'conventional' hard rock leases, where Black Range would progressively increase its equity, but this deal lapsed due to regulatory problems. Black Range will concentrate on its Hansen project. In August 2014 Anfield Resources agreed to buy the mill and associated mining properties in three states, including Velvet-Wood in Utah, for \$5 million.

In September 2016 Anfield completed the purchase of 24 Wyoming ISL properties in the Black Hills, Powder River Basin, Great Divide Basin, Laramie Basin, Shirley Basin and Wind River Basin areas from Uranium One for \$6.55 million. In March 2018 it agreed to purchase the Charlie project in the Pumpkin Buttes area of Powder River Basin from Cotter Corporation. NI 43-101 resource estimates for these Wyoming properties are being prepared and progressively published. Those for Red Rim, Clarkson Hill and Nine Mile had been completed by mid-2018, showing a total of 1405 tU indicated and 1718 tU inferred resources. The 2016 transaction also included a resin processing agreement with Uranium One to toll process up to 193 tU per year of Anfield's loaded resin at Uranium One's Irigaray plant. The Charlie project, with state mining lease, is adjacent. It has 1190 tU indicated resources and Anfield is buying it from Cotter Corporation.

In October 2024 it was announced that IsoEnergy was to acquire Anfield Energy.

Others, ISL

In New Mexico, Uranium International Corp (UIC) has announced 1,180 tU measured and indicated resource at Dalton Pass, with ISL potential. It also announced a 1,160 tU measured and indicated resource at Nose Rock, deep in hard rock. Both are NI 43-101 compliant, in the Grants mineral belt and owned by Strathmore Minerals. UIC has the option of earning a 65% share of each.

Laramide Resources Ltd bought URI's subsidiary Hydro Resources Inc to obtain the Church Rock and Crownpoint ISL properties in New Mexico for \$12.5 million in April 2016, along with an option for URI to acquire Laramide's La Sal II in Utah for \$4 million. A maiden NI 43-101 inferred resource estimate for Church Rock of 19,540 tU at 0.064%U was confirmed in November 2017, and that for Crownpoint of 1960 tU inferred resources at 0.086%U in December 2018.

In Colorado, Perth-based Okapi Resources in October 2021 announced a resource estimate of 10,600 tU for the Talahassee Uranium Project in paleochannels 100 to 270 metres deep. This is in line with a 2004 estimate by Black Range Minerals. The Hansen and Picnic Tree deposits with several historic mines are within 5 km south of the company's leases.

Others, hardrock

Cotter Corporation, a General Atomics subsidiary, was planning a \$200 million rebuild of its Cañon City mill, where it expects to treat ore from the Mount Taylor mine in New Mexico. (Mount Taylor, which has been on standby since 1989, is owned by another General Atomics subsidiary, Rio Grande Resources Corporation.)

Neutron Energy Inc has taken full ownership of the Cebolleta Land Grant in New Mexico which has 8000 tU resources after mining took place 1975-81, producing 460 tU.

Yellowcake Mining Corp reports 5,000 tU reserves at its planned Beck mine in the Uravan area of Colorado and agreed in May 2008 to sell a 50% stake in it to Korea Electric Power Corp (KEPCO). However, in February 2009, KEPCO withdrew, leaving the project bereft of funds. The company had joint ventures with Strathmore Minerals for Juniper Ridge and a Gas Hills prospect in Wyoming, but these were terminated in 2008. In 2010 Strathmore agreed to sell Juniper Ridge to Crosshair Energy, but this agreement terminated in 2012.

Crosshair Energy has the Bootheel project in Wyoming with about 1780 tU resources.

Bluerock Energy Corporation has shipped the first ore from development of the J-Bird mine in Colorado to Denison's White Mesa mill in Utah.

Laramide Resources Ltd is applying to reopen the La Sal II mine in Lisbon Valley, Utah, bought in 2010 from Homestake with about 1000 tU. It is about 90 km from Energy Fuels' White Mesa mill, and a two-year toll milling agreement was signed in January 2013. As part of the 2016 deal with URI, Laramide agreed to sell La Sal II to URI for \$4 million.

Laramide also has the La Jara Mesa project in the Grants mineral belt of New Mexico, with 4000 tU resource (NI 43-101 compliant, two-thirds 'indicated').

