

## Special Comment

# Moody's Global Infrastructure Finance

June 2009

## New Nuclear Generation: Ratings Pressure Increasing

### Summary

- Moody's is considering taking a more negative view for those issuers seeking to build new nuclear power plants
- Rationale is premised on a material increase in business and operating risk
- Longer-term value proposition appears intact, and, once operating, nuclear plants are viewed favorably due to their economics and no-carbon emission footprint
- Historically, most nuclear-building utilities suffered ratings downgrades—and sometimes several—while building these facilities
- Political and policy conditions are spurring applications for new nuclear power generation for the first time in years
- Nevertheless, most utilities now seeking to build nuclear generation do not appear to be adjusting their financial policies, a credit negative
- First federal approvals are at least two years away, and economic, political and policy equations could easily change before then
- Progress continues slowly on Federal Loan Guarantees, which will provide a lower-cost source of funding but will only modestly mitigate increasing business and operating risk profile
- Partnerships, balance sheet strengthening, bolstering liquidity reserves and “back-to-basics” approaches to core operations could help would-be nuclear utilities maintain their ratings

This Special Comment is an addendum to our prior research reports associated with the credit implications of building new nuclear generation in the U.S. These prior reports, entitled “New Nuclear Generating Capacity: Potential Credit Implications for U.S. Investor Owned Utilities” published in May 2008 and “New Nuclear Generation in the United States: Keeping Options Open vs Addressing An Inevitable Necessity” published in October 2007 are referenced in the back under the section Moody's Related Research.

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## New Nuclear Generation: Ratings Pressure Increasing

### Overview

It has now been three decades since the last, serious nuclear construction cycle. The 1979 accident at Pennsylvania's Three Mile Island nuclear power plant appears to have permanently affected the nation's views about building new nuclear power generation. As a result, substantial new regulatory procedures were implemented. Development and construction costs soared, recovery was challenged, and for many issuers, financial deterioration and ratings downgrades followed. For some, ratings recovery took years.

But while nuclear power remains a thorny political and policy issue today, the concept of building new facilities has gradually reawakened in recent years, offering a buffer against foreign energy dependence, unpredictable commodity prices, and heavily polluting fuel sources. As a result, several of the largest U.S. power companies in recent years have announced plans to pursue new nuclear generation.

This may eventually boost the country's options for power generation. But from a credit perspective, the risks of building new nuclear generation are hard to ignore, entailing significantly higher business and operating risk profiles, with construction risk, huge capital costs, and continual shifts in national energy policy. Project risks are somewhat more clear today than during the last build cycle, in the 1970s, since we now have a track record that measures nuclear power's operating performance; strong plant economics due to low fuel cost; proven efficient and safe operating capabilities; new and refined regulatory procedures; and more certainty over reactor designs before construction begins.

Less clear today is the effect that energy efficiency programs and national renewable standards might have on the demand for new nuclear generation. National energy policy has also begun eyeing lower carbon emissions as a key desire for energy production—theoretically a huge benefit for new nuclear generation—but the price tags associated with these development efforts are daunting, especially in light of today's economic turmoil. It isn't clear what effect such shifts, or changes in technology, will have for new nuclear power facilities.

Credit conditions are yet another question. Few, if any, of the issuers aspiring to build new nuclear power have meaningfully strengthened their balance sheets, and for several companies, key financial credit ratios have actually declined. Moreover, recent broad market turmoil calls into question whether new liquidity is even available to support such capital-intensive projects. (The U.S. Nuclear Regulatory Commission's (NRC) first Construction and Operating Licenses, or COLs, are expected to win approval in roughly 24-36 months, after which investment in these projects could well increase significantly.)

Moody's is considering applying a more negative view for issuers that are actively pursuing new nuclear generation. History gives us reason to be concerned about possible significant balance-sheet challenges, the lack of tangible efforts today to defend the existing ratings, and the substantial execution risk involved in building new nuclear power facilities.

### Nuclear's "bet-the-farm" risk

The NRC says about 14 companies to date have submitted COL applications, proposing numerous new nuclear reactors for power generation. The first of these COL's is expected to be approved beginning in mid-2011. Many of the COL license applications include partners, but the next table lists the primary holding company entity behind each project, and our view of the activity level associated with the endeavor.

