**IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF OHIO
EASTERN DIVISION**

**UNITED STATES OF AMERICA, et al.,
Plaintiffs,**

v.

**OHIO EDISON COMPANY, et al.,
Defendants.**

**Case No. 2:99-CV-1181
JUDGE EDMUND A. SARGUS, JR.
Magistrate Judge Terence P. Kemp**

OPINION AND ORDER

This matter is before the Court following a trial to the Court on Plaintiffs' claims that Defendant Ohio Edison Company has violated the Clean Air Act ["CAA"], 42 U.S.C. §§ 7401, *et seq.*, in connection with its operation of the W.H. Sammis Station, a coal-fired electric generating facility located in Jefferson County, Ohio. The Plaintiffs consist of the United States of America together with the States of Connecticut, New Jersey and New York. The Sammis Plant is owned by Pennsylvania Power Company, a wholly owned subsidiary of Defendant Ohio Edison which, in turn, is a wholly owned subsidiary of FirstEnergy Corporation of Akron, Ohio. The Court has jurisdiction over this action pursuant to 28 U.S.C. § 1331. Pursuant to Fed. R. Civ. P. 52(a), the Court makes the following Findings of Fact and Conclusions of Law based on the evidence adduced at trial.

I.

INTRODUCTION AND SUMMARY

A. Introduction

This case highlights an abysmal breakdown in the administrative process following the passage of the landmark Clean Air Act in 1970. For thirty-three years, various administrations have wrestled with and, to a great extent, have avoided a fundamental issue addressed in the Clean Air Act, that is, at what point plants built before 1970 must comply with new air pollution standards. The Clean Air Act requires plants constructed after 1970 to meet stringent air quality standards, but the Act exempts old facilities from compliance with the law, unless such sites undergo what the law identifies as a "modification." Decades later, the United States Environmental Protection Agency, together with the States of Connecticut, New Jersey and New York ask this Court to find that eleven construction projects undertaken between 1984 and 1998 on the seven electric generating units at the Sammis Plant constituted modifications, requiring Ohio Edison to bring the units into compliance with current ambient air quality standards.

By any standard, the enforcement of the Clean Air Act with regard to the Sammis Plant has been disastrous. From a public health perspective, thirty-three years after passage of the Act, the plant to this day emits on an annual basis 145,000 <u>tons</u> of sulphur dioxide, a pollutant injurious to the public health. From an employment perspective, Ohio Edison has chosen to meet other statewide and regional air quality standards by switching to out of state, low sulphur coal, a strategy which in conjunction with other utilities has caused a huge loss of coal mining and related jobs in Ohio.[1] From the standpoint of Ohio Edison, since 1970 the company has invested over $450 million to install pollution control devices on the Sammis units yet still fails to meet the new source pollution standards. Thirty-three years later, the air is still not clean, tens of thousands of jobs have been lost, and enforcement by the EPA has been highly inconsistent.

[1]In 1980, 14,638 coal miners were employed in Ohio mining high sulphur coal. By 2000, the number dropped to only 2,688. U. S. Census, 2000. During the same period, national coal production increased from 612 million tons to 1.12 billion tons. 2001 Annual Energy Review, U. S. Dept. of Energy.

As is described in detail below, the original and current language of the Clean Air Act requires that an older plant undergoing a modification thereafter comply with new air quality standards. Regulations issued under the Clean Air Act by the U. S. EPA may not conflict with statutory language enacted into law by Congress. EPA regulations give further definition as to what types of projects are to be viewed as modifications which trigger the application of new air quality standards to an older facility. These statutory and regulatory definitions are at issue here.

This Court takes note of the fact that three decades after passage of the Clean Air Act the EPA finally moved, through this and several other lawsuits, to finally resolve this fundamental issue under the Act. While the law has always been clear, the enforcement strategies of the EPA have not. It is clear to this Court that at various times since 1970 officials of the EPA have been remiss in enforcing the law and clarifying its application to specific projects. For the reasons explained in Section III, I(H), *infra*, the Court finds that the EPA's failures in enforcement do not absolve Ohio Edison from liability under a law that has always been clear.

It is also evident from the record in this case that various electric utilities and industry organizations have sought within legal bounds to influence the conduct of the EPA. Given the enormous cost of retrofitting an older electric power plant with new pollution control devices, this strategy should not be unexpected in the democratic and administrative process. What should be unexpected and condemned, however, is an agency unwilling to enforce a clear statutory mandate set forth in an act of Congress.

With regard to this case, the parties have litigated at this juncture whether the eleven projects at the Sammis units have triggered application of the standards set forth in the 1977 amendments to the Clean Air Act. The questions resolved today by this Court are legal in nature. In contrast, in the next phase of this case, the remedies the Court may consider and impose involve a much broader, equitable analysis, requiring the Court to consider air quality, public health, economic impact, and employment consequences. The Court may also consider the less than consistent efforts of the EPA to apply and enforce the Clean Air Act.

B. Summary of Issues

The issues presented in this lawsuit turn on an interpretation of the term "modification." Congress provided in the Clean Air Act that any modification of a plant triggered application of the Act and later amendments. As described in Section I(C), *infra*, the Administrator of the EPA has refined, by regulation, the definition of modification to include only activities which involve both a physical change to a unit and a resulting significant increase in emissions. Excluded from the definition of modification are projects involving only "routine maintenance, repair or replacement." 40 C.F.R. § 52.21(b)(2)(iii)(a).

In this case, Ohio Edison undertook eleven construction projects at the seven Sammis Units. The total cost of the projects was approximately $136.4 million. The documents prepared to justify the expenditures described the various purposes of the projects to include replacement of major components to increase both the life and the reliability of the units. A primary goal of the projects was to prevent or at least diminish the number and duration of outages, meaning unplanned periods of time when the unit was offline and unproductive.

By physically replacing aging or deficient components, Ohio Edison intended and achieved a significant increase in the operation and output of the units. In turn, the amount of emission of sulphur dioxide, nitrogen oxides and particulate matter also increased.

If the projects were modifications, as used in the Clean Air Act, Ohio Edison was required prior to construction to project and calculate post-construction emissions to determine if the new standards applied. Further, if the projects were modifications, Ohio Edison was required to obtain a pre-construction permit. Because the company contended the projects were not modifications but were instead "routine maintenance, repair and replacement," neither of those courses was pursued. The EPA and state plaintiffs contend that all eleven projects constituted modifications.

While the analysis required to distinguish between a modification sufficient to trigger compliance from routine maintenance, repair and replacement is complex, the distinction is hardly subtle. Routine maintenance, repair and replacement occurs regularly, involves no permanent improvements, is typically limited in expense, is usually performed in large plants by in-house employees, and is treated for accounting purposes as an expense. In contrast to routine maintenance stand capital improvements which generally involve more expense, are large in scope, often involve outside contractors, involve an increase of value to the unit, are usually not undertaken with regular frequency, and are treated for accounting purposes as capital expenditures on the balance sheet. As outlined in Section III, the only two courts which have addressed this issue have essentially adopted this same analysis.[2]

As explained in detail below, the projects were all intended to result in increased hours of operation as a result of a reduction in the number and length of forced outages, or shutdown for repair or maintenance. A significant decrease in outages results in a significant increase in both

---

[2] *See Wisconsin Electric Power Company v. Reilly*, 893 F.2d 901 (7th Cir. 1990) (*en banc*); *United States v. Southern Indiana Gas & Electric Co.*, 245 F.Supp.2d 994 (S.D. Ind. 2003).

production and emissions. Given the actual goals placed on the construction projects by Ohio Edison, and the substantial increase in emissions certain to follow, the company was required to project future emissions. If those projected increases were substantial, as defined by regulations noted below, preconstruction approval, which was never sought, was required by law.

The eleven projects at issue in this case were extensive, involving a combined outlay of $136.4 million dollars. The vast majority of the expenditures were treated for accounting purposes as capital, as opposed to maintenance, expenses. Most of the work was performed by outside contractors, as opposed to in-house maintenance crews. The purpose of the projects was to extend the lives of units built before 1970, not simply to perform routine preventative care on components of the units. Finally, all of the projects involved replacement of major components which had never before been replaced on the particular units. As a result, the projects were not routine in any sense of the term, and could have been projected to significantly increase the emission of pollutants.

Congress expressly intended the Clean Air Act and the 1977 Amendments to become applicable to pre-existing plants, as such facilities were modified. As noted by the United States Court of Appeals for the Seventh Circuit in *WEPCO*:

> Congress did not permanently exempt existing plants from these requirements . . . existing plants that have been modified are subject to the Clean Air Act programs at issue here.

WEPCO, 893 F.2d at 909. Further, as at least one member of the Sixth Circuit has observed:

> The purpose of the "modification" rule is to ensure that pollution control measures are undertaken when they can be most effective, at the time of new or modified construction.

National-Southwire Aluminum Co. v. EPA, 838 F.2d 835, 843 (6th Cir. 1988) (Boggs, J., dissenting).

As described in greater detail below, the eleven projects at issue in this case were major modifications sufficient to trigger application of the Clean Air and subsequent amendments.

II.

FINDINGS OF FACT

I. Background

The Sammis Plant is situated along the Ohio River on State Route 7 in the Village of Stratton, Saline Township, Jefferson County, Ohio. The Plant consists of seven separate generating units, numbered 1 through 7. Units 1 through 4 were placed in service from 1959 to 1962. Units 1 - 4 are approximately 150 feet tall, or about 15 stories high. The units use nearly identical naturally circulating boilers in which steam outlet pressures of up to 2,450 pounds per square inch [“psi”] are created.

Unit 5 was placed into service in 1967. The unit’s boiler operates in a “once-through universal pressure design,” in which water is evaporated and heated to superheated steam in one continuous series of tubes inside the boiler. Unit 5 includes a coal pulverizing unit which is unique within the United States. The unit is approximately 180 feet tall, or roughly 18 stories high.

Unit 6 was placed into service in 1969, while Unit 7 began operations in 1971. The boilers of Units 6 and 7 are identical in design. Similar to Unit 5, these units utilize a once-through universal pressure design while operating at a higher supercritical steam pressure of above 3,203 psi. The boilers of Units 6 and 7 are approximately 200 feet tall.

Coal-fired power plants, such as the Sammis plant, generate electricity using three major components: the boiler, turbine and generator. The boiler is a large building-like structure in which coal is burned inside the furnace and the energy from the combustion process is transferred to water to produce steam. The steam is then directed to the turbine where it is further converted to mechanical energy in the form of a spinning turbine shaft, which in turn drives the generator that produces electricity. The walls, roof and floor of the boiler are comprised of tubes, as are the other major components of the boiler, *i.e.*, the economizer, primary superheater, secondary superheater and reheater. The components are made up of densely packed assemblies of tubes that incrementally raise the temperature of the steam before it leaves the boiler to generate electricity.

The Sammis units are fueled by pulverized coal, meaning that coal is fed from bunkers to pulverizers that grind the coal to a powdery consistency. The pulverized coal is then conveyed through coal pipes to burners where it is ignited and combusts within the furnace area of the boiler. The flame resulting from the combustion of the pulverized coal/air mixture extends into the furnace area of the boiler, releasing the chemical energy present in the coal in the form of light and heat energy. In the combustion of coal, chemical energy, gas by-products and particulate matter ["PM"] are released. The gases are collectively referred to as flue gas. The flue gases produced from the combustion process form carbon dioxide, carbon monoxide, sulfur dioxide ["SO_2"]and nitrogen oxides ["NO_x"]. The flue gases flow through the convection section of the boiler and exit to the air heater and to any pollution control devices. From there, the flue gases enter an induced draft fan and then exit through a stack and into the atmosphere.[3]

The tubes that comprise the waterwalls and major components are in constant contact with the flue gas and/or combusting coal. Leaks in the tubes are caused by thermal cycling (heating up and cooling down), external corrosion from exposure to caustic agents, erosion from high flue gas velocities and entrained ash particles and internal corrosion caused by poor water quality. As a result, the tubes require regular repair or replacement.

Each of the units has a Net Dependable Capacity ["NDC"], which is the maximum output of electricity that a unit can expect to achieve over a long period of time. (*Pipitone Testimony,* Tr. Vol. V at 211). A unit's NDC is confirmed each year by an eight hour test in accordance with protocols established by the North American Electric Reliability Council ["NERC"].[4] Sammis Units 1 and 2 had original NDCs of 188 megawatts ["MW"] each. Units 3 and 4 were rated at 192 MW, Unit 5 was rated at 330 MW, and Units 6 and 7 were rated at 650 MW. (*Pipitone Testimony*, Tr. Vol. V at 218). In the late 1970s, the NDCs were lowered to improve Sammis' overall reliability and more accurately measure potential output. The changed ratings remain the same today: Units 1-4 have an NDC of 180 MW each, Unit 5 has an NDC of 300

---

[3]Ohio Edison has installed electrostatic precipitators on all seven units to collect fly ash coming out of the boilers. The precipitators on Units 1 through 4 were installed from 1959 to 1962. For Units 5, 6 and 7, the precipitators were installed when the units went into service, in 1967, 1969 and 1971, respectively. (*Kaiser Testimony*, Tr. Vol. X at 63). At the time of installations, the precipitators were state-of-the-art technology. (*Id.*). Later, from 1980 to 1984, Ohio Edison undertook an Air Quality Control project at a cost of $450,000,000.00. (*Pipitone Testimony*, Tr. Vol. VI at 101). The project involved the construction of a unique deck-like structure over Ohio State Route 7 along the Sammis Plant.

[4]Ohio Edison is a member of the East Central Area Reliability Council ["ECAR"], which, in turn, is a member of NERC. NERC and ECAR were organized by utilities following the Northeast blackout of 1965 in order to promote reliable electric power supply in the United States. Both organizations operate to insure that all regions of the country have sufficient available power to meet demand, primarily through an electric power grid system which allows transfer of power from one utility to another.

MW and Units 6 and 7 have an NDC of 600 MW each. (*Id.* , Tr. Vol. V at 213). Ohio Edison plans its operations based upon the NDCs of its units. (*Id.*, Tr. Vol. V at 212). Ohio Edison also uses the NDCs in reports concerning reserve margins for its electrical system which are sent to the Public Utilities Commission of Ohio ["PUCO"] and the Federal Energy Regulatory Commission ["FERC"]. (*Id.*, Tr. Vol. V at 214).

Electricity is generated on an "as needed" basis, since at most plants electricity cannot be stored. The demand for electricity and hence, the generation of electricity, varies on any given day as well as with the weather patterns and the overall economy. (*Garfield Testimony*, Tr. Vol. VII at 150-52). The Sammis plant operates within a system of interconnected electric generating units on a "power grid." (*Id.*, Tr. Vol. VII at 156-57). Ohio Edison is obligated to possess enough generating capacity to meet the highest possible electricity demand with adequate backup capacity to ensure against unforeseeable emergencies. (*Koppe Testimony*, Tr. Vol. IV at 161).

Reliability is a critical element of power plant operation. (*Pipitone Testimony*, Tr. Vol. V at 192). In general, reliability is measured with reference to whether a unit is able to operate over sustained periods at the level of output required by the utility. (*Id*., Tr. Vol. V at 193). One measure of reliability is availability, *i.e.*, the percentage of total time in a given period that a unit is available to generate electricity. (*Id.*). A related measure of reliability is the amount of forced outage rate, which reflects the percentage of time in a period (such as a year) when a unit is forced off-line involuntarily. (*Id.*, Tr. Vol. V at 195). A forced outage occurs when a unit must be brought off-line due to a component problem. (*Monti Testimony*, Tr. Vol. I at 196). The most common cause of forced outages in a coal-fired electric plant is boiler tube failure. (*Hecking*

Testimony, Tr. Vol. II at 132; Def. Exhibit 284).[5]

Utilization is a measure of how much an available unit is actually used to generate electricity. (*Garfield Testimony*, Tr. Vol. VII at 166). Many factors influence a utility's utilization of a given unit, including the unit's fuel costs, the unit's heat rate or efficiency, the unit's response to load variation, the unit's location in the transmission system, and the demand for electricity and other low-cost sources of electricity. (*Id.*, Tr. Vol. VII at 166).

Heat rate measures the quantity of heat necessary to generate a kilowatt-hour of electricity. (*Koppe Testimony*, Tr. Vol. IV at 158). Heat rate is measured as a ratio of Btu's per kilowatt hour. (*Pipitone Testimony*, Tr. Vol. V at 192). In general, the lower a unit's heat rate, the less coal it will burn to generate the same amount of electricity. (*Koppe Testimony*, Tr. Vol. IV at 159).