In January 2017 Mesa Exploration acquired the Noah uranium prospect in Utah's Lisbon Valley mining district on the Colorado Plateau, 96 km north of the White Mesa mill.

Australia's TNT Mines is exploring the San Juan County area of Utah, including the East Canyon uranium-vanadium project area.

In July 2021 Vancouver-based International Consolidated Uranium (now Consolidated Uranium) agreed to buy the Daneros, Tony M and Rim mines in Utah from EFRC.

In Virginia, Virginia Uranium Inc, in association with Virginia Energy Resources Inc, has a proposal to mine the Coles Hill uranium deposit in Pittsylvania county which has 3260 tU as measured resource and 42,800 tU as indicated resource at 0.05 %U (NI 43-101 compliant). An associated conventional mill would be near Chatham. A detailed state review reported on the project, but the Governor at the end of 2013 announced that he would veto any enabling legislation. This was unsuccessfully appealed, with the companies asking the courts either to order the Commonwealth of Virginia to permit the plaintiffs to exercise their right, under Virginia's constitution, to mine the uranium situated on their property, or to provide compensation for the "full value" of the mineral resource – \$6 billion. In June 2019, the US Supreme Court upheld Virginia's moratorium on uranium mining. Virginia Uranium had contested the state's authority to enact the 1982 ban on uranium mining.

In Texas, Texas Rare Earth Resources Corp has signed an agreement with Areva to take up to 116 tU per year by-product uranium from its Round Top heavy rare earth project in Hudspeth County. About 37,000 tU is identified in all classes of REE resources there.

US in situ leach (ISL) uranium mines and production facilities

	ISL mines	Mill	Status	Annual capacity
Uranium One	Willow Creek/Christiansen Ranch, WY	Irigaray, WY	Operating 2011-18, standby	500 tU
	Moore Ranch, WY	Irigaray, WY	Licensed but suspended	190 tU, 770 tU
	Jab, Antelope, WY	Irigaray, WY	Developing	
Anfield	Charlie, WY	Irigaray, WY (toll)		
EFRC (Uranerz Energy)	Nichols Ranch, Hank, Jane Dough, WY	Smith Ranch - Highland, WY	Operating from 2014	300 tU initially, 770 tU
EFRC (Mestena Uranium)	Alta Mesa, TX	Alta Mesa, TX	Operating to 2013	578 tU
Ur-Energy	Lost Creek, WY	Lost Creek, WY	Operating from 2013, standby	770 tU
Cameco Resources Inc	Smith Ranch - Highland, WY	Smith Ranch - Highland, WY	Operating	2100 tU
Cameco Resources	Crow Butte, NE	Crow Butte, NE	Operating	385 tU
Uranium Resources Inc (URI)	Rosita & Kingsville Dome, TX	Kingsville Dome, TX	Operating in 2008, but closed mid-2009	300 tU
Hydro Resources Inc (URI subsidiary) sold to Laramide Resources	Church Rock & Crownpoint, NM		Partially licensed	385 tU

	ISL mines	Mill	Status	Annual capacity
Uranium Energy Corp, former: AUC/Bayswater	Reno Creek, WY	Reno Creek, WY	Partially licensed	330 tU, then up to 770 tU
Uranium Energy Corp	La Palangana, south TX	Hobson, TX	Standby	385 tU
	Goliad, Burke Hollow, TX	Hobson, TX	Goliad approved, standby	385 tU
Peninsula/Strata	Lance, WY	Ross	Started operation Q1 2016, operating	150 tU
Azarga Uranium	Dewey-Burdock, SD		Licensing deferred	385 tU
Total capacity				8053 tU

US hard rock uranium mines and mills

	Mine	Mill	Status	Annual capacity
EFRC	Arizona 1, Pinenut, Pinyon Plain, Wate, AZ	White Mesa, UT	Arizona 1 operated 2009-14, Pinenut operated 2014-16, others on hold	
EFRC	La Sal, Energy Queen, Daneros, Whirlwind, CO-UT	White Mesa, UT	Mines on standby, Pinon Ridge, CO mill licensed but on hold	
EFRC	Roca Honda, NM	White Mesa, UT	Planned	
EFRC	Sheep Mtn & Gas Hills, WY	Whie Mesa, UT	Planned	
EFRC	Henry Mtns, UT	White Mesa, UT	Development on hold	
EFRC		White Mesa, UT	Operating, but closing temporarily 2015	3000 tU
Western Uranium	Sunday complex, CO	Pinon Ridge, CO	Licensed but on hold	