From a credit perspective, companies that pursue new nuclear generation will take on a higher business and operating risk profile, pressuring credit ratings over the intermediate- to long-term. Even so, we also believe companies will ultimately revise their corporate-finance policies to begin materially strengthening balance sheets and bolstering available liquidity capacity at the start of the construction cycle. In addition, we believe regulators will generally continue to support the long-term financial health of the utilities they regulate, and will authorize recovery of investments and costs over a reasonable timeframe.

## New Nuclear Generation: Ratings Pressure Increasing

Moody's believes there is a significant difference between new nuclear plants located adjacent to existing units from those that are greenfield projects. In our opinion, brown-field projects benefit from the existing infrastructure (including security plans), local political support and historical operating record of the existing units. We believe the U.S. Department of Energy also recognized this as well in the selection of the Southern Company's Vogtle; NRG's South Texas Project, SCANA's Summer and Constellation's Calvert Cliffs / Nine Mile projects. We ascribe a "high" activity level for these projects.

Many of the development plans appear to have been slowed down over the past 6 – 12 months for various reasons. We ascribe a "low" activity level to those projects. Other may have slowed down only modestly. For these projects, we ascribe a "medium" activity level.

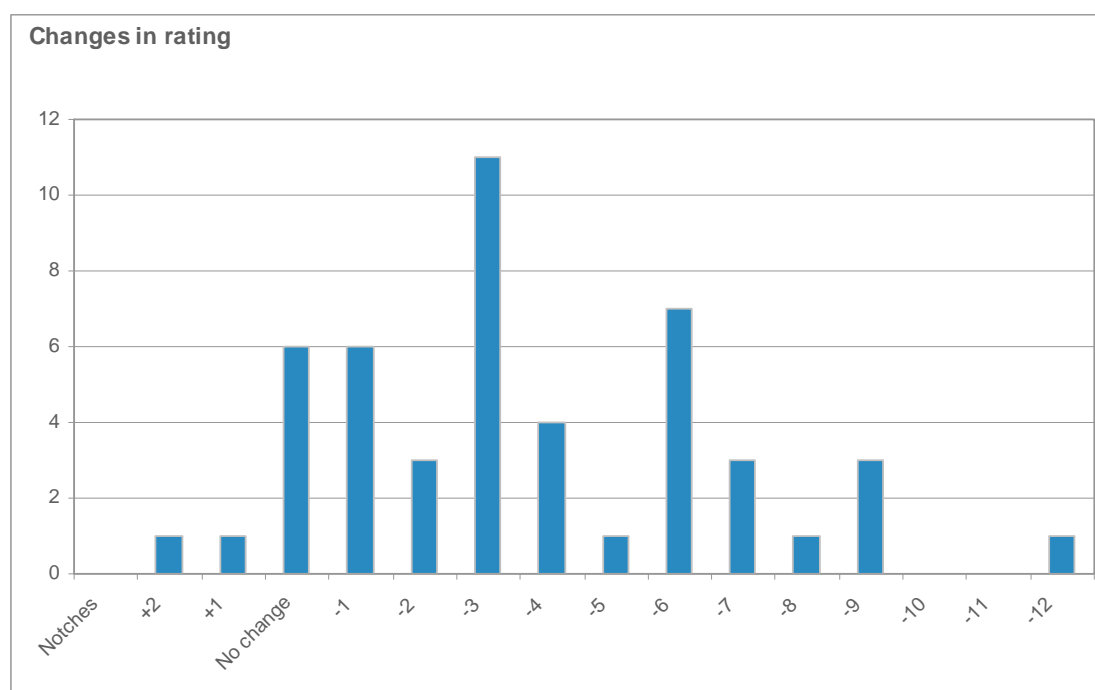
**Table 1: COL applications received by the NRC**