In the 1980s and 1990s, Ohio Edison developed a program to improve the heat rate of the Sammis units. (*Pipitone Testimony*, Tr. Vol. VI at 37). Projections of future heat rate improvements were reflected in five-year plans for the Sammis Plant. (Def. Exhibit 1345, Sammis Plant Five-Year Plan, 1986-1990; Joint Exhibit 315, Sammis Plant Five-Year Plan, 1989-1993). According to Defendant representatives Pipitone and Kaiser, a range of activities were undertaken to improve the heat rate of the Sammis units, from replacement of boiler duct work expansion joints and refurbishment of internal turbine seals to opeartor training. (*Pipitone Testimony*, Tr. Vol. VI at 37; *Kaiser Testimony*, Tr. Vol. X at 94, 104). According to Pipitone, the Sammis units experienced long-lasting heat rate improvements as a result of the foregoing

[5]In addition to forced outages, units are regularly shut down for scheduled outages involving pipe replacement, and less frequently, turbine maintenance.

efforts. (*Pipitone Testimony*, Tr. Vol. VI at 38).

As stated *supra*, electric generating boilers are subject to failure due to the conditions under which they operate. Combustion temperatures of up to 3000° F in the Sammis boilers transfer heat to the boiler tube metal, which has temperatures of 450° F to 1,200° F, and then to the fluid inside the tubes at temperatures of approximately 400° to 1,100° F. (Def. Exhibit 136, *Report of R. Vetterick* at 11). Short-term overheat is the most common cause of boiler tube failure. (*Id.* at 12). Boiler tube metal temperature quickly rises if anything inside the boiler tube interferes with the heat flow to the boiler fluids. (*Id.* at 11). At higher temperatures, the tube metal becomes "plastic," losing strength to the point where the boiler tube metal begins to stretch or bulge out like a balloon due to the internal pressure. (*Id.*). As a result, the boiler tube wall becomes thinner and ruptures. (*Id.* at 11-12). Another common cause of boiler tube failure is erosion. (*Id.* at 12). Fly ash in the flue gas wears away the metal of the boiler tubes and as the tube walls lose strength from thinning, boiler tube failures occur. (*Id.* at 12).

Consequently, boiler components, particularly boiler tubes, must be repaired or replaced on a regular basis. At Sammis, each boiler is regularly scheduled for an outage, during which tube replacement and other needed repairs or work are performed so as to minimize unit downtime. (*Pipitone Testimony*, Tr. Vol. V at 202). Scheduled boiler outages occur every twelve to thirty-six months at the Sammis units. (*Id.*). Scheduled turbine outages, which involve more downtime, occur every five to seven years at the Sammis units. (*Id.* , Tr. Vol. at 203). During turbine outages, work is performed inside the boiler and the turbine itself is disassembled and inspected. (*Hekking Testimony*, Tr. Vol. II at 135-36). Monorails are permanently installed at Sammis for use in such repair and replacement work. (*Wagstaff Depo.* at 164). The work done inside the boilers is performed by contractors because Sammis' in-house staff is not certified to perform welds on pressurized parts, *i.e.*, tubes, tube panels and tube assemblies. (*Pytash Testimony*, Tr. Vol. VII at 84, 85, 89, 93, 107, 108, 122, 124). Regularly scheduled outages result in fewer forced outages, reduced temporary deratings and overall improvement in unit reliability and availability. (*Pytash Testimony*, Tr. Vol. VII at 100-01, 104-05, 109, 112-14).

In connection with improving Sammis' overall plant performance, Ohio Edison undertook "Plant Betterment / Life Extension Studies" beginning in 1984 for each of the Sammis units. (*Pipitone Testimony*, Tr. Vol. VI at 12). For example, the study as to Unit 3, dated August 18-31, 1987, states that the "purpose of the inspection [of Unit 3] was to identify what major components would require repair or replacement to permit reliable unit generation to the year 2015 (30 years) and to determine when this work would be required." (Def. Exhibit 1456 at § I). Further, the study states that "it is practical, from an equipment viewpoint, to extend the life of Sammis Unit 3 until the year 2015 while maintaining current levels of efficiency and availability. The cost to repair or replace the major unit components identified in this report as required to extend life as a base loaded unit to 2015 is estimated to less than $100/kw (1985 dollars)." (*Id.*).

According to Defendant, electric generating units do not have predetermined lives. Defendant contends that the life of a given unit is determined by overall economic, market and system conditions. (*Pipitone Testimony*, Tr. Vol. VI at 19-20). Ohio Edison submits that, whether a unit has additional life depends upon the cost incurred by the unit in producing electricity compared to the market price of electricity. Defendant argues that the date 2015 was a date selected for economic analysis purposes. (*Id.*, Tr. Vol. VI at 28, 30). The Government takes issue with this contention and argues that the projects undertaken were done to extend the useful lives of the Sammis units.

One of the Government's experts, Alan Hekking, testified that the age of a coal-fired power plant has a significant impact on the plaint's availability and reliability, as well as the amount of maintenance. (*Hekking Testimony*, Tr. Vol. II at 138-39; *see also* STEAM - Its Generation and Use, Babcock & Wilcox at 46-1 to 46-2 (40th ed. 1992), Pl. Exhibit 1399).[6] At the beginning of plant life, there is a start-up period which is often marked by a high forced outage rate. Thereafter, the new plant experiences few forced outages. (*Hekking Testimony*, Tr. Vol. II at 141). As the plant matures, the aging process results in increased forced outages, maintenance costs and availability declines. Unless overhauls are performed or major components are completely replaced, the forced outage rate gradually increases. (*Id.* at 144).

In the 1980s, as the majority of coal-fired plants in the United States reached the age of 25 to 30 years, a strategy called "life extension" emerged. (*Id.* at 146). Life extension is a term used in the electric utility industry to explain a method of delaying plant retirement by replacing and redesigning components of the unit to make the unit more available and reliable for years into the future. (*Id.* at 146-47).

Ohio Edison participated in the life extension strategy through its membership in a number of electric utility industry groups, in particular, the Electric Power Research Institute ["EPRI"], which was formed in the 1970s. Ohio Edison was a member of the organization from

---

[6]The Court notes that Babcock and Wilcox, the publishers of STEAM - Its Generation and Use, were among the first to design and produce water tube boilers for use in the generation of electricity. Babcock and Wilcox's first design was introduced in 1856. In this case, both Plaintiffs' and Defendants' experts agree that the text is an authoritative source on steam generation as particularly applied to the coal-fired electric utility industry. Sammis Units 5, 6 and 7 all contain Babcock and Wilcox boilers. (*Amended Joint Stipulations* at ¶¶ 55, 57, 59).

the time of its inception. (*Pipitone Testimony*, Tr. Vol. VI at 116-18). EPRI sponsored conferences and published studies concluding that the average service life of a coal-fired boiler is typically 30 to 40 years. (*Hekking Testimony*, Tr. Vol. II at 156-57). For example, as EPRI explained at a conference in June 1986:

> Fossil-fuel-fired generating stations have traditionally been built with an assumed nominal design and economic life of about 30 years. The implicit expectation was that these units would be replaced at the end of this period with new units that would meet load requirements and, through the use of technological improvements, produce power at lower cost, higher availability, and higher efficiency. These expectations have not been realized because of a number of factors that include low load growth, escalating construction costs, historically high interest rates, siting difficulties, and increasingly uncertain regulatory restraints. Utilities have recognized that the potential lifetime of an existing plant may be far in excess of the nominal economic life and that there are numerous inherent economic and system planning advantages in the continued usage of older plants. Thus, utilities are beginning to consider life extension methods as a possible way of retaining units in service for 50 to 60 years or longer.

(Pl. Exhibit 1862).

As described *infra*, a number of the Sammis activities were undertaken to extend the useful lives of the units. These activities were consistent with the "life extension" strategy.

II. The Eleven Sammis Activities

Plaintiffs claim that Ohio Edison undertook eleven projects at the Sammis Units 1 through 7 which constitute "modifications" for purposes of the CAA. The eleven activities are made up of thirty-four parts replacements to the units. The parts that were replaced were both pressure and non-pressure components. The pressure parts of the Sammis boilers include the furnace water wall tubes, economizer tubes, superheater tubes and reheater tubes. (*Amended*

Joint Stipulations at ¶ 36). The economizer, superheater and reheater function as heat exchangers with water or steam flowing on the inside and the hot boiler combustion gases passing on the outside. (*Id.*). The non-pressure parts are comprised of burners, coal pipes, pulverizers and low pressure turbine rotors. (*Krause Testimony*, Tr. Vol. VI at 217).

A. Activity 1: 1993 Scheduled Outage - Unit 1

Unit 1 was removed from service for a scheduled turbine outage from September 26, 1993 to January 1, 1994. (*Amended Joint Stipulations* at ¶ 75). At the time of the outage, Unit 1 was thirty-four years old with no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced three banks of horizontal reheater tubes due to corrosion, high temperature creep and dissimilar material weld damage. (*Amended Joint Stipulations* at ¶ 73). The capitalized cost of the replacements was approximately $2,828,096.92. (*Id.* at ¶ 74). The total cost of the replacement was $3,286,466.00. (*Id.*).

Ohio Edison also replaced furnace ash hopper boiler tubes at Unit 1. (*Id.* at ¶ 76). The capitalized cost of the replacement was approximately $2,543,157.12. The total cost of the replacement was $2,404,062.00. (*Id.* at ¶ 77). During the same scheduled outage, Ohio Edison also replaced secondary superheater outlet headers at Unit 1. (*Id.* at ¶ 79). The capitalized cost of the replacement was approximately $858,344.53 and the total cost of the replacement was $931,360.00. (*Id.* at ¶ 80).

The aggregate capitalized cost, in 1992 dollars, of the replacement components at Unit 1 was $6.1 million dollars. (Def. Exhibit 1905). Ohio Edison's Sammis Boiler Study, July 6, 1989, showed that in 1987-88, there were 8 boiler tube failures at the Unit 1 reheater, secondary superheater outlet headers and furnace ash hopper tubes, all of which were replaced during the Unit 1 outage. (Joint Exhibit 226). The study showed that there would be a virtually 100% reduction in tube failures if the components were replaced. (*Id.*). Furthermore, the X-176 forms[7] prepared for the replacements of the Unit 1 reheater and furnace ash hopper tubes predicted a prevention of tube failures and associated improved availability in the years to follow the replacements. (Pl. Exhibit 476). The same predictions were made on the X-176 forms for replacement of the Unit 1 secondary superheater outlet headers (Def. Exhibit 1553) and replacement of the Unit 1 furnace ash hopper boiler tubes (Pl. Exhibit 482).

B. Activity 2: 1991 Scheduled Outage - Unit 2

Unit 2 was removed from service for a scheduled turbine outage from February 22, 1991 to June 1, 1991. (*Amended Joint Stipulations* at ¶ 84). At the time of the outage, Unit 2 was thirty years old and had no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced three banks of horizontal reheater tubes due to internal corrosion. (*Amended Joint Stipulations* at ¶ 83). The capitalized cost of the replacement was approximately $2,888,399.93. (*Id.*). The total cost of the replacement was $2,521,867.00. (*Id.*). Ohio Edison also replaced furnace ash hopper tubes at Unit 2 during the outage. The capitalized cost of the replacement was approximately $2,036,653.90 and the total cost was $2,978,756.00. (*Id.* at ¶ 86). During the forced outage, Ohio Edison also replaced the secondary superheater outlet headers of Unit 2. The capitalized cost of the replacement was $875,719.18 and the total cost of

---

[7]Ohio Edison's X-176 forms are internal project justification forms prepared for the various replacement projects at issue. Proponents of a project must outline the need, the cost, and the projected benefits of the expenditure.

the replacement was $956,385.00. (*Id.* at ¶ 89).

The aggregate capitalized cost of the replacement projects at Unit 2, in 1992 dollars, was $5.9 million. (Def. Exhibit 1905). According to Ohio Edison, the tubes and headers replaced during the outage are frequently replaced within the coal-fired electric utility industry. (Def. Exhibit 136, *Vetterick Report* at 23-24). Ohio Edison concedes that none of the components were inoperable at the time of replacement. Rather, Ohio Edison determined that replacement would be more cost-effective than future repairs. (*Krause Testimony*, Tr. Vol. VI at 196, 198, 200-02; *Pipitone Testimony*, Tr. Vol. VII at 9-15; *Koppe Testimony*, Tr. Vol. IV at 199-201). The purpose of the replacement projects at Unit 2 was to reduce maintenance costs and forced outages and improve availability and reliability. (Def. Exhibit 1905).

Ohio Edison's Sammis Boiler Study, July 6, 1989, shows that in 1987-88, there were 5 tube failures at the Unit 2 reheater, secondary superheater outlet headers and furnace ash hopper tubes. (Joint Exhibit 226). The study predicted that there would be close to a 100% reduction in tube failures if the components were replaced. (*Id.*). The X-176 forms for the Unit 2 reheater, secondary superheater outlet headers and furnace ash hopper boiler tube replacements anticipated the elimination of tube failures and associated improved availability in the years following the replacements. (Def. Exhibits 1528, 1369 and Joint Exhibit 174).

C. Activity 3: 1992 Scheduled Outage - Unit 3

Unit 3 was removed from service for a scheduled turbine outage from August 30, 1992 to December 26, 1992. At the time of the outage, Unit 3 was thirty-one years old with no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced three banks of horizontal reheater tubes due to creep damage[8], differential metal weld stresses and internal out-of-service corrosion. (*Amended Joint Stipulations* at ¶ 91). The capitalized cost of the replacements was approximately $3,437,528.06. The total cost of the reheater tube replacement was $3,113,596.00. (*Id.* at ¶ 92). During the outage, Ohio Edison also replaced furnace ash hopper tubes due to corrosion fatigue and out-of-service corrosion. (*Id.* at ¶ 94; Def. Exhibit 136, *Vetterick Report* at 24-25). The capitalized cost of the replacement was approximately $2,184,654.18 and the total cost of the replacement was $2,321,520.00. (*Amended Joint Stipulations* at ¶ 95).

Ohio Edison also replaced secondary superheater outlet headers on Unit 3 due to creep failure. (*Id.* at ¶ 97; Def. Exhibit 136, *Vetterick Report* at 25). The capitalized cost of the replacement was approximately $859,517.62 and the total cost of the replacement was $875,423.00. (*Amended Joint Stipulations* at ¶ 98). In addition, Ohio Edison replaced some front wall south cell tubes at Unit 3 due to failure from internal corrosion and internal deposits. (*Id.* at ¶ 100; Def. Exhibit 136, *Vetterick Report* at 25-27). Thirty-nine of the one hundred ten tubes that comprise the front wall of the south cell were replaced. (*Krause Testimony*, Tr. Vol. VI at 218). The capitalized cost of the replacement was approximately $614,323.83 and the total cost of the replacement was $626,092.00. (*Amended Joint Stipulations* at ¶ 101).

During the same outage, Ohio Edison also replaced some furnace south sidewall tubes at Unit 3 due to severe bowing from previous failures, poor circulation and overheat failures. (*Id.* at ¶ 103; Def. Exhibit 136, *Vetterick Report* at 28-29). Seventy-four of the two hundred seventy

[8]Creep damage is a type of corrosion caused by high temperatures in the reheater tubes. (*Pipitone Testimony*, Tr. Vol. VI at 187).

five south sidewall tubes were replaced. (Pl. Exhibit 147, *Hekking Report* at 37). The capitalized cost of the furnace south sidewall tube replacement was $235,300.76 and the total cost of the replacement was $234,682.00. (*Amended Joint Stipulations* at ¶ 104). In addition, Ohio Edison replaced radiant downflow tubes at Unit 3 due to severe radiant heat thermal fatigue. (Def. Exhibit 1905 and Def. Exhibit 136, *Vetterick Report* at 27-28).

According to Defendant, the types of replacements made during Activity 3 are common in the coal-fired electric utility industry. (Def. Exhibit 136, *Vetterick Report* at 24-29; *Krause Testimony*, Tr. Vol. VII at 9-15; *Koppe Testimony*, Tr. Vol. IV at 199-201). Further, although none of the components were inoperable at the time of replacement, Ohio Edison determined that it would be more cost-effective to replace them than to make continued repairs. (*Krause Testimony*, Tr. Vol. VI at 196-98, 200-02; *Pipitone Testimony*, Tr. Vol. VI at 97-98, 113). Ohio Edison's goal in doing the replacements was to reduce maintenance costs and forced outages and to improve availability and reliability. (Def. Exhibit 1905). The aggregate capitalized cost, in 1992 dollars, of the Activity 3 replacement projects was $7.8 million dollars. (*Id.*).

