The McNeil Story

John M. Irving*, McNeil Plant Manager
Burlington Electric Department, 585 Pine St., Burlington, Vermont, USA 05401
Fax: 802-865-7482; jirving104@AOL.com

In 1978, 73% of the voters of the City of Burlington, Vermont, approved the construction of a 50MW wood fired power plant. This plant is now known as the Joseph C. McNeil Generating Station. Prior to that time, Burlington relied on an aging coal fired plant with outdated emission controls. Power supply options were extremely limited for Burlington Electric, a department of the City. Oil prices were $25 per barrel and showed no signs of declining. Environmental concerns would not allow another coal fired plant. Natural gas was not available in Vermont in sufficient quantities or at reasonable prices, and the accident at Three Mile Island Nuclear Plant precluded any thought of investing in additional nuclear power options.

It seemed logical to build a wood fired plant in a state where 80% of the land area is forested and considering Vermont had one of the lowest populations of any state in the country. The choice to build the plant in the largest city in Vermont proved to be somewhat more controversial. Siting a biomass plant in an urban area has distinct advantages in that there is greater potential for combined heat and power and the plant can serve as an excellent educational tool. It also has the disadvantage in that siting an industrial facility near a residential neighborhood causes concerns from local neighbors. The Burlington Electric Department chose to build the plant in Burlington primarily so the annual property taxes ($1 million/year) would go towards the local tax base.

There were some concerns about the plant in the permitting process. The most immediate access to the McNeil site from the interstate highway was through the streets of neighboring Winooski, Vermont. In order to mitigate these concerns, BED agreed to receive 75% of all wood fuel deliveries by railroad, despite a 20% effective increase in fuel prices for transportation. There were concerns that a plant using 500,000 tons of wood annually would devastate the forests in Vermont. Studies were done to allay this fear and BED agreed to have four professional foresters to develop and administer strict harvesting policies. The State of Vermont issued an air quality permit with extremely low particulate emission limits, (.007 grains/dry standard cubic foot). The local chapter of The Sierra Club and the City of Winooski then sued the State for issuing a permit with no limits on nitrogen oxides (NOx). A court settlement followed where BED agreed to install continuous monitors for NOx and limit the emissions to 0.2 pounds per million Btu heat input. When the actual court order was issued, there was also an annual cap of 239.4 tons per year of NOx attributable to wood, which would limit the plant to a 50% capacity factor on wood. When BED pointed this out to the State regulators, they agreed to remove the annual cap from the permit.

Startup for the McNeil Plant in 1984 presented new challenges. Noise from plant operations caused concerns for neighbors adjacent to the plant. Vibration from unloading railcars was also objected to, as was fugitive dust from unloading railcars from an elevated trestle during north winds. In 1985, an aging wood inventory resulted in smoldering wood and odors from fermentation. Equipment modifications and operating procedure revisions solved all these concerns by 1988.

In 1995, after a seven-year period without much controversy, neighbors started again complaining about dust. Several changes occurred just prior to this.

?? The trees separating McNeil Station from a housing complex immediately south of McNeil were cut down as part of a plan to stabilize the bank, which was very unstable. The trees had served as a visual and dust barrier previously.

?? Sawdust, which had not been available in significant quantities previously, was more abundant as farming declined in Vermont. The rail transportation requirement made it necessary for a portion of the sawdust to be delivered by railroad.
?? Smooth wood conveyor belts had been replaced with ribbed belts to prevent wood slippage in winter months when the wood was frozen. Ribbed belts are harder to clean and result in more fugitive dust from wood dust on the return belt.

Improvements were made including windscreens, dust screens, tree plantings, improved conveyor belt cleaners, regular road sweeping and a new wood processor which reduced fines. Unloading railcars was avoided during high winds from McNeil towards local residences. Sawdust deliveries by rail were discontinued. Public meetings were held with technical and medical experts to evaluate the situation and educate the public. State air quality regulators continued to take the position that no standards were exceeded. A dust study was conducted by a local engineering firm that concluded no standards had been exceeded and that the highest dust levels occurred when the wind was coming from the south (i.e., the City itself), rather than from the north from McNeil. While wood dust was a minor portion of dust in the neighborhood, when it occurred, it was very visible and identifiable as wood dust due to the large particle size. Regular meetings were held with neighbors to evaluate conditions and improvements with no resolution.

In 1998, the State of Vermont was revising the McNeil Air Permit for compliance with Title V of the Clean Air Act. A staff member discovered the 1982 Court Order and stated that a court order could not be unilaterally deleted from the permit. The annual NOx limit was reinserted into the permit until all parties agreed it should be removed. Limiting the plant operation to a 50% capacity factor on wood has serious implications to the station. Alternative fuels are very expensive and do not allow green marketing benefits for the plant. This would also prohibit McNeil from completing plans for a district heating system using energy from the station. Monitoring and modeling had shown that there were no NOx related concerns associated with the plant. The State of Vermont, the City of Winooski, and McNeil Plant management all agreed the annual NOx limit should be removed. The Sierra Club position was that the NOx cap should not be removed until the dust situation was resolved to the satisfaction of the neighbors.

In 1999, the McNeil Plant management agreed to construct a $1 million enclosure around the rail trestle unloading area. The State of Vermont and the New England Central Railroad provided funding assistance for this project. A state of the art TEOM continuous particulate monitor was placed in service in November 2000. The trestle enclosure was completed in December 2000. Monitoring results confirmed earlier studies that dust levels were significantly below any applicable standard and highest with winds coming from Burlington rather than from McNeil.

As a result of the NOx from wood limit in the court order, in the month of December 2000 alone McNeil was forced to consume 850,000 gallons of fuel oil and 24 million cubic feet of natural gas. This resulted in fuel costs 60% higher than if all fuel had been wood (+$600,000/month). The resultant greenhouse gas emissions were 5 times as great under this fuel mix compared to if the fuel had been 100% wood.

The Burlington Electric Department brought the issue back to the Vermont Superior Court, which had issued the original order. All parties except for The Sierra Club agreed the court order should be vacated and the issue of NOx emissions left to the State of Vermont Agency of Natural Resources. The Sierra Club has represented that it will agree to vacate the court order if the McNeil management pays their legal costs and provides funding to the neighbors to challenge future permit renewal. This is the status as this abstract is written.