Company	Sr. Unsec.	Reactor Design	Proposed New Reactor	Activity Level
Ameren	Baa3	US EPR	Callaway	Low
Constellation	Baa3	US EPR	Calvert Cliffs	High
Constellation	Baa3	US EPR	Nine Mile Point	High
Dominion	Baa2	ESBWR	North Anna	Low
DTE Energy	Baa1	ESBWR	Fermi	Low
Duke Energy	Baa2	AP 1000	William S Lee	Medium
Energy Future Holdings	B3 CFR	US APWR	Comanche Peak	Low
Entergy	Baa3	ESBWR	Grand Gulf	Low
Entergy	Baa3	ESBWR	River Bend	Low
Exelon	Baa1	ESBWR	Victoria County	Low
NRG Energy	Ba3 CFR	ABWR	South Texas Project	High
PPL	Baa2	US EPR	Bell Bend	Medium
Progress	Baa2	AP 1000	Levy County	Medium
Progress	Baa2	AP 1000	Shearon Harris	Low
SCANA	Baa1	AP 1000	V.C. Summer	High
Southern	A3	AP 1000	Vogtle	High
TVA	Aaa	AP 1000	Bellefonte	Low

## Historical rating trends are not good

Historical rating actions have been unfavorable for issuers seeking to build new nuclear generation. Of 48 issuers that we evaluated during the last nuclear building cycle (roughly 1965-1995), two received rating upgrades, six went unchanged, and 40 had downgrades. Moreover, the average downgraded issuer fell four notches. All of these ratings were evaluated on the senior secured or first mortgage bond ratings.

## New Nuclear Generation: Ratings Pressure Increasing



We view new nuclear generation plans as a “bet the farm” endeavor for most companies, due to the size of the investment and length of time needed to build a nuclear power facility. While we continue to view operating nuclear units positively, we increasingly sense that none of the issuers actively pursuing these endeavors have taken any material actions to strengthen their balance sheets. As a result, it has become increasingly likely that the pursuit of new nuclear power projects will lead to some near-term rating actions or outlook changes.

This table highlights the credit metrics some of the issuers that appear most aggressive in their nuclear development plans.

**Table 2: Selected utilities actively pursuing new nuclear generation**

Company	Sector	Sr. Unsec.	Rating Outlook	2008 Debt*	2008 Revenue*	Debt / Revenue
South Carolina Electric & Gas	IOU	A3	Stable	\$3,464	\$2,816	123%
South Carolina Public Service Authority (Santee Cooper)	Municipal	Aa2	Stable	\$3,715	\$1,586	234%
Georgia Power	IOU	A2	Stable	\$8,156	\$8,412	97%
Municipal Electric Authority of Georgia	Municipal	A1	Stable	\$3,390	\$772	439%
Power South	Cooperative	Baa1	Stable	\$1,398	\$750	186%
Oglethorpe	Cooperative	Baa1	Stable	\$3,910	\$1,239	316%
San Antonio CPS	Municipal	Aa1	Stable	\$3,600	\$2,200	164%
City of Austin	Municipal	A1	Positive	\$1,600	\$1,200	133%
NRG Energy	Unregulated	Ba3 CFR	RUR-up	\$9,275	\$6,885	135%

\* in \$ millions

## New Nuclear Generation: Ratings Pressure Increasing

### Plant construction can pressure metrics

The sheer size, cost and complexity of new nuclear construction projects will increase a utility's or power company's business and operating risk profile, leading to downward rating pressure. The length of a nuclear construction effort also entails lengthy regulatory reviews and potential delays in recovering investments, changing market conditions, shifting political and policy agendas, and technological developments on both the supply and demand side.

Given these long-term risks, a company's financial policy becomes especially critical to its overall credit profile during construction. In general, we believe a company should prepare for the higher risk associated with construction by maintaining, if not strengthening, its balance sheet, and by maintaining robust levels of available liquidity capacity.

This is crucial, because our preliminary analysis suggests that credit metrics will deteriorate meaningfully without significant mitigating factors or other structural provisions. As cash outflows materially begin to outpace inflows, leverage is expected to increase and metrics related to cash flow are expected to decline. A weakening financial profile, coupled with increasing business and operating risk, should result in credit deterioration.

### Precedents offer limited insight

Much has changed since the last major nuclear-generation construction cycle (1965-1995). The industry has learned from experience, including up-front regulatory oversight of development and investment; streamlined federal NRC approval procedures; and enhanced construction cycles and techniques.

In addition, new environmental regulations, specifically those aimed at reducing carbon dioxide emissions; appear well positioned for near-term implementation. These environmental developments should otherwise bolster the case for new nuclear generation, as it is viewed as one of the only large scale generation technology with a no-carbon footprint.