The Sammis Boiler Study, July 6, 1989, identified ten tube failures at the seven components that were replaced as part of Activity 3. (Joint Exhibit 226). The study predicted close to a 100% reduction in tube failures after the replacements. (*Id.*). The X-176 forms preceding the projects predicted a prevention of tube failures and associated improved availability in the years following the replacements. (Joint Exhibit 573, Def. Exhibit 1450, Pl. Exhibit 576, Pl. Exhibit 123, Def. Exhibit 1453 and Pl. Exhibit 490).

D. Activity 4: 1990 Scheduled Outage - Unit 4

Unit 4 was removed from service for a scheduled turbine outage from May 13, 1990 to September 26, 1990. (*Amended Joint Stipulations* at ¶ 108). At the time the outage began, Unit 4 was twenty-seven years old with no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced furnace ash hopper tubes due to tube metal deterioration from corrosion and fatigue and out-of-service corrosion. (*Id.* at ¶ 106; Def. Exhibit 136, *Vetterick Report* at 29-30). The capitalized cost of the replacement was approximately $1,873,989.95 and the total cost was $3,028,104.00. (*Amended Joint Stipulations* at ¶ 107).

During the outage, Ohio Edison also replaced front waterwall tubes in part due to waterside corrosion, fatigue cracking, random soot blower erosion, and weld failures. (*Id.* at ¶ 109; Def. Exhibit 136, *Vetterick Report* at 30-31). The capitalized cost of the replacement was approximately $1,490,250.06 and the total cost of replacement was $1,871,148.00. (*Amended Joint Stipulations* at ¶ 110). Ohio Edison also replaced superheater control condenser tubes at Unit 4 due to heat exchanger cracking. (Def. Exhibit 136, *Vetterick Report* at 31).

According to Ohio Edison, the tubes and headers replaced during Activity 4 are commonly replaced by coal-fired plants in the electric utility industry. (Def. Exhibit 136, *Vetterick Report* at 29-31; *Krause Testimony*, Tr. Vol. VII at 9-15; *Koppe Testimony*, Tr. Vol. IV at 199-201). All of the components were operable at the time Ohio Edison determined that replacement would be more cost-effective than continued repair. (*Krause Testimony*, Tr. Vol. VI at 196-98, 200-02; *Pipitone Testimony*, Tr. Vol. VI at 98-101, 97-98, 113). Ohio Edison's intent in undertaking Activity 4 was to reduce maintenance costs and forced outages and improve availability and reliability. (Def. Exhibit 1905). The aggregate capitalized cost of the project, in 1992 dollars, was $3.7 million. (*Id.*).

The Sammis Boiler Study, July 6, 1989, showed that from 1985 to 1988, there were 17 tube failures at the Unit 3 furnace ash hopper tubes, secondary superheater third pass outlet header tube stubs, and waterwall tubes that were ultimately replaced as part of Activity 4. (Joint Exhibit 226). The study predicted a virtually 100% reduction in tube failures if the components were replaced. (*Id.*). In addition, the X-176 forms prepared for the three projects done in Activity 4 predicted a prevention of tube failures and associated improved availability in the years immediately following the replacements. (Joint Exhibit 404, Joint Exhibit 139, Pl. Exhibit 1956).

E. Activity 5: 1984 Scheduled Outage - Unit 5

Unit 5 was removed from service for a scheduled turbine outage from January 24, 1984 to October 7, 1984. During that time, Ohio Edison replaced the vertical tube furnace with a spiral tube furnace. At the time the project commenced, Unit 5 was sixteen years old. (Def. Exhibit 1905). The purpose of the replacement was to avoid overheating and possible explosions resulting from design and safety deficiencies inherent in the unit. (*Krause Testimony*, Tr. Vol. VI at 206-08, 214-17; Def. Exhibit 1905; Def. Exhibit 136, *Vetterick Report* at 32-34). All of the components were operable at the time of replacement. (*Krause Testimony*, Tr. Vol. VI at 196-98, 200-02; *Pipitone Testimony*, Tr. Vol. VI at 97-98, 113). The spiral waterwall tubes installed on Unit 5 performed exactly the same function as the vertical waterwall tubes that were replaced, carrying the same amount of feed water and absorbing the same amount of heat as the tubes they replaced. (*Vetterick Testimony*, Tr. Vol. IX at 166). The boiler's capacity and operating pressure did not change since there was no functional change with the spiral tube arrangement. (Def. Exhibit 136, *Vetterick Report*, at 33; *Vetterick Testimony,* Tr. Vol. IX at 166). According to Vetterick, Ohio Edison's replacement of the vertical tube furnace with a spiral tube furnace was representative of a commonly practiced response to fundamental design problems in the older boiler and did not change the boiler's basic operating performance characteristics. (Def. Exhibit 136, *Vetterick Report* at 32-34). Only five percent of Unit 5's total heating surface was replaced during the project. (*Id.* at 32).

The capitalized cost of the replacement of the vertical tube furnace with a spiral tube furnace was $12,058,188.07. (*Amended Joint Stipulations* at ¶ 113). The total capitalized cost of the project, including the installation of new low NO_X burners, was approximately $16,739,000.00. (*Wagner Testimony*, Tr. Vol. VIII at 72-73). The total cost of the project at Unit 5 was approximately $17,500,000.00. (*Id.*, Tr. Vol. VIII at 71).

F. Activity 6: 1990 Scheduled Outage - Unit 5

Unit 5 was removed from service for a scheduled turbine outage from April 22, 1990 to July 21, 1990. At the time of the outage, Unit 5 was twenty-two years old with no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced economizer tubes damaged by erosion in order to reduce fly ash pluggage and to lessen flue gas velocities. (*Amended Joint Stipulations* at ¶ 115). The capitalized cost of the replacement of the economizer was approximately $1,500,190.77. (*Id.* at ¶ 116). The total cost of the replacement of economizer tubes was $1,538,340.00. (*Id.*).

During the same outage, Ohio Edison replaced secondary superheater outlet pendant tubes at Unit 5 due in part to damage from high temperature creep. (*Id.* at ¶ 118). Only the third pass of the tubes was replaced; the first and second passes of the secondary superheater tubes were not replaced. (*Krause Testimony*, Tr. Vol. VI at 220). The capitalized cost of the replacement was approximately $1,889,595.69. (*Amended Joint Stipulations* at ¶ 119). The total cost of the replacement was $1,831,916.00. (*Id.*).

Also during the outage, Ohio Edison replaced reheater outlet pendant tubes due to damage caused by high temperature creep and coal ash erosion. (*Id.* at ¶ 121). The bank of inlet tubes were not replaced. (*Id.* at ¶¶ 121-23). The capitalized cost of the replacement of the reheater outlet pendant tubes was approximately $1,258,613.84. (*Id.* at ¶ 122). The total cost of the replacement was $1,196,860.00. (*Id.*). According to Ohio Edison, the tube replacement is common in the coal-fired electric utility industry. (Def. Exhibit 136, *Vetterick Report* at 35-37; *Krause Testimony*, Tr. Vol. VII at 9-15; *Koppe Testimony*, Tr. Vol. IV at 199-201). All of the components were operable at the time of the replacement. Ohio Edison determined, however, that replacement would be more cost-effective than continued repairs. (*Krause Testimony*, Tr. Vol. VI at 196-98, 200-02; *Pipitone Testimony*, Tr. Vol. VI at 97-98, 113). The purpose of the activity was to reduce maintenance costs and avoid increases in the forced outage rate. (Def. Exhibit 1905). The aggregate capitalized cost of the project, in 1992 dollars, was $4.8 million. (*Id.*).

Ohio Edison's Sammis Boiler Study, July 6, 1989, revealed that from 1985 to 1988, there were 17 tube failures at the Unit 5 economizer, reheater outlet pendants, secondary superheater outlet pendants and the upper furnace arch floor, all of which were replaced during Activity 6. (Joint Exhibit 226). The study predicted a 100% reduction in tube failures if the components were replaced. (*Id.*). The X-176 forms prepared for the replacements predict a prevention of tube failures and associated improved availability in the years immediately following the replacements. (Joint Exhibit 92, Def. Exhibit 1469, Joint Exhibit 436, Pl. Exhibit 868).

G. Activity 7: 1986-87 Scheduled Outage - Unit 6

Unit 6 was removed from service for a scheduled turbine outage from September 5, 1986 to February 1, 1987. (*Amended Joint Stipulations* at ¶ 126). At the time of the project, Unit 6 was seventeen years old with no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced horizontal reheater and economizer tubes due to erosion, corrosion, and tube failures from fly ash erosion. (*Amended Joint Stipulations* at ¶ 124; *Koster Depo.* at 292-93). The capitalized cost of the replacement was approximately $4,899,877.85. (*Id.* at ¶ 125).

According to Ohio Edison, the replacement of the horizontal reheater and economizer tubes is common in the coal-fired electric utility industry. (Def. Exhibit 136, *Vetterick Report* at 37-40; *Krause Testimony*, Tr. Vol. VII at 9-15; *Koppe Testimony*, Tr. Vol. IV at 199-201). All of the components were operable at the time of replacement. Ohio Edison determined that replacement was more cost-effective than continued repairs. (*Krause Testimony*, Tr. Vol. VI at 196-98, 200-02; *Pipitone Testimony*, Tr. Vol. VI at 97-98, 113). The purpose of the project was to avoid tube leaks. (Def. Exhibit 1905). The aggregate capitalized cost of the project was $6.3 million. (*Id.*).

In the Sammis Five Year Plan, 1986-1990 (Joint Exhibit 384), Ohio Edison noted that "[r]ecent failure history in the pendant reheater, horizontal reheater, and furnace waste and slope areas indicate that failures in these sections will increase from an estimated seven in 1985 to eighteen in 1990." The X-176 forms for the project predicted a prevention of tube failures and associated improved availability in the years following the replacements. (Def. Exhibit 1617).

H. Activity 8: 1991-92 Scheduled Outage - Unit 6

Unit 6 was removed from service for a scheduled turbine outage from December 6, 1991 to April 17, 1992. (*Amended Joint Stipulations* at ¶ 129). At the time, Unit 6 was twenty-three years old with no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced burners at Unit 6 with new low-NO_x burners to comply with CAA requirements. (*Amended Joint Stipulations* at ¶ 127; Def. Exhibit 136, *Vetterick Report* at 40-41). The capitalized cost of the replacement was approximately $4,002,998.07. (*Amended Joint Stipulations* at ¶ 128). The total cost of the project was $3,881,462.00. (*Id.*). According to Ohio Edison, the replacement of burners with low NO_X burners is common within the coal-fired electric utility industry for purposes of reliable operation and pollution control. (Def. Exhibit 136, *Vetterick Report* at 41). The low NO_X burners were installed to reduce NO_X emissions in anticipation of the requirements under the Acid Rain Program, Title IV of the Clean Air Act. (*Id.* at 40-41). Prior to replacement, the Unit 6 burners "caused slagging problems in the furnace" so that Ohio Edison "occasionally had to take 50 megawatt derates to get the boiler cleaned up for further service." (*Krause Testimony*, Tr. Vol. VII at 62). The deratings of capacity were taken about 12 days per year. (*Id.*).

According to Vetterick, the low-NO_X burners could not have been installed without replacement of the waterwall tubes through which the burners must pass and replacement of the coal pipes to connect the pulverizers to the burners. (*Id.* at 40, 43-44). Ohio Edison partially replaced front and rear waterwall tubes in the burner area to accommodate the new low NO_X burners and to address failures from thermal fatigue and steam corrosion. (*Amended Joint Stimulations* at ¶ 130; Def. Exhibit 136, *Vetterick Report* at 40-41; Def. Exhibits 1477, 1482, 1483, 1484). The capitalized cost of the replacement of front and rear waterwall tubes at Unit 6 was approximately $4,352,391.02. (*Amended Joint Stipulations* at ¶ 131). The total cost of the project was $4,496,302.00. (*Id.*).

During the outage, Ohio Edison replaced reheater riser and pendant tubes at Unit 6 to address failures from out-of-service corrosion damage and high temperature creep. (*Id.* at ¶ 133; Def. Exhibit 136, *Vetterick Report* at 41-43). The capitalized cost of the replacement was approximately $4,976,400.32. The total cost of the replacement was $5,321,175.00. (*Amended Joint Stipulations* at ¶ 134).

Ohio Edison also replaced the first, second, and third pass mix area wall panels at Unit 6 due to increasing tube failures at the mix location. (*Id.* at ¶ 136; Def. Exhibit 136, *Vetterick Report* at 40-41; Def. Exhibits 1478 and 1479). The capitalized cost of the replacement was approximately $2,875,535.93. (*Amended Joint Stipulations* at ¶ 137). The total cost of the replacement was $2,527,402.00. (*Id.*).

In addition, Ohio Edison replaced coal pipes at Unit 6 to accommodate the new low-NO_X burners and to address fire hazard and safety problems from pipe erosion and leakage. (*Id.* at ¶ 139; Def. Exhibit 136, *Vetterick Report* at 43-44, Def. Exhibits 1487 and 1481). The capitalized cost of the replacements was approximately $3,437,941.95. (*Amended Joint Stipulations* at ¶ 140). The total cost was $3,424,440.00. (*Id.*).

According to Ohio Edison, the tubes, pipes and burners replaced during the outage are commonly replaced by coal-fired plants in the electric utility industry. (Def. Exhibit 136, *Vetterick Report* at 40-44; *Krause Testimony*, Tr. Vol. VII at 9-15; *Koppe Testimony*, Tr. Vol. IV at 199-201). Ohio Edison contends that the project resulted in approximately 60% reduction in NO_X emissions. (*Krause Testimony*, Tr. Vol. VII at 3, 7). The aggregate capitalized cost of the project, in 1992 dollars, was $20.7 million. (Def. Exhibit 1905).

Ohio Edison's Sammis Boiler Study, July 6, 1989, shows that from 1985-1988 there were 28 tube failures at the Unit 6 reheater riser and waterwall tubing and mix area that were replaced as part of Activity 8. (Joint Exhibit 226). The study predicted close to a 100% reduction in tube failures if the components were replaced. (*Id.*). The X-176 forms for the replacements done during Activity 8 anticipated a reduction in tube failures and/or improved availability in the years immediately following the replacements. (Pl. Exhibit 577, Def. Exhibit 1593, 1429 and 1491).

I. Activity 9: 1998 Scheduled Outage - Unit 6

Unit 6 went out of service for a scheduled turbine outage from January 24, 1998 to May 2, 1998. (*Amended Joint Stipulations* at ¶ 144). At the time of the project, Unit 6 was twenty-eight years old with no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced the CR-77 pulverizers with new MPS pulverizers due to a long history of maintenance problems and low quality coal fineness that caused an increased slagging conditions in the furnace and secondary superheater. (*Amended Joint Stipulations* at ¶ 142; Def. Exhibit 136, *Vetterick Report* at 44-46; *Vetterick Testimony*, Tr. Vol. IX at 172-75; Def. Exhibits 1410, 1496; Pl. Exhibit 1614).

Both the CR-77 pulverizers and the new MPS pulverizers were manufactured by Babcock and Wilcox. (*Hekking Testimony*, Tr. Vol. III at 56-57). At the time of replacement, in 1998, the CR-77 pulverizers at Sammis Units 6 and 7 were the last such operating pulverizers in the world. (*Vetterick Testimony*, Tr. Vol. IX at 174-75; Def. Exhibit 136, *Vetterick Report* at 45-46; *Krause Testimony*, Tr. Vol. VI at 225 and Vol. VII at 14). Ohio Edison's replacement of the pulverizers with MPS pulverizers was consistent with actions taken by other coal-fired plants within the electric utility industry under the same circumstances. (Def. Exhibit 136, *Vetterick Report* at 45-46). The MPS pulverizers were installed to reduce maintenance costs, increase unit availability and improve heat rate and additional peaking megawatts availability. (Def. Exhibit 1905). The capitalized cost of the project was approximately $16,522,015.42. (*Amended Joint Stipulations* at ¶ 143).