	Mine	Mill	Status	Annual capacity
	Hansen-Taylor Ranch, CO			
Cotter Corp		Canon City, CO	Standby, refurbish plan	
Rio Tinto		Sweetwater, WY	Standby	
Anfield	Velvet Wood, UT	Shootaring Canyon, UT	Standby	

Legacy environmental issues

Uranium mining was a major activity in the late 1940s and into the 1950s, when the focus was on national security rather than environmental protection. There was little regulation or oversight of facilities, and tailings were put in impoundments without liners, giving rise to groundwater contamination.

There was a considerable legacy of pollution from hundreds of abandoned uranium mines and treatment plants, most government-sponsored and dating from the 1950s. This problem was addressed in the 1980s. For instance, the Uravan mill site on the San Miguel River in Colorado was designated a Superfund site and was cleaned up between 1987 and 2007 at a cost of over \$120 million. Historic mining and milling at Uravan included the production of radium, vanadium and uranium, leaving radioactive residues from the early 1900s through to the mid-1980s. From the time Uravan mill began operating in the 1920s until it was shut down, it processed over ten million tonnes of uranium-vanadium ore, giving rise to a similar amount of uncontained tailings, and 1,440 megalitres of liquid wastes were treated in the site rehabilitation program.

The Schwartzwalder mine west of Denver, Colorado, was once the largest underground uranium mine in USA. It has been polluting Ralston Creek feeding the city's water supply and is now subject to bacterial bioremediation by Cotter Corp.

In 2015, the US Department of Justice announced that \$13.2 million in federal funding will be placed into a trust to pay for evaluations of abandoned uranium mines across Navajo lands in Arizona, New

Mexico, and Utah. This will expedite the cleanup of 16 mines seen as the most significant hazards. The funding is part of an ongoing multi-agency federal initiative to address legacy issues connected with historic uranium mining across the Navajo Nation which produced four million tonnes of uranium ore between 1944 and 1986. According to the [US Environmental Protection Agency \(EPA\) website](#): "Nearly 30 million tons of uranium ore were extracted from Navajo lands under leases with the Navajo Nation" over this period.

In 2017 the NRC ordered Homestake Mining to undertake groundwater remediation at the site of a mill which operated near Grants in New Mexico from 1958 to 1990. In 1975 it was discovered that seepage from 22 million tonnes of tailings in two impoundments had contaminated groundwater aquifers, and a groundwater protection plan was implemented from 1977. The site is also under the oversight of the US EPA through the Superfund programme. Homestake submitted a revised groundwater monitoring programme to the NRC for this Grants Reclamation Project in August 2018.

The versatile White Mesa mill in Utah operated by EFRC is able to re-treat some of the mine residues and recover some uranium from them to help clean up old mine sites.

Notes & references

References

1. US uranium mine production and number of mines and sources, [Domestic Uranium Production Report – Annual](#), US Energy Information Administration [[Back](#)]

General sources

[US Energy Information Administration](#)
Company reports

Related information

[Uranium Mining Overview](#)[USA: Nuclear Fuel Cycle](#)**OUR ASSOCIATION**[Our Mission](#)[Leadership](#)[Our Members](#)[Vacancies](#)[Contact Us](#)**GENERAL ENQUIRIES**

t: +44 (0)20 7451 1520

f: +44 (0)20 7839 1501

e: info@world-nuclear.org**MEDIA ENQUIRIES**

Henry Preston

t: +44 (0)20 7451 1523

e: press@world-nuclear.org**ADDRESS**

York House,
23 Kingsway,
London,
WC2B 6UJ,
United Kingdom

MEMBERSHIP ENQUIRIES

Member support

members@world-nuclear.org

Joining enquiries

enrolment@world-nuclear.org**CONNECT WITH US****PRIVACY NOTICE****COOKIES POLICY****REUSE OF WORLD NUCLEAR ASSOCIATION CONTENT**

© 2016-2025 World Nuclear Association, registered in England and Wales, number 01215741.