We are not questioning the arguments in favor of new large-scale nuclear generation. We observe, however, that nuclear projects require massive investments, and the long-term recovery of which presents a primary risk factor for issuers actively trying to build new nuclear power plants. Historically, in fact, many of the large nuclear utilities experienced some financial distress while building their plants. Material rating downgrades remain just as distinct a possibility today.

Issuer experience varied during the last U.S. nuclear build cycle, which we define as 1965-1995. This table is not meant to be all-inclusive (it excludes several issuers, such as Portland General and its Trojan nuclear plant. Although almost all issuers experienced rating downgrades to varying degrees, and not all of the downgrades may have been directly related to nuclear development, it was clearly either a primary or contributing factor in most cases.

## New Nuclear Generation: Ratings Pressure Increasing

**Table 3: Precedent rating actions for utilities involved in nuclear development**

Issuer	Period	Beginning rating	Lowest rating	Notches moved
Alabama Power	1975-1987	A2 FMB	Baa3	4
Arizona Public Service	1981-1993	A2 FMB	Baa3	4
Baltimore Gas & Electric	1974-1979	A2 FMB	A2	--
Cleveland Electric Illuminating	1981-1993	Aa2 FMB	Baa3	7
Commonwealth Edison	1968-1990	Aa2 FMB	Baa1	5
Connecticut Light & Power	1972-1978	Aa2 FMB	A2	3
Consolidated Edison Co of NY	1972-1978	A2 FMB	Baa2	3
Consumers Energy	1969-1974	Aaa FMB	Aa2	2
Detroit Edison	1985-1992	Baa1 SS	Baa2	1
Duke Energy Carolinas	1972-1986	Aa2 FMB	A2	3
Duquesne Light	1974-1988	Aa2 FMB	Baa2	6
Entergy Arkansas	1973-1979	A2 FMB	Baa2	3
Entergy Gulf States	1980-1988	A2 FMB	Ba3	7
Entergy Louisiana	1983-1988	Baa3 FMB	Ba2	2
Entergy Mississippi	1981-1987	A2 FMB	Ba2	6
Florida Power & Light	1972-1984	Aa2 FMB	A2	3
Georgia Power	1975-1990	Baa2 FMB	Baa2	--
Houston Light & Power	1987-1994	A2 FMB	A3	1
Illinois Power	1984-1989	A2 FMB	Baa3	4
Indiana Michigan Power	1973-1979	A2 FMB	Baa2	3
Iowa Electric Light & Power	1973-1977	Aa2 FMB	Baa2	6
Jersey Central Power & Light	1968-1980	A2 FMB	Ba2	6
Kansas Gas & Electric	1982-1986	Baa2 FMB	Baa3	1
Long Island Lighting	1972-1990	Aa2 FMB	B2	12
Metropolitan Edison	1973-1984	A2 FMB	B2	9
New England Power	1971-1992	Aa2 FMB	A1	2
Niagara Mohawk Power	1968-1988	Aaa FMB	Baa2	8
Northern Indiana Public Service	1973-1985	Aa2 FMB	Baa2	6
Northern States Power (MN)	1970-1976	Aa2 FMB	Aa2	--
NSTAR Electric	1971-1990	Aa2 FMB	Baa2	6
Ohio Edison	1975-1988	Aa2 FMB	Baa3	7
Pacific Gas & Electric	1983-1988	A1 FMB	A1	--
Philadelphia Electric Company	1973-1991	Aaa FMB	Baa3	9
PPL Electric Utilities	1982-1986	Aa2 FMB	A2	3
Progress Energy Carolinas	1970-1987	Aa2 FMB	Baa2	6
Progress Energy Florida	1975-1981	A2 FMB	A2	--
Public Service Co of Colorado	1976-1990	Aa2 FMB	A3	4
Public Service Co of New Hampshire	1980-1991	Baa2 FMB	Caa2	9
Public Service Electric & Gas	1973-1987	Aa2 FMB	Aa3	1
Puget Sound Energy	1978-1986	Baa2 FMB	A3	+2
Rochester Gas & Electric	1969-1975	Aa2 FMB	A2	3
South Carolina Electric & Gas	1979-1985	A2 FMB	A1	+1
Southern California Edison	1979-1985	Aa2 FMB	Aa2	--