During the five years prior to the replacement of the CR-77 pulverizers, Unit 6 suffered 449 deratings and one outage attributable to the pulverizers. (Pl. Exhibit 152, *Koppe Report* at 60). Between 1985 and 1989, Ohio Edison experienced an average loss of annual megawatts per year of 94,619 MW hours. The loss was attributable to outages and deratings caused by the performance of the pulverizers at Unit 6. (Pl. Exhibit 1908). As of June 13, 1990, Ohio Edison predicted that "[c]ontinued operation of these pulverizers is projected to result in even higher operation and maintenance costs in the future." (*Id.*). In May 13, 1997, Ohio Edison again studied the pulverizers at Unit 6 and determined that the unavailability of Unit 6 pulverizers due to needed repairs represented 85,500 lost megawatt hours per year of generation. (Joint Exhibit 31; Pl. Exhibit 43, *Rosen Rebuttal Report* at 12). In a Capital Investment Evaluation prepared on June 24, 1997, Ohio Edison assumed that Unit 6 would suffer a derating of 75 MW for 1140 hours annually. (Pl. Exhibit 1614; Pl. Exhibit 43, *Rosen Rebuttal Report* at 12). The Capital Investment Evaluation also projected an increase in net demonstrated capacity (NDC) of 30 MW as a result of replacing the pulverizers. (Pl. Exhibit 1614).

J. Activity 10: 1989-1990 Outage - Unit 7

Unit 7 was removed from service for a scheduled turbine outage from October 2, 1989 to January 27, 1990. (*Amended Joint Stipulations* at ¶ 146). At the time, Unit 7 was seventeen years old with no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced economizer tubes at Unit 7 to address frequent tube failures due to fly ash erosion. (*Amended Joint Stipulations* at ¶ 145; Def. Exhibit 136, *Vetterick Report* at 47; Def. Exhibit 1500). Ohio Edison also replaced horizontal reheater and reheater riser tubes due to out of service corrosion. (*Amended Joint Stipulations* at ¶ 147; Def. Exhibit 136, *Vetterick Report* at 48-49; Def. Exhibit 1084). The capitalized cost of these replacements was approximately \$4,103,027.42. (*Amended Joint Stipulations* at ¶ 148). The total cost of the replacements was \$7,859,000.00. (*Id.*).

During the outage, Ohio Edison also replaced front ash hopper tubes at Unit 7 in part because of fireside tube metal wastage, corrosion, fatigue cracking and damage from slag falls. (*Id.* at ¶ 153; Def. Exhibit 136, *Vetterick Report* at 49-50; Def. Exhibits 1501 and 1505). The capitalized cost of the replacements was approximately \$496,505.39 and the total cost of the replacements was \$1,032,095.00. (*Amended Joint Stipulations* at ¶ 154).

During the same outage, Ohio Edison replaced the Westinghouse BB73 low pressure turbine rotors at Unit 7 with new ruggedized rotors due to design defects that led to blade and steeple cracking, high cycle fatigue and excessive vibration. (*Amended Joint Stipulations* at ¶ 150; Def. Exhibit 1906, *Placek Report*, at 2-11; *Placek Testimony*, Tr. Vol. X at 12-17; *Pipitone Testimony*, Tr. Vol. VI at 85-88; Joint Exhibit 186; Def. Exhibit 1504). The BB73 rotors were manufactured by Westinghouse and had a history of poor performance as a result of significant design problems. (Def. Exhibit 1906, *Placek Report* at 3-10; *Placek Testimony*, Tr. Vol. X at 8-10, 14-15; *Pipitone Testimony*, Tr. Vol. VI at 85-88). Over fifty percent of the Westinghouse BB73 turbine rotors placed in service the coal-fired electric utility industry have been replaced. (*Placek Testimony*, Tr. Vol. X at 16-17, 33). Nearly seventy percent of the BB73 rotors placed in service in the early 1970s, similar to those at Sammis Unit 7, have been replaced in the industry. (Def. Exhibit 1906, *Placek Report* at 10; *Placek Testimony*, Tr. Vol. X at 16-17). The capitalized cost of the replacement of the low pressure turbine rotors was approximately $6,381,006.60. (*Amended Joint Stipulations* at ¶ 151). The total cost of the replacement was $8,239,738.00. (*Id.*).

According to Ohio Edison, the NDC of Unit 7 never increased as a result of the low-pressure turbine rotor replacement project. (*Pipitone Testimony*, Tr. Vol. VI at 90; *Placek Testimony*, Tr. Vol. X at 16-17,33). Ohio Edison submits that, while Westinghouse stated that its new ruggedized rotors would permit a 3.5 MW increase in Unit 7's capacity if more steam could have been supplied to the turbine, Unit 7's boiler was incapable of supplying more steam to the turbine and therefore the capacity increase was never possible. (*Kaiser Testimony*, Tr. Vol. X at 87). According to Ohio Edison, the heat rate improved as a result of the project. (*Pipitone Testimony* , Tr. Vol. VI at 91-92).

During the outage, Ohio Edison also replaced burners, coal pipes, pulverizers and combustion controls at Unit 7.[9] The components were replaced to reduce maintenance costs and avoid increased forced outages. The capitalized cost of the replacements was $11.9 million. (Def. Exhibit 1905).

The Sammis Boiler Study, July 6, 1989, shows that from 1985-88 there were 45 boiler tube failures caused by the Unit 7 economizer, horizontal reheater and reheater riser tubes, furnace ash hopper and burners. (Joint Exhibit 226). The study predicted a 100% reduction in failures if the components were replaced. (*Id.*). Further, the X-176 forms for the replacements show that a prevention of tube failures and/or improved availability in the years immediately following the replacements would be realized. (Def. Exhibit 1340, 1605; Pl. Exhibit 868, 637; Def. Exhibit 1501, 1343).

K. Activity 11: 1991 Scheduled Outage - Unit 7

Unit 7 was removed from service for a scheduled boiler outage from August 30, 1991 to October 6, 1991. (*Amended Joint Stipulations* at ¶ 158). At the time of the outage, Unit 7 was nineteen years old with no scheduled retirement date. (Def. Exhibit 1905). During the outage, Ohio Edison replaced selected waterwall tube panels because of damage from metal waste, overheating, corrosion, fatigue and longitudinal cracking. (*Amended Joint Stipulations* at ¶ 158; Def. Exhibit 136, *Vetterick Report* at 50-51; Joint Exhibit 416).

---

[9]Ohio Edison argues that, while Plaintiff referred to these replacements at trial, the pre-suit Notice violations and Complaints are silent as to these replacements. In response, the Government asserts that the failure to include the replacements in the pre-suit Notice violation is immaterial since Defendant has been aware of Plaintiffs' challenge to the overall project and since Defendant knowingly tried the matter to this Court. The Court concludes that the failure to specifically identify each replacement in the pre-suit Notice of Violation is of no consequence in view of the fact that Ohio Edison was clearly on notice that the projects undertaken during the Unit 7 outage were being challenged by the Government.

According to Ohio Edison, the waterwall tube panels are frequently replaced in the coal-fired electric utility industry. (Def. Exhibit 136, *Vetterick Report* at 50-51; *Krause Testimony*, Tr. Vol. VII at 9-15; *Koppe Testimony*, Tr. Vol. IV at 199-201). The purpose of the project was to reduce maintenance costs and decrease the forced outage rate. The waterwalls were not inoperable at the time of replacement; rather, Ohio Edison determined that it was more cost-effective to replace rather than to repair the tubes. (*Krause Testimony*, Tr. Vol. VI at 200-02; *Pipitone Testimony*, Tr. Vol. VI at 97-101). The capitalized cost of the replacement was approximately $446,259.00, in 1992 dollars. (Def. Exhibit 1905).

The X-176 form for the replacement of the Unit 7 waterwall tubes shows that a prevention of tube failures and associated improved availability would result in the years immediately following the replacement. (Pl. Exhibit 529).

III.

ANALYSIS OF LAW

I. The Clean Air Act

The Clean Air Act was enacted "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population." 42 U.S.C. § 7401(b). The basic provisions of the Clean Air Act, including the requirements for the EPA to establish National Ambient Air Quality Standards ["NAAQS"] and for the states to develop plans for attaining those standards through State Implementation Plans ["SIPs"], were enacted in 1970. At the same time, Congress created the New Source Performance Standards ["NSPS"] program to ensure that increased pollution from the construction of new and modified emissions sources would be controlled. NSPS standards require major stationary sources of air pollution to install pollution controls based on state of the art technology, taking into account the cost of achieving such reduction and any nonair quality health and environmental impact. 42 U.S.C. § 7411(a)(1).

The Clean Air Act defines "new source" as "any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source." 42 U.S.C. § 7411(a)(2). A "stationary source" is "any building, structure, facility, or installation which emits or may emit any air pollutant." § 7411(a)(3). The term "modification" is defined as "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted." 42 U.S.C. § 7411(a)(4). Consequently, a plant constructed before the Clean Air Act and its implementing regulations is not covered by the New Source pollution standards unless, after such date, it undergoes a modification.

In 1977, the CAA was amended to include two additional source programs, the Prevention of Significant Deterioration ["PSD"] and the Non-Attainment New Source Review Requirements ["NNSR"]. PSD applies to all new emissions capacity in areas meeting NAAQS and NNSR applies to all new emissions capacity in areas not in compliance with NAAQS, *i.e.,* nonattainment areas. The PSD and NNSR provisions are collectively referred to as the New Source Review ["NSR"] Program. The NSR provisions apply to both new and "modified" sources of air pollution. The provisions require "major emitting facilities" to obtain permits prior to construction as well as installation of state-of-the-art pollution control technology under the direction of the permitting agency. 42 U.S.C. §§ 7475 and 7503.

Congress chose to "grandfather" existing pollution sources from the NSPS and NSR provisions at the time the statute was enacted. As explained in further detail *infra*, Congress did not, however, intend that such existing sources be forever spared the burden and expense of installing pollution control devices. As Congress required, compliance with the CAA is triggered when an existing source makes a "modification" which results in an increase in emissions, unless a regulatory exemption applies to the activity.

The definition of "modification" used in the NSPS provisions applies to the NSR provisions. A modification is "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted." 42 U.S.C. § 7411(a)(4). The EPA regulations define "modification" as follows:

> [A]ny physical change or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of section 111 of the Act . . . .

40 C.F.R. § 60.14(a). A modification triggers permitting requirements under the CAA as well as the duty to install pollution controls. 42 U.S.C. §§ 7475(a), 7479(2)(C) and 7503(a). The regulations provide certain exceptions to the definition of "physical change." The exception at issue in this case that for "routine maintenance, repair and replacement." 40 C.F.R. § 52.21(b)(2)(iii)(a). Similarly, the regulations defining "modification," state that the following does not trigger compliance:

(1) Maintenance, repair and replacement which the Administrator determines to

> be routine for a source category, subject to the provisions of paragraph (c) of this section and § 60.15.

40 C.F.R. § 60.14(e)(1).

As this Court earlier observed at the summary judgment stage, there is no regulatory definition for what is "routine." The Defendant contends that what is "routine" should be measured by projects performed in the coal-fired electric industry as a whole as opposed to projects done at a particular generating unit. In contrast, the Plaintiffs contend that the definition of "routine maintenance, repair and replacement" is narrow. Plaintiffs urge the Court to apply the regulatory interpretation used by the EPA, which looks at each activity on a case-by-case basis, taking into account the nature, extent, purpose, frequency and cost of the activity. According to this interpretation, no activities in the utility industry are categorically exempt as routine maintenance, repair and replacement.

A. "Modification" and the "Routine Maintenance, Repair and Replacement" Exemption

Before considering whether the eleven activities at issue in this case trigger CAA compliance, the Court must resolve the parties' dispute as to the proper interpretation of the term "modification" and the extent of the "routine maintenance, repair and replacement" regulatory exemption. This issue has been addressed by few courts. The leading decision comes from the Seventh Circuit Court of Appeals in the case of *Wisconsin Electric Power Co. v. Reilly*, 893 F.2d 901 (7^{th} Cir. 1990) (*en banc*) [hereinafter referred to as the "*WEPCO* decision"].

1. ***WEPCO***

In *WEPCO*, the Wisconsin Electric Power Company ["WEPCO"] challenged two final determinations made by the EPA as to certain proposed renovations to the Port Washington Power Plant. The plant, located on Lake Michigan north of Milwaukee, consisted of five coal-fired steam generating units that were placed in operation between 1935 and 1950. Each generating unit had a design capacity of 80 megawatts. To address the age-related decline in performance at some of the units, WEPCO and its consultant, Bechtel Eastern Power Corporation, conducted a Plant Availability Study in 1983. As a result of the study, WEPCO concluded that extensive renovation would have to be performed to continue plant operation. As a result of the study, WEPCO submitted a proposed replacement program, termed a "life extension" program, to the Wisconsin Public Service Commission for approval. In support of its proposal, WEPCO stated:

> Renovation is necessary to allow the Port Washington units to operate beyond their currently planned retirement dates of 1992 (units 1 and 2) and 1999 (units 3, 4 and 5) . . . [and that renovation would render the plant] capable of generating at is designed capability until year 2010 . . . .

Id. at 906 (internal citation omitted).

The matter was eventually referred to the EPA headquarters for consideration of whether WEPCO needed to obtain a PSD permit prior to making the proposed renovations. Donald Clay, EPA Acting Assistant Administrator, issued a memorandum on September 9, 1988 in which he preliminarily concluded that the project would subject the plant to both NSPS and PSD requirements. According to the EPA, the project would constitute a "physical change" resulting in an increase in plant production and emissions of pollutants. The memorandum dismissed WEPCO's contention that the project was within the scope of the "routine maintenance, repair and replacement" regulatory exemption. *Id.* at 906. WEPCO appealed the EPA's determination to the Seventh Circuit, alleging that it misconstrued both the CAA as well as the accompanying regulations.

The Seventh Circuit began its analysis by observing that courts generally accord "substantial deference to the EPA's interpretation of the Clean Air Act Amendments . . . ." *WEPCO*, 893 F.2d at 906. Such deference does not, however, necessarily mean that the EPA has unbridled discretion in construing the CAA. The Seventh Circuit defined the scope of deference by reference to the Supreme Court's decision in *Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984). In that case, the Court held:

> When a court reviews an agency's construction of the statute which it administers, it is confronted with two questions. First, always, is the question whether Congress has directly spoken to the precise question at issue. If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress. If, however, the court determines Congress has not directly addressed the precise question at issue, the court does not simply impose its own construction on the statute, as would be necessary in the absence of an administrative interpretation. Rather, if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether the agency's answer is based on a permissible construction of the statue.

Chevron, 467 U.S. at 842-43 (footnotes omitted). The Seventh Circuit observed that "we defer . . . to an agency's construction of its own regulations . . . [particularly] where, as is the case here, the subject being regulated is technical and complex." *WEPCO*, 893 F.2d at 907 (citations omitted).

With this background in mind, the Seventh Circuit proceeded to consider whether the proposed changes at WEPCO constituted a "modification" for purposes of the CAA. The Court had no difficulty in concluding that, "under the plain terms of the [CAA], WEPCO's replacement program constitutes a 'physical change'" and therefore a "modification." *Id.* WEPCO proposed to replace rear steam drums on units 2, 3, 4 and 5. Each of the steam drums measured sixty feet in length, 50.5 inches in diameter and 5.25 inches in thickness. *Id.* In addition, WEPCO planned to replace the air heaters in units 1-4. (*Id.*). The Court noted that in order to do these projects, the units would have to be taken out of service successively for nine month periods. *Id.* The Court held that, for purposes of NSPS and PSD, the term "any physical change . . . means precisely that." *Id.* at 908.

The Seventh Circuit rejected WEPCO's argument that the proposed equipment replacement projects did not constitute a "physical change" under the CAA.

> [T]o adopt WEPCO's definition of "physical change" would open vistas of indefinite immunity from the provisions of NSPS and PSD. Were we to hold that the replacement of major generating station systems -- including steam drums and air heaters -- does not constitute a physical change (and is therefore not a modification), the application of NSPS and PSD to important facilities might be postponed into the indefinite future. There is no reason to believe that such a result was intended by Congress. The Clean Air Act Amendments were enacted to "speed up, expand, and intensify the war against air pollution in the United States with a view to assuring that the air we breathe throughout the Nation is wholesome once again." In particular, the permit program established by the 1977 Amendments to the Clean Air Act represented a balance between "the economic interests in permitting capital improvements to continue and the environmental interest in improving air quality."