## New Nuclear Generation: Ratings Pressure Increasing

Issuer	Period	Beginning rating	Lowest rating	Notches moved
Texas Utilities	1989-1995	Baa3 FMB	Baa3	1
Toledo Edison	1977-1988	Baa2 FMB	Baa3	1
Union Electric	1980-1988	A2 FMB	Baa2	3
Virginia Electric and Power	1971-1982	Aa2 FMB	A2	3
Wisconsin Public Service	1969-1975	Aa2 FMB	A2	3

### Metrics show no meaningful improvement

Among electric utilities—both non-nuclear and nuclear vertically integrated companies—many key financial credit metrics have remained reasonably steady in recent times. While a stable financial profile reflects our sense of the sector's relative stability and predictability, we are becoming increasingly concerned that the nuclear utilities do not appear likely to see any meaningful improvement over the near to intermediate term.

Because companies that build new nuclear generation will increase their overall business and operating risk profiles, we believe they will need to compensate with near-term financial policies that produce strong financial credit ratios. While a constructive regulatory relationship will help mitigate near-term credit pressures, we will remain on guard for potential construction delays and cost overruns that could lead to future rate shock and/or disallowances of cost recovery. Given the lengthy construction time needed for nuclear projects, there is no guarantee that tomorrow's regulatory, political, or fuel environments will be as supportive to nuclear power as today's.

**Table 4: Credit comparisons of nuclear and non-nuclear utilities**

	Integrated Utility (non-nuclear) Average of 38 companies in peer group				Integrated Utility (nuclear) Average of 25 companies in peer group			
	7-yr	5-yr	3-yr	2008	7-yr	5-yr	3-yr	2008
Debt / Capitalization	43%	43%	42%	44%	42%	42%	42%	43%
Debt / EBITDA	3.8	3.2	3.3	3.8	3.0	3.0	3.3	3.3
Debt / Revenues	82%	80%	79%	83%	84%	82%	81%	86%
CFO / Debt	23%	22%	22%	18%	26%	26%	26%	24%
(CFO Pre-W/C) / Debt	24%	23%	22%	22%	27%	26%	26%	25%
FFO / Debt	26%	25%	24%	24%	27%	27%	26%	24%
EBITDA / Interest Expense	6.4	6.5	6.4	6.0	6.6	6.7	6.4	6.3
(CFO Pre-W/C + Interest) / Interest Expense	5.5	5.5	5.3	5.3	5.8	5.9	5.9	6.0
(CFO Pre-W/C-Dividends) / Capex	78%	72%	61%	60%	89%	83%	76%	69%
(CFO Pre-W/C-Dividends) / Debt	17%	17%	17%	17%	20%	20%	20%	20%

## New Nuclear Generation: Ratings Pressure Increasing

We can apply the same general financial-profile views to the parent companies that are now pursuing new nuclear construction:

**Table 5: Credit conditions of parent companies seeking to build nuclear power generation**

	Parent - nuclear Average of 14 companies in peer group			
	7-yr	5-yr	3-yr	2008
Debt / Capitalization	55%	54%	54%	56%
Debt / EBITDA	3.8	3.6	3.2	1.2
Debt / Revenues	131%	121%	123%	126%
CFO / Debt	17%	18%	18%	16%
(CFO Pre-W/C) / Debt	18%	19%	20%	18%
FFO / Debt	19%	20%	20%	19%
EBITDA / Interest Expense	4.5	4.7	4.8	4.3
(CFO Pre-W/C + Interest) / Interest Expense	4.2	4.4	4.4	4.2
(CFO Pre-W/C-Dividends) / Capex	101%	109%	87%	75%
(CFO Pre-W/C-Dividends) / Debt	14%	15%	15%	13%

### Benefits of near-term recovery are limited

New nuclear power construction appears to enjoy strong political and regulatory support in a number of jurisdictions, especially in the southeastern states, where there is now legislation afoot to promote it. This support typically involves the regulators in the decision-making process on the business side; regular reviews of the sponsors' capital budgets; and real-time recovery of financing and other charges associated with the construction process.

Nevertheless, regulatory risks will persist over the longer term, and we increasingly think it unlikely that everything will work out as intended. We are concerned with the size of the investments being made even before the NRC grants a COL; the ongoing potential risks from displacement technology developments over the course of the construction period; and the recovery of sizeable sunk costs, should an issuer abandon a project in the future.