WEPCO, 893 F.2d at 909 (citations omitted). The Seventh Circuit further observed that Congress intended that compliance with the CAA be accomplished at a time when the same would be most effective for existing pollution sources -- that is, when a modification is undertaken. *Id.*

After concluding that WEPCO's proposed projects were "modifications," the Court went on to consider whether the projects were exempt from CAA compliance as being "routine maintenance, repair and replacement." The Court again noted that "we accord substantial deference to an agency's interpretation of its own regulations, especially with respect to technical and complex matters." *Id.* at 910. The Seventh Circuit relied on the EPA's interpretation as expressed in the Clay Memorandum to define when an activity fits the regulatory exemption:

> [T]o determine whether proposed work at a facility is routine, "EPA makes a case-by-case determination by weighing the nature, extent, purpose, frequency, and cost of the work, as well as other relevant factors, to arrive at a common-sense finding." Clay Memorandum at 3.

Id.

In applying the factors, the Seventh Circuit concluded that the nature and extent of the proposed projects at WEPCO did not compare with other projects done in the industry, as WEPCO argued. The Court further concluded that the purpose, frequency and cost of the work also supported the EPA's decision. WEPCO conceded that the projects were intended to extend the life of the units from their planned retirement dates and that the cost of the projects would be at least $70.5 million. According to the Court, such facts suggested that the projects were not routine. *Id.* at 912.

In reaching its conclusion, the Court rejected an argument advanced by WEPCO that <u>any</u> replacement project necessarily extends the life of the facility. The Court stated:

> While it is certainly true that the repair of deteriorated equipment will contribute to the useful life of any facility, it does not necessarily follow that the repairs in question would extend the *life expectancy* of the facility. The need for some repairs along the line is a given in determining in the first instance the life expectancy of a plant. WEPCO cannot seriously argue that its units' planned retirement dates of 1992 (units 1 and 2) and 1999 (units 3, 4 and 5) did not take into account at least minor equipment repairs and replacements. And WEPCO concedes that the Port Washington program will *extend* the life expectancy of the plant until 2010.

Id. (emphasis in original) (footnote omitted). In sum, the Seventh Circuit found the EPA's conclusion that the proposed projects were not "routine" was a reasonable interpretation of the regulation issued by the EPA.[10]

2. *Southern Indiana Gas & Electric Co.*

On February 13, 2003, the United States District Court for the Southern District of Indiana addressed the scope of the routine maintenance, repair or replacement exemption in the case of *United States v. Southern Indiana Gas & Electric Co.*, 245 F.Supp.2d 994 (S.D. Ind. 2003). The issue arose in context of resolving Defendant Southern Indiana Gas and Electric Company's ["SIGECO"] motion for summary judgment as whether the Defendant had fair notice of the Government's interpretation of the routine maintenance exception.

The court observed that the validity of the regulatory exemption itself was not an issue since SIGECO claimed the benefit of the exemption; rather, the issue was "whether the EPA's interpretation of the regulation is reasonable." *Id.* at 1007. The court held:

> The Court concludes that the EPA's interpretation of routine maintenance is reasonable and persuasive, and will defer to it in this litigation. Although routine maintenance is not defined in the regulations, the EPA's narrow interpretation is consistent with the plain language of the regulation. The EPA did not exempt "repair, maintenance and replacement;" it exempted "*routine* repair, maintenance and replacement." As the Environmental Appeals Board (EAB) observed, "even without a benefit of context, the use of the word "routine" puts the reader on notice that irregular or unusual activities may not qualify."

Id. at 1009 (citation omitted). The court further concluded:

---

[10]The Seventh Circuit went on to consider whether the proposed projects would result in a significant net emissions increase. This part of the Court's opinion is addressed, *infra*. The Court notes that the four-factor *WEPCO* test was applied by the Environmental Appeals Board in the matter of *In re: Tennessee Valley Authority*, a decision rendered on September 15, 2000. The decision is, however, of no effect in light of the Eleventh Circuit's holding that it was without jurisdiction to consider the matter because the Administrative Compliance Order issued by the EPA was not a final agency action. *Tennessee Valley Authority v. Whitman, et al.*,--- F.3d --- , 2003 WL 21452521 (11th Cir. June 24, 2003).

> In addition, the CAA term "modification" was defined very broadly by Congress, as "any physical change" that increases emissions. . . . The routine maintenance exemption was subsequently promulgated by the EPA in its CAA regulations, and it exempted routine changes at regulated facilities from the broad definition of modification. Giving the routine maintenance exemption a broad reading could postpone the application of NSR to many facilities, and would flout the Congressional intent evidenced by its broad definition of modification. . . . How often similar projects are undertaken throughout the industry may inform the analysis, but Congress certainly did not intend to allow for companies to make an "end run" on NSR by allowing the routine maintenance exemption to swallow the modification rule.

Id.

B. "Modification" and the Scope of the "Routine Maintenance, Repair or Replacement" Exemption in This Case

The CAA regulations provide that "routine maintenance, repair or replacement" activities are exempt from the general rule that a "modification" triggers CAA compliance. As other courts have observed, the term "modification" is broadly defined in the CAA as "*any* physical change in, or change in the method of operation, of a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted." 42 U.S.C. § 7411(a)(4) (emphasis added); *see also Wisconsin Electric Power Corp. v. Reilly*, 893 F.2d 901 (7th Cir. 1990); *United States v. Southern Indiana Gas & Electric Co.*, 245 F.Supp. 2d 994 (S.D. Ind. 2003).

This Court is of the view that the words "any physical change" included in the definition of "modification" must be given their plain meaning -- that is, that <u>any</u> physical change to the units at issue trigger CAA compliance assuming, (1) the change also causes an increase in emissions and (2) the change is not excluded by a regulatory exemption. The Court has no difficulty concluding that the eleven activities undertaken by Ohio Edison at the Sammis plant are "physical changes" for purposes of the CAA. It is undisputed that the work undertaken during each of the eleven activities changed the units in a significant sense by either replacing critical components or rebuilding damaged elements. The more difficult issue is whether the regulatory exemption for "routine maintenance, repair or replacement" operates to exclude the eleven activities from CAA compliance.

The few courts that have considered the issue have noted that the EPA interprets the routine maintenance exemption narrowly. The question before this Court is whether such a narrow interpretation is reasonable or, whether, as Ohio Edison argues, the exclusion should be broadly interpreted. In *WEPCO*, 893 F.2d at 907, the Seventh Circuit stated that "[a]n agency's interpretation must be upheld unless it is plainly erroneous or inconsistent with the regulation." Such deference is particularly appropriate when the subject being regulated is technical and complex, as is the case with the CAA. *Id.* Further, as the United States Supreme Court has held, "a court may not substitute its own construction of a statutory provision for a reasonable interpretation made by the administrator of an agency." *Chevron, U.S.A., Inc. v. Nat'l Res. Def. Council, Inc.*, 467 U.S. 837, 844 (1984).

In considering whether activities at coal-fired units are exempt from CAA compliance as routine maintenance, repair or replacement, the EPA reviews the activities on a case-by-case basis, taking into account the nature and extent of the activity, as well as its purpose, frequency and cost. This approach was found to be reasonable by the Seventh Circuit in *WEPCO* and by the Indiana District Court in *Southern Indiana Gas and Electric Company*. This Court similarly concludes that the EPA's approach to the interpretation of the routine maintenance exemption is reasonable and is consistent with the plain language of the regulation as well as the stated purpose and language of the CAA.

The regulation at issue does not exempt *"any* maintenance, repair or replacement" from compliance with the CAA -- rather, the regulation exempts "*routine* maintenance, repair or replacement." While the word "routine" is not defined, the Court finds the EPA's narrow interpretation of the word "routine" to be justified. As both parties in this case agree, the general rule is that any physical change to a unit which results in an increase in emissions constitutes a "modification" triggering compliance with the CAA. If the routine maintenance exemption were defined broadly, as Ohio Edison urges, the exemption would swallow both the rule and specific provisions of the Clean Air Act. More fundamentally, the exception for "routine maintenance, repair or replacement" was not included by Congress in the Clean Air Act. This regulatory exception then must also be harmonized with the statutory language of the Clean Air Act. This Court concludes that if the broad definition given to "routine maintenance, repair or replacement" by Ohio Edison were adopted, the regulation would be in direct conflict with the superceding and controlling language of the Clean Air Act.

When coal-fired generating plants undertake activities at a unit which are not frequent, which come at a great cost, which extend the life of the unit and, which require the unit to be placed out of service for a number of months, such activities can hardly be considered "routine." It is at this time that a coal-fired plant is obligated under the CAA to determine whether the physical changes result in an increase in emissions that would require the installation of pollution control devices. As the *WEPCO* court observed over a decade ago, the CAA should not be interpreted in a way that "would open vistas of indefinite immunity from the provisions of NSPS and PSD." *WEPCO*, 893 F.2d at 909. A broad reading of the routine maintenance exemption, as advanced by Ohio Edison, would indeed result in such immunity and would thwart the purposes of the CAA.

Ohio Edison argues that what is routine should be measured by the types of activities which are performed in the industry as a whole. In support of this view, Ohio Edison relies on the reference to the routine maintenance exemption found in the regulatory definition of "modification." The regulation provides:

> **§ 60.14 Modification.**
> (a) Except as provided in paragraphs (e) and (f) of this section, any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of section 111 of the Act. . . .
>
> * * *
>
> (e) The following shall not, by themselves, be considered modifications under this part:
> (1) Maintenance, repair and replacement which the Administrator determines to be routine for a source category . . . .

40 C.F.R. § 60.14(a), (e)(1).

Ohio Edison argues that use of the words "source category" means that what is routine must be measured by what is done in the coal-fired electric industry as a whole. The Court rejects this argument. Although the above regulation makes reference to "source category," the regulation creating the routine maintenance exemption does not. As indicated *supra*, the regulatory exemption simply states that a "physical change" shall not include "[r]outine maintenance, repair and replacement." 40 C.F.R. § 52.21(b)(2)(iii)(a).

In addition, the regulation on which Ohio Edison relies, § 60.14(e)(1), clearly states that the Administrator determines what activities are considered to be routine maintenance, repair or replacement. The EPA Administrator has adopted a narrow, case-by-case approach to this determination. In the Court's view, the EPA's decision to consider the types of activities performed in the coal-fired electric generating industry as a whole in connection with only the "frequency" factor of the four-part test, is reasonable. Furthermore, in the Court's view, the EPA's overall narrow interpretation of the routine maintenance exemption is reasonable. It is the frequency of an activity at a particular unit that is most instructive in the analysis of what can be considered "routine." The types of activities undertaken within the industry as a whole have little bearing on the issue if an activity is performed at a unit only once or twice in the lifetime of that particular unit. This Court defers to the EPA's interpretation of the routine maintenance, repair or replacement exemption. The Court will use the case-by-case, four part analysis to determine whether the activities done at Sammis fit within the regulatory exemption.

C. Application of the "Routine Maintenance, Repair or Replacement" Exemption to the Activities at Ohio Edison's Sammis Plant

As a preliminary matter, the Court considers which party bears the burden of proof as to the routine maintenance exemption. As the Government contends, the party claiming the benefit of an exemption to compliance with a statute bears the burden of proof as to the exemption. *See United States v. First City National Bank of Houston*, 386 U.S. 361, 366 (1967) (holding that the general rule is that the party claiming the benefit of exemption to a statute bears the burden of proof). Thus, it is Ohio Edison's burden to show that the eleven activities are exempt from CAA compliance.

The following table gives a general description of the activities at issue:

Unit # (Activity #) Date In Service Megawatt Capacity	**Activity Description**	**Cost**	**Outage Duration**

Unit 1 (Activity 1) 1959 (Stip. ¶ 48) 185 MW (Stip. ¶ 35).	Replaced and Redesigned Horizontal Reheater, Secondary Superheater Outlet Headers, and Furnace Ash Hopper Tubes (*Stip*. ¶¶ 73, 76, 79).	$6.62 Million (*Stip*. ¶¶ 74, 77, 80).	14 weeks in 1993-94 (*Stip*. ¶¶ 75, 78, 81).
Unit 2 (Activity 2) 1960 (Stip. ¶ 50) 185 MW (Stip. ¶ 35).	Replaced and Redesigned Horizontal Reheater, Superheater Outlet Headers, and Furnace Ash Hopper Tubes (*Stip*. ¶¶ 82, 85, 88).	$6.46 Million (*Stip*. ¶¶ 83, 86, 89).	14 weeks in 1991 (*Stip*. ¶¶ 84, 87, 90).
Unit 3 (Activity 3) 1961 (Stip. ¶ 52) 185 MW (Stip. ¶ 35).	Replaced Horizontal Reheater, Superheater Outlet Headers, Furnace Ash Hopper Tubes, Furnace Front Wall South Cell, Furnace South Sidewall Tubes, Rear Waterwall and Furnace Arch Tubes, and Front Convection Pass Waterwall Tubes (*Stip*. ¶¶ 91, 94, 98, 101, 103; *Hekking Rpt* at 36, 38, Pl. Ex. 147).	$9.05 Million (*Stip*. ¶¶ 92, 95, 98, 101, 104; *Larkin Supp. Rpt.* at 31, 33, Pl. Ex. 40).	17 weeks in 1992 (*Stip*. ¶¶ 93, 96, 99, 102, 105).
Unit 4 (Activity 4) 1962 (Stip. ¶ 54) 185 MW (Stip. ¶ 35).	Replaced and Redesigned Furnace Ash Hopper Tubes, Front Waterwall Tubes, and Superheater Third Pass Section (*Stip*. ¶¶ 106, 109; *Hekking Rpt*. at 43, Pl. Ex. 147).	$5.72 Million (*Stip*. ¶¶ 107, 110; *Larkin Supp. Rpt*. at 41, Pl. Ex. 40).	19 weeks in 1990 (*Stip*. ¶¶ 108, 111).

Unit 5 (Activity 5) 1967 (Stip. ¶ 56) 317.5 MW (Stip. ¶ 35).	Replaced and Redesigned Entire Vertical Tube Furnace with Spiral Tube Furnace (Stip. ¶ 112). Replaced and redesigned burners and windbox; replaced combustion controls and coal piping (*Hekking Test*., Tr. II, 186:21 - 187:12, 195:6 - 196:5; *Koster Dep*. Tr. at 164:12 - 165:23, 170:5-11; *Hekking Rpt*. at 48-49, Pl. Ex. 147).	$33 Million projection (*Hekking Test.*, Tr. II, 185:3-12; Work Order, Jt. Ex. 407) $30 Million (actual cost "in the vicinity of", *Kaiser Test.,* Tr. X, 142:22 - 143:10).	8 ½ months in 1984 (*Stip*. ¶ 114).
Unit 5 (Activity 6) 1967 (Stip. ¶ 56) 317.5 MW (Stip. ¶ 35).	Replaced Economizer, Secondary Superheater Outlet Pendant Section, Reheater Outlet Pendant Section, and Upper Floor Arch Tubes (*Stip*. ¶¶ 115, 118, 121; Jt. Ex. 182 at SMS 0008207) (furnace arch).	$5 Million (*Stip*. ¶¶ 116, 119, 122; Pl Ex. 685 at SAR 020277 (furnace arch).	13 weeks in 1990 (*Stip*. ¶¶ 117, 120, 123).
Unit 6 (Activity 7) 1969 (Stip. ¶ 58) 623 MW (Stip. ¶ 35).	Replaced and Redesigned Economizer and Horizontal Reheater (*Sti*p. ¶ 124).	$5 Million (*Stip*. 125; *Hekking Rpt* at 61, Pl. Ex. 147).	21 weeks in 1986-87 (*Stip*. ¶ 126).

Unit 6 (Activity 8) 1969 (Stip. ¶ 58) 623 MW (Stip. ¶ 35).	Replaced Burners; Coal Pipes; Front and Rear Furnace Waterwall Tubes; Furnace Sidewalls and Lower Front and Rear Ash Hopper Tubes; First, Second, and Third Pass Furnace Waterwall Mix Area; Reheater Riser and Pendant Section and Roof Tubes (*Stip*. ¶¶ 127, 130, 133, 136, 139; Pl Ex. 502 (Sidewalls and Ash Hoppper); Pl Ex. 480 at SIO 9703 (roof tubes)).	$22 Million (*Stip*. ¶¶ 128, 131, 134, 137, 140; Pl. Ex. 502 at SAR 040697; *Hekking Rpt*. at 68-69, Pl. Ex. 147).	19 weeks in 1991-92 (*Stip*. ¶ 129, 132, 135, 138, 141).
Unit 6 (Activity 9) 1969 (Stip. ¶ 58) 623 MW (Stip. ¶ 35).	Complete Replacement of All Six Pulverizers with a Reconfigured System Containing Just Five Pulverizers (*Stip*. 142).	$16 Million (*Stip*. ¶ 143, *Hekking Rpt* at 72, Pl. Ex. 147).	14 weeks in 1998 (*Stip*. ¶ 144).
Unit 7 (Activity 10) 1971 (Stip. ¶ 60) 623 MW (Stip. ¶ 35).	Replaced and Redesigned Economizer, Horizontal Reheater and Riser Tubes, Low Pressure Turbine Rotors, Burners, Coal Pipes, Combustion Controls and Furnace Waterwall Mix Area (*Stip*. ¶¶ 145, 147, 150, 153; Jt. Ex. 421 at SMS 0060547 (listing replacement of burners, coal pipes, combustion controls, coal pipes and mix area).	$27 Million (*Stip*. ¶ 148, 151, 154; *Larkin Supp. Rpt.* at 74-80, Pl. Ex. 40).	17 weeks in 1989-90 (*Stip*. ¶¶ 146, 149, 152, 155).
Unit 7 (Activity 11) 1971 (Stip. ¶ 60) 623 MW (Stip. ¶ 35).	Replaced Furnace Waterwall Panels (*Stip*. ¶ 156).	$1.1 Million (*Stip*. ¶ 157).	5 weeks in 1991 (*Stip*. ¶ 158).

1. Nature and Extent of Activities

The activities summarized above involved replacement or upgrade of major boiler components, turbine components and boiler plant equipment. The activities involved replacement of miles of tubing and, in some instances, replacement of entire sets of equipment, such as burners or pulverizers. Further, performance of the work required that each unit be shut down for weeks or months at a time. It is clear that the nature and extent of the activities at issue was large. Furthermore, with respect to Activity 5 - Unit 5, the work was unprecedented. The entire furnace on Unit 5 was replaced with a unique spiral tube design furnace. The furnace was the first of its kind on a coal-fired unit in the United States. While it is undisputed that the new furnace was required to remedy design problems with the original furnace, the installation of a one-of-a-kind spiral tube furnace cannot be considered routine.

The magnitude of each of the activities at issue is further reflected in Ohio Edison's project justification forms, known as X-176s. The forms state that each of the activities was undertaken with the goal of reducing forced outages and improving availability and reliability of the unit(s). The forms further reflect that the benefits achieved would extend the life (lives) of the unit(s) for thirty years. (*Monti Testimony*, Tr. Vol. 1 at 215-18, 224-26, 235-37; Tr. Vol. II at 4-5, 14, 17-18). Without the repairs, the units would endure more forced outages which would mean greater maintenance costs in the future. Thus, the X-176 forms provide further evidence that the nature and extent of the eleven projects were of a grand scale, as contrasted with regularly anticipated maintenance.

The large scale of the projects is further reflected by the fact that the work performed was done by outside contractors. Similar to other coal-fired electric generating plants, Sammis classifies its employees into functional groups consisting of operations, maintenance, engineering, coal yard operations and administration. (*Hekking Testimony*, Tr. Vol. II at 119, 124; *Hekking Report* , Pl. Exhibit 147 at 12-13). The maintenance group is responsible for day-to-day maintenance of the various pieces of plant equipment as well as the structures and physical property. Such activities may include blowing slag off tubes with soot blowers (*Monti Testimony*, Tr. Vol. I at 198-99) and repairing a boiler tube after a tube failure (*Id.* at 196-97, 199-201, 205, 208). The maintenance staff generally performs work during scheduled planned outages, which last from two to four weeks. (*Monti Testimony*, Tr. Vol. II at 30; *Hekking Testimony*, Tr. Vol. II at 133). In contrast, the work performed during extended turbine outages is generally beyond the capacity of the in-house maintenance staff. (*Hekking Testimony*, Tr. Vol. II at 133, 136-37). The activities at issue in this case were not handled by the maintenance staff. Further, the approval funding for the projects was handled by Ohio Edison's central office, not by the Sammis plant itself. The Sammis management does, however, have broad discretion over the decision-making and budgeting as to regularly scheduled maintenance and repairs.

In the Court's view, Ohio Edison's budgeting and accounting treatment of the eleven activities further demonstrates the extensive nature of the projects. All of the projects were funded using Ohio Edison's capital improvements budget. The projects were also capitalized for accounting purposes. In contrast, projects performed by the Ohio Edison maintenance staff are budgeted through an operation and maintenance budget (O&M) for the Sammis plant. (*Hekking Testimony*, Tr. Vol. II at 127, 130, 133-35, 163-64, 165). The distinction in treatment shows that the activities at issue were not viewed by Ohio Edison as maintenance projects.

Ohio Edison contends that the budgeting and accounting treatment of the activities at issue bears no relation to whether the activities are "routine maintenance, repair or replacement" for purposes of the CAA. The Court disagrees. All electric utilities in the interstate market are subject to the accounting rules set forth by the Federal Regulatory Energy Commission. As to intrastate sales of electricity, the Ohio Public Utilities Commission has adopted the Uniform System of Accounts ["USOA"], 18 C.F.R. Part 101. Consequently, all of the operations of Ohio Edison are accounted for under this system. (*See also Larkin Testimony*, Tr. Vol. III at 174-75; *Larkin Report* , Pl. Exhibit 40, at 2). The USOA requires that an electric utility such as Ohio Edison maintain permanent accounting records recording the status of physical assets. The permanent records are called "continuing plant inventory" or "property records." (*Larkin Testimony*, Tr. Vol. III at 176-77). The construction or replacement of major boiler components such as economizers, superheaters, reheaters and air heaters, as well as the construction or replacement of major turbine generator components are all recorded in the plant's property records. (*Id.* at 179-81).

Accounting experts retained by both the Plaintiffs and Ohio Edison agreed that expenses designated as capital improvements must involve a benefit lasting for more than one year. In contrast, regular maintenance is not booked as a capital expense, since no long-term benefit is obtained. (*Id.* at 170; *Lacey Testimony*, Tr. Vol. X at 234-36). Replacements of minor items of property may only be capitalized if they result in a "substantial betterment." (*Larkin Testimony*, Tr. Vol. III at 182-83, 187). A substantial betterment means that the expenditure makes the asset more useful, extends its life, or adds value to the service that can be rendered from the asset. (*Id.* at 183). Under the USOA, a maintenance expense does not extend the life of an asset and therefore would not be capitalized. (*Id.* at 184-85). Ohio Edison's own system of accounting, known as the Plant Accounting Bulletin, was designed to implement the USOA and is consistent with the USOA requirements. (*Id.* at 187-88).

Ohio Edison's accounting treatment of the activities at issue is also consistent with Generally Accepted Accounting Principles ["GAAP"]. For GAAP purposes, costs incurred to achieve greater future benefits are capitalized, whereas costs that simply maintain a given level of service are expensed. (*Id.* at 191-93). In order for a cost to be capitalized, one of three conditions must be present: the useful life of the asset must be increased; the quantity of units produced from the asset must be increased; or the quality of the units produced must be enhanced. (*Id.*). An ordinary repair that simply maintains an asset does not satisfy these criteria and is therefore treated as an expense. (*Id.*).

Despite Ohio Edison's argument to the contrary, this Court finds that the accounting and budgeting treatment of the activities at issue as capital expenditures to be highly probative of whether the activities can be considered routine maintenance, repair or replacement for purposes of the CAA. The term "maintenance" has a well-understood meaning under the USAO, which every interstate utility must follow. In addition, the USAO's treatment of maintenance versus capital expenses is virtually identical to that of GAAP. A straightforward and logical construction of the term "maintenance," let alone "routine maintenance," would exclude from its scope any amounts defined as capital expenditures.

Ohio Edison also argues that the nature and extent of the activities at issue is not as great as the activities in the *WEPCO* case and therefore, the Sammis activities fall within the routine maintenance exemption. This argument is misplaced. As the court in *United States v. Southern Indiana Gas & Electric Company*, 245 F.Supp.2d 994, 1017 (2003), recently held:

> [N]othing in *WEPCO* suggests that any project smaller than WEPCO will automatically qualify as routine maintenance, or that WEPCO was some type of baseline for companies to compare its projects to in efforts to determine if they would qualify for routine maintenance. Rather, *WEPCO* was an easy case on routine maintenance -- the EPA and the Seventh Circuit quickly disposed of the defendant's arguments that it qualified for routine maintenance. . . . *WEPCO* is significant because it expresses the EPA's interpretation of routine maintenance and illustrates how the EPA applies it to a particular project. But comparing the nature of the WEPCO project to SIGECO's projects to suggest that SIGECO did not have fair notice of the EPA's interpretation of routine maintenance is unpersuasive because the EPA never indicated that WEPCO was a measuring stick for routine maintenance.

This Court is of the same view as the district court in the *SIGECO* case. Nothing in the Seventh Circuit's opinion in *WEPCO* suggests that any projects smaller than those undertaken at the Port Washington Plant would necessarily be considered routine maintenance. Thus, a mere comparison of activities done in *WEPCO* to those done at Sammis is not dispositive of whether the projects fall within the routine maintenance exemption.

In sum, the Court concludes that the nature and extent of the eleven projects done at Sammis weighs against a finding that the activities are routine maintenance, repair or replacement for purposes of the CAA.

2. Purpose of Activities

The second factor in the analysis is to consider the purpose of the activities. The evidence adduced at trial demonstrates that the stated benefits of each of the activities, as reflected on the X-176 forms, was to increase availability and reliability of the Sammis units. An additional stated benefit was to extend the lives of the units. In each instance, the extension on life to be achieved from the project was estimated at thirty years. (*See e.g.*, Pl. Exhibit 652). From this evidence, it is clear to the Court that the purpose of the activities was beyond mere maintenance of the units. Rather, the purpose of the activities was to extend the lives of the units and make them more available and reliable well into the future. Thus, the purpose factor weighs against a finding that the projects fall within the "routine maintenance, repair or replacement" exemption from CAA compliance.

3. Frequency of Activities

The Court next considers the frequency of the activities at issue. As the Court earlier observed, Ohio Edison contends that this factor requires consideration of the frequency of the activity in the industry as a whole rather than at a particular unit. In the Court's view, focus on the industry as a whole is not necessarily dispositive of whether the activity constitutes "routine maintenance." Whether an activity can be considered "routine maintenance, repair or replacement" is more appropriately judged by how frequently the activity has been performed at the particular unit at issue. In the *WEPCO* case, the Seventh Circuit noted WEPCO's concession that the renovation projects had never been done before and were of the type that would only occur once or twice during a unit's expected life cycle. *WEPCO*, 893 F.2d at 912.

In this case, Ohio Edison has failed to establish that the activities at issue were undertaken with such frequency that they could be considered "routine" at the particular unit on which they were performed. The evidence adduced shows that almost all of the major component and equipment replacements at the Sammis plant had never been performed before on the particular unit. Furthermore, given that one of the anticipated benefits for the activities was a longer unit life (projected at thirty years), it seems clear that the projects were considered once or twice in a unit's lifetime. Furthermore, it is undisputed that at least one project --

Activity 5- Unit 5, installation of the spiral tube furnace-- was the first of its kind in the United States.

While coal-fired units across the electric utility industry indeed may have engaged in repairs similar to the ones done at Sammis (with the exception of the spiral tube furnace replacement at Unit 5), an industry-wide standard as to what is routine would, in the Court's view, render the exemption meaningless. The frequency factor certainly can take into account repairs done at other plants across the country but, in the Court's view, such evidence is not as instructive in addressing whether a particular activity at a particular unit can be considered routine.

In sum, the Court concludes that the frequency factor weighs against a finding that the projects at issue in this case constitute "routine maintenance, repair or replacement."

4. Cost of Activities

The final factor for consideration is the cost of the activities. It is undisputed that each of the activities at Sammis involved major capital expenditures. The following is a summary of the costs:

Activity 1, Unit 1:	$6,621,888.00
Activity 2, Unit 2:	$6,547,008.00
Activity 3, Unit 3:	$9,017,764.00
Activity 4, Unit 4:	$5,716,728.00
Activity 5, Unit 5:	$33,000,000.00
Activity 6, Unit 5:	$5,007,585.00

Activity 7, Unit 6:	$4,899,876.00
Activity 8, Unit 6:	$22,656,657.00
Activity 9, Unit 6:	$16,522,015.00
Activity 10, Unit 7:	$25,427,731.00
Activity 11, Unit 7:	$1,146,422.00

(Pl. Exhibit 1974).

The total costs of the eleven projects is $136.4 million. The total capitalized costs is $93.4 million. (Pl. Exhibit 1975). It is clear to the Court that the costs incurred in performing the eleven activities at Sammis supports a finding that the activities were anything but routine. Ohio Edison spent millions of dollars on the projects but failed to consider whether any of the projects triggered compliance with the CAA. Moreover, as this Court earlier observed, the fact that costs incurred in performing the projects were capitalized and were not budgeted as maintenance expenses supports a finding that the projects do not fall within the routine maintenance exemption.

In sum, this Court concludes that the four-factor test for routine maintenance, repair or replacement has not been satisfied with respect to the eleven activities undertaken at Sammis that are the subject of this case. The activities are therefore not exempted from the CAA definition of "modification." The remaining issue is whether the second part of the "modification" definition is satisfied-- that is, whether the activities resulted in emissions increases so as to trigger compliance with the CAA.

D. Emissions Increase

As outlined *supra*, 42 U.S.C. § 7411(a)(4) defines a "modification" as "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted." As the Seventh Circuit observed in *WEPCO*:

> To determine whether a physical change constitutes a modification for purposes of NSPS, the EPA must determine whether the change increases the facility's *hourly rate* of emission. 40 C.F.R. § 60.14 (1988). For PSD purposes, current EPA regulations provide that an increase in the *total amount* of emissions activates the modification provisions of the regulations. 40 C.F.R. § 52.21(b)(3) (1988).

WEPCO, 893 F.2d at 905 (emphasis in original). The regulations for the PDS program define "major modification" in the following manner:

> [A]ny physical change in or change in the method of operation of a major emitting source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act.

40 C.F.R. § 52.21(b)(2)(i). As the Seventh Circuit observed in *WEPCO*, the PSD regulations require preconstruction review of the modification of major emitting facilities. *WEPCO*, 893 F.2d at 915. As the court further explained:

> Congress added a program for the Prevention of Significant Deterioration ("PSD"), concerned with increases in total annual emissions, to ensure that operators of regulated sources in relatively unpolluted areas would not allow a decline of air quality to the minimum level permitted by NAAQS. Air quality is preserved in this program by requiring sources to limit their emissions to a "baseline rate;" regulated owners or operators in areas that have attained NAAQS must obtain a permit before constructing or modifying facilities. 42 U.S.C. § 7475(a)(1).

Id. at 904-05.

In *WEPCO*, the Defendant challenged the legality of the EPA's method for calculating emissions in the regulations accompanying the CAA, asserting that the provisions exceeded the authority conferred on the EPA by Congress and were arbitrary and capricious. The Defendant did not, however, dispute that its proposed activities would cause "its emissions to increase from their current operating levels." *Id.* at 910. The question before the Seventh Circuit was whether the EPA properly compared actual emission rates with "baseline" rates to determine projected increases in emissions for NSPS and PSD purposes. As the Seventh Circuit noted, the difference between NSPS and PSD is crucial for purposes of calculating emissions increases. *Id.* at 913.

As to PSD emissions calculations, the Seventh Circuit reviewed the EPA's comparison of actual pre-renovation emissions with potential post-renovation emissions at the Port Washington plant. The Defendant did not contest the pre-renovation figures but challenged the EPA's calculation of the plant's post-renovation "potential to emit" which was based on an assumption of round-the-clock operations (24 hours per day, 365 days per year). The EPA used this continuous operation assumption "because WEPCO *could potentially* operate its facility continuously, despite the fact that WEPCO has never done so in the past." *Id.* at 916 (emphasis in original).