These longer-term risks are difficult to quantify today, but the possibility of abandoning a construction project should not be fully dismissed, regardless of the low probability of such an occurrence today. We remain concerned that should an issuer walk away from a nuclear project, for whatever reason, its multi-billion investment may not be fully recovered, or it may be amortized over a long-term period. This could introduce some material financial distress for almost any issuer.

### Public Power and Cooperatives are positioned with flexible cost recovery mechanisms but rate pressure is expected

A number of municipally owned and not-for-profit cooperatives are partners in several new nuclear development projects. Several of these issuers have already begun raising significant amounts of debt to finance their share of the up-front development costs associated with these projects.



## New Nuclear Generation: Ratings Pressure Increasing

Public power utilities have begun to take proactive approaches to their participation in these projects to mitigate the burden. The Municipal Electric Authority of Georgia, for example, built a sizable reserve in excess of \$700 million and found off takers for some of its initial ownership share to mitigate the financial burden of its ownership in the Vogtle 3 and 4 nuclear project. San Antonio CPS has begun to educate its customer base and to examine its rate process to begin to fund construction in advance of the construction schedule.

Nevertheless, despite their more levered balance sheets, we still consider the municipals and cooperatives better-positioned than the investor-owned utilities, because of their self-regulating rate authorities.

Yet one of the challenges associated with pursuing a new nuclear project is the size of the investment. These entities—like their investor-owned counterparts—risk the prospect that their customers will be unable to absorb steadily increasing rates. Ongoing economic turmoil in the U.S. amplifies this risk over the near to intermediate term and municipals and cooperatives do not have an ability to raise equity capital.

### Is size an issue?

One possible solution might be for utilities to create partnerships for building new nuclear generation, thereby diluting this risk through various sharing mechanisms. Even some of the largest utility and power companies in our sector pale in comparison to the largest industrial customers, and to the foreign power companies, some of which could be strong candidates for such partnerships:

**Table 6: Relative size comparison of other energy companies**

Company	Sr. Unsec.	2008 Debt*	2008 Revenue*	2008 Assets
<b>Large energy companies</b>				
Electricity de France (EdF)	Aa3	\$82,985	\$87,833	\$279,618
Exxon Mobil	Aaa	\$56,596	\$425,071	\$295,024
BP plc	Aa1	\$58,862	\$361,143	\$250,816
<b>U.S. UTILITIES</b>				
Exelon	Baa1	\$18,069	\$18,859	\$48,524
Southern	A3	\$20,276	\$17,127	\$49,380
Duke Energy	Baa2	\$16,721	\$13,207	\$53,968
SCANA Corporation	Baa1	\$4,972	\$5,319	\$11,567
NRG Energy	Ba3 CFR	\$9,275	\$6,885	\$25,071

\* in \$ millions

### Conclusion

The likelihood that Moody's will take a more negative rating position for most issuers actively seeking to build new nuclear generation is increasing. With only about 24 months remaining before the NRC begins issuing licenses for new projects and major investment begins, few of the issuers we currently rate have taken any meaningful steps to strengthen their balance sheets. Considering these new projects tend to raise an issuer's business and operating risk profiles, the utility's overall credit profile appears weaker.

Most issuers still have some time to revise their financing policies. Even so, we are concerned that the turmoil in the financial markets, continued uncertainty associated with Federal loan guarantees, and the general tenor associated with bank credit facilities and liquidity will make such revisions more difficult in the future.

## New Nuclear Generation: Ratings Pressure Increasing

In order to defend existing ratings, or to limit negative rating actions, we will look for investor-owned utilities to:

- create strategic partnerships, to share costs and risks;
- increase reliance on equity as a component to financing plans;
- moderate their dividend policies to retain cash flow; and
- adopt a “back-to-basics” focus on core electric utility operations, posing less distraction for management

In addition to this “back to basics” focus on core operations and management, we would expect municipal and cooperative utilities to increase up-front rates to consumers, in order to build liquidity cushions and prevent rate shocks.

From a risk mitigation perspective, the prospect of seeking business partners—particularly major multinational energy companies with some experience in the nuclear arena—might also be worth exploring as a good way to preserve liquidity and cash flow, while still reaping the benefits of new nuclear power generation.