In considering whether use of the "potential to emit" concept was appropriate, the Seventh Circuit observed that the PSD regulations state that the EPA may rely on the potential to emit if the unit "has not *begun normal operations* on the particular date." *Id.* at 917, citing 40 C.F.R. § 52.21(b)(21)(iv) (emphasis in original). The Seventh Circuit looked to the D.C. Circuit's decision in *Alabama Power Co. v. Costle*, 636 F.2d 323 (D.C. Cir. 1979), in concluding that if a source already has an established operation, use of the assumed continuous operation as a basis for finding an emissions increase is not appropriate. *WEPCO*, 893 F.2d at 917-18. The

Seventh Circuit noted that the EPA did not have data available to consider whether a significant net emissions increase would result at the Port Washington plant if the units were operated under its former hours and conditions. WEPCO was directed to make such data available to the EPA. *Id.* at 918 n.14. Thus, while the "potential to emit" standard was held to be unlawful if applied to operational plants, the ultimate calculation as to future emissions was left unresolved by the Seventh Circuit.

In this case, the Government does not rely on the "potential to emit" calculation for PSD compliance in light of the Seventh Circuit's decision as well as the EPA's 1992 preamble[11] to its proposed regulations which followed and adopted the *WEPCO* decision, known as the WEPCO Rule. Although the Defendant characterizes the Government's current position as new, the Court finds the Government's decision to disregard the "actual to potential" test well-founded in light of the current state of the law. It is clear that Sammis was operational at the time the activities were proposed. Thus, any use of the actual to potential to emit test is not legally supportable.

As noted previously, for a planned project at a major source that will effect a non-exempt physical change, the NSR/PSD regulations require a pre-construction evaluation of whether the change "would result in a significant net emissions increase of any pollutant subject to regulation under the Act." 40 C.F.R. § 52.21(b)(2)(i). The first step in the analysis is to determine the actual emissions before the proposed change. This is referred to as the "baseline emissions" and is expressed in average tons of pollutants emitted per year. In this regard, 40 C.F.R. §

[11]The preamble reflects the EPA's rulemaking authority as to Clean Air Act regulations. In the preamble, the EPA identifies and clarifies its interpretation of the various regulations. With respect to the test for emissions increases, the 1992 Preamble is in accord with the Seventh Circuit's decision in *WEPCO*.

52.21(b)(21)(ii) provides:

> (ii) In general, actual emissions as of a particular date shall equal the average rate, in tons per year, at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. The Administrator shall allow the use of a different time period upon a determination that it is more representative of normal source operation. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during he selected time period.

The second step is to determine whether the proposed physical change will result in an increase in emissions, also expressed in tons per year. In this regard, 40 C.F.R. § 52.21(23)(i) provides:

> (i) *Significant* means, in reference to a net emissions increase or the potential of a source to emit any of the following pollutants, a rate of emissions that would equal or exceed any of the following rates:

	Pollutant and Emissions Rate[12]
Nitrogen oxides:	40 tpy [tons per year]
Sulfur dioxide:	40 tpy
Particulate matter:	25 tpy of particulate matter emissions;
	15 tpy of PM_{10} emissions

The parties in this case disagree as to the appropriate method for calculating projected emissions. Thus, the Court considers this issue first.

1. Calculation of Baseline Emissions

As the Government points out, calculation of baseline emissions differs depending on whether the activities were conducted before or after the 1992 Preamble to the WEPCO Rule. For activities prior to July 21, 1992, the date the rule took effect, the Court concludes that

[12]The Court lists only those pollutants that are at issue in this case.

application of the August 7, 1980 PSD regulations is appropriate for calculating baseline emissions.[13] In this regard, the regulations provide:

> (ii) In general, actual emissions as of a particular date shall equal the average rate, in tons per year, at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. The Administrator shall allow the use of a different time period upon a determination that it is more representative of normal source operations. Actual emissions shall be calculated using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

40 C.F.R. § 52.21(b)(21)(ii) (1980). Consequently, for Activities 2, 4, 5, 6, 7, 8, 10 and 11, the Court uses the 24 months immediately preceding the physical change to calculate the baseline emissions.

For activities after July 21, 1992, the Court applies the 1980 PSD regulations as amended by the 1992 WEPCO Rule. The amendment provides that, in calculating baseline emissions, a utility may use "any 2 consecutive years within the 5 years prior to the proposed change [as] representative of normal source operations for a utility." 57 Fed. Reg. 32323 (July 21, 1992). The Court applies this rule for calculating baseline emissions for Sammis Activities 1, 3 and 9.

2. Calculation of Post-Physical Change Emissions

The parties vigorously dispute the methodology for calculating post-physical change emissions. The Government contends that Ohio Edison was obligated to calculate the projected change in emissions that would result from the activity <u>prior</u> to performing the same in order to determine whether the project requires compliance with PSD. Ohio Edison disagrees and claims

---

[13] Sammis Activities 2, 4, 5, 6, 7, 8, 10 and 11 fall in this category.

that the calculation of projected change in emissions prior to the physical change being undertaken is optional. Ohio Edison further contends that this Court should simply review the actual changes in emissions that occurred after each of the eleven projects since that data is available.

The CAA clearly mandates that an electric utility performing a non-exempt physical change must make a calculation as to the potential emissions increase that would result from the change. Further, contrary to Ohio Edison's contention, the Clean Air Act clearly requires that this calculation be made by the electric utility before the physical change is actually undertaken. The Court reaches this conclusion based on the requirements of the CAA as well as the regulatory framework.

First, the CAA imposes a preconstruction permitting requirement prior to undertaking a major modification. 42 U.S.C. § 7475. Second, under the regulations, compliance is required when a utility undertakes a physical change "that *would* result in a significant net emissions increase of any pollutant subject to regulation under the Act." 40 C.F.R. § 52.21(b)(2)(i). Third, the regulations have always required a calculation of baseline, or pre-change, emissions to be compared with a projection of post-change emissions. While the methodology for calculating post-change emissions has varied, the obligation to make a pre-change calculation of the projected post-change emissions has been consistent and unambiguous. Finally, these regulations, and common sense, provide for a review and appeal of a proposed project before it is completed. It would be both bad law and bad public policy to intentionally require or even allow construction before determining whether the modification was permissible under the Clean Air Act. For these reasons, even though actual data exists as to the emissions resulting from the eleven projects, the law does not permit an after-the-fact analysis of the effect of a plant modification, which otherwise was required by law to obtain a pre-construction permit.

This Court holds that the determination of whether a given project will cause a significant net pollution increase requires a pre-construction determination as to the additional pollutants projected to be emitted as a result of the proposed physical change. The Court now considers the parties' disagreement as to the appropriate methodology for calculating the projected post-change emissions.

a. Government's Methodology

The Government contends that the "actual to projected future actual" test should be applied for calculating the potential post-change emissions for each of the eleven Sammis activities. The test incorporates the Preamble to the WEPCO rule which was promulgated by the EPA on July 21, 1992.

For purposes of calculating future actual emissions, the regulations define "actual emissions" as follows:

> (v) For an electric utility steam generating unit (other than a new unit or the replacement of an existing unit) actual emissions of the unit following the physical or operational change shall equal the *representative actual annual emissions of the unit*, provided the source owner or operator maintains and submits to the Administrator on an annual basis for a period of 5 years from the date the unit resumes regular operation, information demonstrating that the physical or operational change did not result in an emissions increase. A longer period, not to exceed 10 years, may be required by the Administrator if he determines such a period to be more representative of normal source post-change operations.

40 C.F.R. § 52.21(b)(21)(v) (emphasis added). In turn, "representative actual annual emissions" is defined as follows:

> (33) *Representative actual annual emissions* means the average rate, in tons per year, at which the source is projected to emit a pollutant for the two-year period after a physical change or change in the method of operation of a unit, (or a different consecutive two-year period within 10 years after that change, where the Administrator determines that such period is more representative of normal source operations), considering the effect any such change will have on increasing or decreasing the hourly emissions rate and on projected capacity utilization. In projecting future emissions the Administrator shall:
> (i) Consider all relevant information, including but not limited to, historical operational data, the company's own representations, filings with the State or Federal regulatory authorities, and compliance plans under title IV of the Clean Air Act; and
> (ii) Exclude, in calculating any increase in emissions that results from the particular physical change or change in the method of operation at an electric utility steam generating unit, that portion of the unit's emissions following the change that could have been accommodated during the representative baseline period and is attributable to an increase in projected capacity utilization at the unit that is unrelated to the particular change, including any increased utilization due to the rate of electricity demand growth for the utility system as a whole.

40 C.F.R. § 52.21(b)(33).

The regulations define "net emissions increase" as follows:

> (3)(i) *Net emissions increase* means the amount by which the sum of the following exceeds zero:
> (a) Any increase in actual emissions from a particular physical change or change in method of operation at a stationary source; and
> (b) Any other increases and decreases in actual emissions at the source that are contemporaneous with the particular change and are otherwise creditable.

40 C.F.R. § 52.21(b)(3)(i). For purposes of this regulation, "contemporaneous" is defined as the period from five years prior to the change up to the date that the unit undergoing the physical change or change in the method of operation becomes operational again and begins to emit the pollutants. 40 C.F.R. § 52.21(b)(3)(ii) and (viii).

The Government's expert, Dr. Richard Rosen, first reviewed the eleven Ohio Edison projects to determine if PSD standards were triggered, requiring projections of future emissions and pre-construction permits. Rosen concluded that the main purpose of the Sammis activities was to extend the operational lives of the units and to allow them to operate at a higher level of output including greater emissions of pollutants. (Pl. Exhibit 146, *Rosen Report* at 5). In support of this conclusion, Rosen reviewed a series of Sammis Plant documents beginning with a document entitled "Sammis Availability Study" performed in 1979 by the Bechtel Corporation. The study was performed to address the increasing number of unit outages. In particular, the study states:

> [T]he electric utility industry has been trying to upgrade [the] reliability [of generating units]. Ohio Edison is no exception, and efforts have intensified over the past few years, culminating in the formation of a top-level executive committee in early 1978 -- the Ohio Edison Reliability Committee. This Committee directs a comprehensive program to improve the overall reliability and performance of the Sammis Plant. To supplement internal studies, Bechtel Associates Professional Corporation was commissioned in May 1978 to conduct a comprehensive engineering study of the Sammis Plant, with the objective of generating recommendations for improving plant performance.

(Joint Exhibit 277).

The 1979 Plant Availability Study is several hundred pages long and identifies key capability / availability losses at the Plant. The study includes an engineering evaluation to improve plant availability on a unit by unit basis. Finally, the study contains an economic evaluation, including estimates of capital costs to increase availability and economic feasibility of the proposed changes.

Rosen also relied on the"Plant Betterment - Life Extension Studies" undertaken by Ohio Edison to determine what major components would need repaired or replaced to permit reliable generation of electricity for an additional thirty years. For example, the study for Unit 3, reported in 1987, states that a "detailed inspection of Sammis Unit 3 was performed during the August 18-31, 1984 outage. The purpose of the inspection was to identify what major components would require repair or replacement to permit reliable unit generation to the year 2015." (Def. Exhibit 1456). The study concludes:

> The results of the inspection indicate that it is practical, from an equipment viewpoint, to extend the life of Sammis Unit 3 until the year 2015 while maintaining current levels of efficiency and availability. The cost to repair or replace the major unit components identified in this report are required to extend life as a base loaded unit to 2015 is estimated to be less than $100 / kw (1985 dollars).

(*Id.*).

Similar studies were performed on Sammis Units 6 and 7. (Def. Exhibits 1476 and 1494). Like the study as to Unit 3, the purpose of the Unit 6 study was to identify the major components of the unit that would need repaired or replaced to allow reliable generation of electricity until the year 2015, *i.e.*, an additional thirty years. The Unit 7 study provides a similar goal -- "to identify what major components would require repair or replacement to permit reliable unit generation to the year 2015." (Def. Exhibit 1494).

In addition to the Plant Betterment Studies, Rosen also reviewed Ohio Edison's boiler studies of the various units. In 1989, Ohio Edison studies the boilers of all 7 units at the Sammis Plant. The study states that "[b]ased on the present growth rates in system load and off-system sales, the Ohio Edison Company is expecting that, by the mid-1990s, load demand will require a reliable peak (base load) output from all available units." (Joint Exhibit 226). Thus, to insure reliable operation well into the future, the study addressed "numerous boiler related problems that could result in a forced outage." (*Id.*). Through the study, Ohio Edison sought to attain "an action plan that will virtually eliminate forced outages caused by boiler pressure component failures." (*Id.*).

In 1991, Ohio Edison performed boiler studies on units 5, 6 and 7. The study recognized that electricity demand through the 1990s would require that all units be used for base load. The study states:

> The essence of the boiler study indicates that nearly all boiler components on the South units are near the end of their useful life. The achievement of the availability and efficiency goals requires that all of these components be either replaced or undergo extensive repair . . . The completion of the action plan will provide units that will operate reliably for the next 20-30 years. In addition, design and material modifications implemented with the action plan should reduce maintenance and repair costs as compared to past needs. Finally, the plan will also provide for improved safety and efficiency in the operation of the south units.

(Joint Exhibit 307).

According to Rosen, the activities performed on Units 1-7 not only had the effect of extending the units useful lives but the activities also resulted in significant net emissions increases. As part of his calculation of emissions, Rosen used factors that had been developed by the EPA in a study and report entitled "*Compilation of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*." (*Id.* at 14). Rosen compared the factors to actual measured emissions where such data was available from the Sammis units. According to Rosen, the factors provide a conservative basis for calculating emissions. (*Id.* at 14-15).

Rosen's emission calculations are comprised of five steps:

<u>Step 1</u>: Annual Availability x Utilization Factor = Capacity Factor

<u>Step 2</u>: Capacity Factor x Unit Capacity x Hours in a Year = Annual Generation

<u>Step 3</u>: Annual Generation x Heat Rate = Annual BTU Consumption

<u>Step 4</u>: Annual BTU Consumption / Fuel Heat Content = Tons of Fuel Consumed

<u>Step 5</u>: Tons of Fuel Consumed x Emissions Factors = <u>Tons of Emissions per year</u>

In his report, Rosen noted that both annual availability and the capacity factor are measured in fractions or percentages of the hours in a year. (*Id.* at 16). The utilization factor is "the coefficient that performs this translation from availability to capacity factor." (*Id.*). A utilization factor of 1.0 means that the unit is always producing power when available. (*Id.*). According to Rosen, "whether or not an increase in unit availability is 'realized' in the form of an increase in actual generation depends on how much more the unit is utilized when its availability increases." (*Id.*).

Step 2 translates the increase in the capacity factor of the plant in to the actual amount of generation that it produced in a year, utilizing the size or rated capacity of the power plant in megawatts. (*Id.*). Step 3 translates the change in amount of electric generation into changes in the amount of thermal energy actually burned, as measured in BTUs (British Thermal Units). This step accounts for variation in the efficiency of the plant in turning fuel into electricity. The efficiency, referred to as heat rate, can vary over time and may be beneficially affected by plant improvements. (*Id.*). Step 4 translates the change in amount of thermal energy used (BTUs) into the amount of fuel used, as expressed in tons of coal burned. (*Id.*). Finally, step 5 is a conversion of the change in tons of fuel into the change in tons of emissions for each pollutant by using the appropriate emissions coefficient, as measured in tons of each pollutant emitted per ton of coal burned. (*Id.*).

In performing his calculations, Dr. Rosen also studied which plant outages and deratings prior to the projects being undertaken were attributable to the plant components ultimately replaced by the activities. The information was derived from Generation Availability Data System (GADS) reports, provided by Ohio Edison to the National Electric Reliability Council

(NERC) on an annual basis.[14] Dr. Rosen relied on expert Robert Koppe's use of the GADS data and his identification of all specific unit outages and deratings that were attributable to the component failures and malfunctions which were ultimately repaired with the activities at issue.

In calculating projected emissions increases for each of the 11 activities, Dr. Rosen used three different methods. For the reasons stated above, this Court concludes that the Actual to Projected Future Actual method is the appropriate method of calculation. In accordance with the regulations, the relevant 24 month baseline period is determined by whether the activity occurred before or after the WEPCO Preamble took effect in July 1992. Eight of the Sammis activities occurred prior to this date and three occurred afterwards. The baseline period for the eight activities that took place before July 1992 is the 24 consecutive months immediately preceding the activity. The baseline period for the remaining three activities is the consecutive 24 months within the five years preceding the activity that is representative of the average amount of power generated during the five year period.