## New Nuclear Generation: Ratings Pressure Increasing

## Appendix A: Historical rating actions

Issuer	Period	Comment	Reactor
Alabama Power	1975-1987	A2 FMB downgraded to Baa2 in 1976, Baa3 in 1982, followed by multiple rating upgrades in 1983, 1984, 1985, 1986	Farley
Arizona Public Service	1981-1993	A2 FMB downgraded to A3 in 1982, Baa2 in 1984, Baa3 in 1989; upgraded to Baa2 in 1992	Palo Verde
Baltimore Gas & Electric	1974-1979	A2 FMB	Calvert Cliffs
Cleveland Electric Illuminating	1981-1993	Aa2 FMB downgraded to A2 in 1981, A3 in 1984, Baa2 in 1985, Baa3 in 1993	Perry
Commonwealth Edison	1968-1990	Aa2 FMB downgraded to A2 in 1980, A3 in 1984, Baa1 in 1987	Dresden / Quad Cities / Zion / LaSalle / Byron / Braidwood
Connecticut Light & Power	1972-1978	Aa2 FMB downgraded to A2 in 1974	Conn. Yankee / Yankee Rowe
Consolidated Edison Co of NY	1972-1978	A2 FMB downgraded to Baa2 in 1974	Indian Point
Consumers Energy	1969-1974	Aaa FMB downgraded to Aa2 in 1972	Palisades
Detroit Edison	1985-1992	Baa3 Sr. Sec. upgraded to Baa1 in 1985, downgraded to Baa2 in 1987 followed by upgrades to Baa1 in 1990, A3 in 1991	Fermi
Duke Energy Carolinas	1972-1986	Aa2 FMB downgraded to A2 in 1973; upgraded to A1 1982, Aa3 in 1983 and Aa2 in 1984	Oconee / McGuire / Catawba
Duquesne Light	1974-1988	Aa2 FMB downgraded to A2 in 1979, A3 in 1982, Baa1 in 1984 and Baa2 in 1987	Beaver Valley
Entergy Arkansas	1973-1979	A2 FMB downgraded to Baa2 in 1974	Arkansas Nuclear
Entergy Gulf States	1980-1988	A2 FMB downgraded to Baa2 in 1982, Baa3 in 1984, follow by upgrade to Baa2 in 1985 and downgrade to Ba2 in 1986 and to Ba3 in 1987	Riverbend
Entergy Louisiana	1983-1988	Baa3 FMB downgraded to Ba2 in 1985, followed by upgrade to Baa2 in 1986, downgraded to Ba2 in 1988 then upgraded back to Baa3 in 1988	Waterford
Entergy Mississippi	1981-1987	A2 FMB downgraded to A3 and again to Baa2 in 1982, downgraded to Ba2 in 1985, followed by upgrades to Baa2 and again to Baa1 in 1986	Grand Gulf
Florida Power & Light	1972-1984	Aa2 FMB downgraded to A2 in 1974, followed by upgrades to A1 in 1982 and Aa3 in 1984	Turkey Point / St. Lucie
Georgia Power	1975-1990	Baa2 FMB upgraded to Baa1 in 1982, downgraded to Baa2 in 1987	Hatch / Vogtle
Houston Light & Power	1987-1994	A2 FMB downgraded to A3 in 1989, upgraded to A2 in 1993	South Texas Project
Illinois Power	1984-1989	A2 FMB downgraded to A3 in 1986, to Baa2 in 1988 and Baa3 in 1989	Clinton
Indiana Michigan Power	1973-1979	A2 FMB downgraded to Baa2 in 1975	Cook
Iowa Electric Light & Power	1973-1977	Aa2 FMB downgraded to A2 in 1974, to Baa2 in 1975, followed by upgrade to A2 in 1977	Duane Arnold
Jersey Central Power & Light	1968-1980	A2 FMB downgraded to Baa2 in 1972 and Ba2 in 1980	Oyster Creek / Three Mile Island
Kansas Gas & Electric	1982-1986	Baa2 FMB downgraded to Baa3 in 1982, upgraded to Baa2 in 1986	Wolf Creek
Long Island Lighting	1972-1990	Aa2 Sr. Sec. downgraded to A2 in 1979, to Baa2 in 1980, upgraded to Baa1 in 1982, followed by downgrade to Baa3 in 1983, to B2 quickly followed by upgrade to Ba3 in 1984, Ba1 in 1989 and Baa3 in 1990	Shoreham
Metropolitan Edison	1973-1984	A2 FMB downgraded to Baa2 in 1979, B2 in 1980 followed by upgrade to Ba2 in 1984	Three Mile Island
New England Power	1971-1992	Aa2 FMB downgraded to Aa3 in 1982, A1 in 1988	Vt Yankee / Seabrook

## New Nuclear Generation: Ratings Pressure Increasing

Issuer	Period	Comment	Reactor
Niagara Mohawk Power	1968-1988	Aaa FMB downgraded to A2 in 1968, A3 in 1982 and Baa1 in 1984 followed by upgrade to A3 in 1985 and downgrade to Baa1 in 1986, Baa2 in 1987 and upgrade to Baa1 in 1988	Nine Mile Point / Fitzpatrick
Northern Indiana Public Service	1973-1985	Aa2 FMB downgraded to Aa3 in 1982, to A3 in 1983 followed by upgrade to A1 in 1984 and downgrade to A2 and then to Baa2 in 1985	Bailly
Northern States Power (MN)	1970-1976	Aa2 FMB	Monticello / Prairie Island
NSTAR Electric	1971-1990	Aa2 FMB downgraded to A2 then to baa2 in 1974 followed by upgrade to A3 in 1983, A1 in 1984 then downgraded to Baa1 in 1988	Maine Yankee / VT Yankee / Pilgram / Seabrook
Ohio Edison	1975-1988	Aa2 FMB downgraded to A2 in 1976, downgraded to Baa3 in 1981; upgraded to Baa2 in 1987	Davis-Besse / Perry
Pacific Gas & Electric	1983-1988	A1 FMB	Diablo Canyon
Philadelphia Electric Company	1973-1991	Aaa FMB downgraded to aa2 in 1973 to A2 in 1974 to Baa2 in 1981 and Baa3 in 1983 followed by upgrade to Baa2 in 1991	Peach Bottom / Limerick
PPL Electric Utilities	1982-1986	Aa2 FMB downgraded to Aa3 and again to A2 in 1982	Susquehanna
Progress Energy Carolinas	1970-1987	Aa2 FMB downgraded to A2 in 1971 to Baa2 in 1975 followed by upgrade to A2 in 1978	Robinson / Brunswick / Shearon Harris
Progress Energy Florida	1975-1981	A2 FMB	Crystal River
Public Service Co of Colorado	1976-1990	Aa2 FMB downgraded to A2 in 1980, upgraded to A1 in 1983, upgraded to Aa3 in 1985, downgraded to A1 in 1986 and to A2 in 1987 and A3 in 1990	Ft St Vrain
Public Service Co of New Hampshire	1980-1991	Baa2 FMB downgraded to Baa3 then Ba1 in 1982, to B3 in 1984 followed by upgrade to B1 in 1986 then downgrade to Caa2 in 1987 followed by upgrade to Baa2 in 1991 exiting from bankruptcy	Seabrook
Public Service Electric & Gas	1973-1987	Aa2 FMB downgraded to Aa3 in 1982	Peach Bottom / Salem / Hope Creek
Puget Sound Energy	1978-1986	Baa2 FMB upgraded to A3 in 1985	Pebble Springs
Rochester Gas & Electric	1969-1975	Aa2 FMB downgraded to A2 in 1969	GINNA
South Carolina Electric & Gas	1979-1985	A2 FMB upgraded to A1 in 1984	Summer
Southern California Edison	1979-1985	Aa2 FMB	San Onofre
Texas Utilities	1989-1995	Baa2 FMB downgraded to Baa3 in 1990	Comanche Peak
Toledo Edison	1977-1988	Baa2 FMB upgraded to Baa1 in 1982, downgraded to Baa2 in 1983, downgraded to Baa3 in 1984	Davis-Besse / Perry
Union Electric	1980-1988	A2 FMB downgraded to Baa1 in 1980, to Baa2 in 1982, followed by upgrade to A3 in 1985 and A2 in 1988	Callaway
Virginia Electric and Power	1971-1982	Aa2 FMB downgraded to A2 in 1974	Surry / North Anna
Wisconsin Public Service	1969-1975	Aa2 FMB downgraded to A2 1969, upgraded to Aa2 in 1975	Point Beach / Kewaunee

## New Nuclear Generation: Ratings Pressure Increasing

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