Dr. Rosen concluded that each of the Sammis activities was expected to increase unit availability. Increased availability leads to more hours of operation. In turn, more hours of operation results in increased emissions, as Dr. Rosen's calculations show. The Court observes that, in its Proposed Conclusions of Law ¶ 62, Ohio Edison itself illustrates the point that Dr. Rosen's calculations demonstrate. For example, the Defendant states that with respect to Activity 7, Unit 6, "there was no consecutive two-year period within the previous five years that did not have a planned outage of three months, while the post-project two-year period did not

[14]Both GADS and NERC are one organization formed in the late 1960s to insure a reliable supply of electricity along a national and regional power grid. Various utilities are required to participate under mutual agreements which are based on the utility's rated capacity. Outages must be reported, together with the reasons for the cessation of output. (*Garfield Testimony*, Tr. Vol. VII at 155-59).

contain a long planned outage." (*Defendant's Proposed Conclusions of Law* at ¶ 62). In other words, following the activity, there was increased availability. It necessarily follows that, from increased availability, the projected future emissions would increase from the pre-activity baseline.

The Court now sets forth emissions calculations for each of the eleven activities, in chronological order:

Activities Prior to 1992

1. 1984 - Unit 5 Spiral Furnace Rebuild (Activity 5)

The evidence adduced at trial shows that the Unit 5 spiral furnace rebuild was necessary to restore the reliability and availability of the unit. In the baseline period prior to the activity, the components replaced caused a total of 2,134 hours of forced outages at the unit. (Pl. Exhibit 152, *Koppe Report* at 49-50). Using the GADS outage data to quantify the prediction of availability improvements results in the following predicted changes in emissions:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	29,706 tpy (tons per year)	34,906 tpy	5,200 tpy
NO_x	7,130 tpy	5,103 tpy	- 2,027 tpy
PM_{10}	152 tpy	178 tpy	26 tpy

The spiral furnace rebuild was expected to reduce the forced outage rate at unit 5 from 17.3 % to 12.6 %. (Pl. Exhibit 1150 at SMS 47491). The rebuild was also expected to improve the heat rate of the unit from 11,553 BTU / kw hr. to 11,400 BTU / kw hr. (Pl. Exhibit 1737 at SMS 90700). The projected decrease in NO_x emissions is attributable to the fact that Ohio Edison installed low-NO_x burners as part of the spiral furnace retrofit.

2. 1986-87 - Unit 6 Outage Work (Activity 7)

In the 1986-1990 Sammis Five Year Plan, Defendant noted with respect to Unit 6 that "[r]ecent failure history in the pendant reheater, horizontal reheater, and furnace waste and slope areas indicate that failures in these sections will increase from an estimated seven in 1985 to eighteen in 1990." (Joint Exhibit 384 at SMS 102537). The X-176 form predicted the prevention of boiler tube failures and associated improved availability in the years following the replacements. (Def. Exhibit 1617). In the baseline period prior to the activity, the components later replaced had caused a total of 66.7 hours of forced outages at the unit. (Pl. Exhibit 152, *Koppe Report* at 55).

In 1984, Ohio Edison installed low NO_x burners on Unit 5. In his emissions calculation for Activity 7 at Unit 6, Dr. Rosen included the decrease in NO_x emissions at Unit 5 as a creditable netting decrease for NO_x emissions from Activity 7 at Unit 6. Using GADS data to quantify the prediction of availability improvements, Dr. Rosen reaches the following emissions results with respect to Activity 7:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	53,574 tpy (tons per year)	53,898 tpy	324 tpy
NO_x	14,250 tpy	13,690 tpy	- 560 tpy
PM_{10}	314 tpy	316 tpy	2 tpy

3. Unit 7 1989-90 Outage Work (Activity 10)

Ohio Edison's July 6, 1989 Sammis Boiler Study showed that, from 1985 to 1988, there had been 45 boiler tube failures caused by the Unit 7 economizer, horizontal reheater and reheater riser tubes, furnace ash hopper and burners. (Joint Exhibit 226). All of these components were replaced during Activity 10. The study predicted a close to a 100% reduction in tube failures if the components were replaced. (*Id.*). In addition, the X-176 forms predicted a prevention of tube failures and/or improved availability in the years immediately following replacements. (Def. Exhibit 1340 - economizer, horizontal reheater and riser tubes; Def. Exhibit 1605 - boiler burners and air registers; Pl. Exhibit 868 - boiler controls and pulverizer coal pipes; Pl. Exhibit 637 - first through third mix area; Def. Exhibit 1501 - front ash hopper slope tubes and support equipment; Def. Exhibit 1343 - LP rotors).

In the baseline period prior to Activity 10, the components replaced caused a total of 750 hours of forced outages at the unit. (Pl. Exhibit 152, *Koppe Report* at 62-64). Using GADS data to quantify the prediction of availability improvements, Dr. Rosen reaches the following emissions results with respect to Activity 10:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	66,194 tpy (tons per year)	69,957 tpy	3,763 tpy
NO_x	16,868 tpy	17,827 tpy	959 tpy
PM_{10}	366 tpy	387 tpy	21 tpy

4. 1990 - Unit 4 Work Outage (Activity 4)

The July 6, 1989 Sammis Boiler Study showed that from 1985 to 1988 there were 17 tube failures at the Unit 4 furnace ash hopper tubes, secondary superheater third pass and outlet header tube stubs, and waterwall tubes that were ultimately replaced as part of Activity 4. (Joint Exhibit 226). The study predicted close to a 100 % reduction in tube failures if the components were replaced. (*Id.*). In addition, the X-176 forms prepared for the three replacement projects comprising Activity 4 predicted a prevention of tube failures and associated improved availability in the years immediately following the replacements. (Joint Exhibit 404 - furnace ash hopper boiler tubes; Joint Exhibit 139 - front waterwall tubes; Pl. Exhibit 1956 - superheater third pass and outlet header stubs).

In the baseline period prior to Activity 4, the components replaced had caused at total of 244.5 hours of forced outages. (Pl. Exhibit 152, *Koppe Report* at 46-47). Using GADS data to quantify the prediction of availability improvements, Dr. Rosen reaches the following emissions predictions:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	7, 789 tpy (tons per year)	7,918 tpy	129 tpy
NO_x	5, 091 tpy	5,175 tpy	84 tpy
PM_{10}	126 tpy	128 tpy	2 tpy

5. 1990- Unit 5 Work Outage (Activity 6)

Ohio Edison's Sammis Boiler Study of July 6, 1989 shows that from 1985 to 1988 there had been 17 tube failures at the Unit 5 economizer, reheater outlet pendants, secondary superheater outlet pendants and upper furnace arch floor, all of which were replaced as part of Activity 6. (Joint Exhibit 226). The study predicted close to a 100 % reduction in tube failures if the components were replaced. (*Id.*). The X-176 forms prepared for the replacements predicted a prevention of tube failures and associated improved availability in the years immediately following the replacements. (Joint Exhibit 92 - economizer; Def. Exhibit 1469 - secondary superheater outlet pendant; Joint Exhibit 436 - reheater outlet bank; Pl. Exhibit 868 - furnace arch replacement).

In the baseline period prior to Activity 6, the components replaced had caused a total of 279.7 hours of forced outages at the unit. (Pl. Exhibit 152, *Koppe Report* at 52-53). Using GADS data to quantify the prediction of availability improvements, Dr. Rosen calculated the following projected changes in emissions:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	38,121 tpy (tons per year)	38,830 tpy	709 tpy
NO_x	6,732 tpy	6,855 tpy	123 tpy
PM_{10}	215 tpy	219 tpy	4 tpy

6. 1991 - Unit 2 Outage Work (Activity 2)

The 1989 Ohio Edison Sammis Boiler Study showed that there had been 5 boiler tube failures at the Unit 2 reheater, secondary superheater outlet headers and furnace ash hopper tubes that were ultimately replaced as part of Activity 2. (Joint Exhibit 226). The study predicted close to a 100 % reduction in tube failures if the components were replaced. (*Id.*). In addition, the X-176 forms predicted the elimination of tube failures and associated improved availability in the years immediately following the replacements. (Def. Exhibit 1528 - reheater; Joint Exhibit 174 - secondary superheater outlet headers; Def. Exhibit 1369 - furnace ash hopper boiler tubes).

In the baseline period prior to the Activity, the components replaced had caused a total of 312.6 hours of forced outages at the unit. (Pl. Exhibit 152, *Koppe Report* at 39-40). Using GADS data to quantify the prediction of availability improvements, Dr. Rosen calculates the following net emissions changes:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	7,314 tpy (tons per year)	7,463 tpy	149 tpy
NO_x	4,978 tpy	5,079 tpy	101 tpy
PM_{10}	110 tpy	112 tpy	2 tpy

7. 1991 - Unit 7 Outage Work (Activity 11)

Ohio Edison's X-176 forms for the replacement of the Unit 7 waterwall panels predicted a prevention of tube failures and associated improved availability in the years immediately following the replacement. (Pl. Exhibit 529).

In the baseline period prior to the activity, the components replaced had caused total of 109 hours of forced outages at the unit. (Pl. Exhibit 152, *Koppe Report* at 65-66). Using GADS outage data to quantify the prediction of availability improvements, Dr. Rosen calculates the following net emissions changes:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	52,581 tpy (tons per year)	53,056 tpy	475 tpy
NO_x	14,257 tpy	14,386 tpy	129 tpy
PM_{10}	301 tpy	304 tpy	3 tpy

8. 1991-92- Unit 6 Outage Work (Activity 8)

The Sammis Boiler Study, July 6, 1989, showed that, from 1985 to 1988, there had been twenty-eight tube failures at the Unit 6 reheater riser, and waterwall tubing mix area, which were ultimately repaired as part of Activity 8. (Joint Exhibit 226) The study predicted close to a 100 % reduction in tube failures if the components were replaced. (*Id.*). Prior to replacement, the Unit 6 burners "caused slagging problems in the furnace" so that Ohio Edison "occasionally had to take 50 megawatt derates to get the boiler cleaned up for further service." (*Krause Testimony*, Tr. Vol. VII at 62). The derates were taken about twelve days per year. (*Id.*). The X-176 forms prepared for the replacement projects predicted a prevention of tube failures and/or improved availability in the years immediately following the replacements. (Pl. Exhibit 577 - reheater riser and pendant tubes; Def. Exhibit 1593 - waterwall mix area; Def. Exhibit 1429 - front and rear lower waterwall tubes; Def. Exhibit 1429 - burner replacement; Def. Exhibit 1491 - coal pipe replacement).

In the baseline period prior to Activity 8, the components replaced had caused a total of 792.8 hours of forced outages at the unit. (Pl. Exhibit 152, *Koppe Report* at 57-58). Using GADS outage data to quantify the prediction of availability improvements, Dr. Rosen predicted projected net emissions changes as follows:

Pollutant	Baseline Period	Two years post-activity	Changes in

	(two year average)	(two year average)	Emissions
SO_2	57,237 tpy (tons per year)	60,655 tpy	3,418 tpy
NO_x	15,685 tpy	6,273 tpy	- 9,412 tpy
PM_{10}	329 tpy	349 tpy	20 tpy

Activities After 1992

1. 1992- Unit 3 Outage Work (Activity 3)

The Sammis Boiler Study of July 6, 1989 showed that there had been ten tube failures at the seven components that were replaced as part of Activity 3. (Joint Exhibit 226). The study predicted close to a 100 % reduction in tube failures after the replacements. (*Id.*). In addition, the X-176 forms prepared for the project predicted a prevention of tube failures and associated improved availability in the years immediately following the replacements. (Joint Exhibit 573 - reheater; Def. Exhibit 1450 - furnace ash hopper tubes; Pl. Exhibit 576 - secondary superheater outlet headers; Pl. Exhibit 123 - front convection pass (economizer riser) tubes; Def. Exhibit 1453 - south sidewall tubes; Pl. Exhibit 490 - south cell tubes in front waterwall).

In the baseline period prior to Activity 3, the components replaced had caused a total of 494.4 hours of forced outages at the Unit. (Pl. Exhibit 152, *Koppe Report* at 42-44). Earlier in 1992, Ohio Edison installed low NO_x burners on Unit 6. In his calculation, Dr. Rosen credited the decrease associated in NO_x emissions from Unit 6 to the NO_x emissions resulting from the Unit 3 activity. Using GADS outage data to quantify the prediction of availability improvements, Dr. Rosen calculated the following emissions changes:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	7,764 tpy (tons per year)	7,998 tpy	234 tpy

NO_x	4,831 tpy	1,658 tpy	- 3,173 tpy
PM_{10}	107 tpy	111 tpy	4 tpy

2. 1993 - Unit 1 Outage Work (Activity 1)

The July 6, 1989 Sammis Boiler Study showed that in 1987 to 1988, there had been eight tube failures at the Unit 1 reheater, secondary superheater outlet headers, and furnace ash hopper tubes, all of which were replaced during Activity 1. (Joint Exhibit 226). The study predicted close to a 100 % reduction in tube failures if the components were replaced. (*Id.*). In addition, the X-176 forms prepared for the project predicted a prevention of tube failures and associated improved availability in the years immediately following the replacements. (Pl. Exhibit 476 - reheater; Def. Exhibit 1553 - secondary superheater outlet headers; Pl. Exhibit 482 - furnace ash hopper boiler tubes).

In the baseline period prior to Activity 1, the components replaced had caused a total of 242.8 hours of forced outages at Unit 1. (Pl. Exhibit 152, *Koppe Report* at 36-37). Using GADS outage data to quantify the prediction of availability improvements, Dr. Rosen calculates the following emissions changes:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	7,187 tpy (tons per year)	7,310 tpy	123 tpy
NO_x	4,824 tpy	4,906 tpy	82 tpy
PM_{10}	111 tpy	113 tpy	2 tpy

3. 1998 - Unit 6 Outage Work (Activity 9)

During the five years prior to the replacement of the Unit 6 pulverizers (1993 to 1998), Unit 6 underwent 449 deratings and one outage attributable to the pulverizers. (Pl. Exhibit 152, *Koppe Report* at 60). As of June 13, 1990, Unit 6 was experiencing unavailability due to partial outages and derates of its pulverizer. At that time, Ohio Edison assumed a constant derating attributable to the pulverizers of 24 MW, or 210,000 MW hours per year. (Pl. Exhibit 1908, *Economic Evaluation of CR-77 Pulverizer Replacement* at SMS 40773-4). In the Sammis Unit 6 Pulverizer Study, Ohio Edison determined that the unavailability of Unit 6 pulverizers represented 85,500 lost megawatt hours per year of generation. (Joint Exhibit 31; Pl. Exhibit 43, *Rosen Rebuttal Report* at 12). In a Capital Investment Evaluation prepared on Jule 24, 1997, Ohio Edison assumed that Unit 6 would suffer a derating of 75 MW for 1140 hours annually, equaling 85,500 lost megawatt hours. (Pl. Exhibit 1614; Pl. Exhibit 43, *Rosen Rebuttal Report* at 12).

In the baseline period prior to Activity 9, the components replaced had caused a total of 145.9 hours of forced outages at the Unit. (Pl. Exhibit 152, *Koppe Report* at 60-61; Pl. Exhibit 44, *Koppe Rebuttal Report* at 32). Using GADS outage data to quantify the prediction of availability improvements, Dr. Rosen calculates the following emissions changes:

Pollutant	Baseline Period (two year average)	Two years post-activity (two year average)	Changes in Emissions
SO_2	47,499 tpy (tons per year)	47,896 tpy	397 tpy
NO_x	8,651 tpy	8,723 tpy	72 tpy
PM_{10}	362 tpy	364 tpy	2 tpy

b. Ohio Edison's Response to Government's Methodology

Ohio Edison contends that under PSD regulations, an actual-to-actual test applies and requires a comparison of hourly emissions rates during the baseline period to hourly emissions rates after the activities. Initially, the Court notes that this position would allow new construction or modification without a pre-construction permit, a position that was expressly rejected by Congress, as described *supra*.

The Government asserts that the Defendant's position derives from a misreading of the regulations. The NSR/PSD analysis focuses on significant net emissions increases in total <u>annual</u> emissions resulting from a physical change to the unit. In contrast, the NSPS analysis, which is not at issue in this case, focuses on the maximum potential hourly emissions immediately before the change and the maximum potential hourly emissions immediately after the change. This distinction was made abundantly clear in the WEPCO Preamble:

> Emissions increases for NSPS purposes are determined by changes in the hourly emissions rates at maximum physical capacity. On the other hand, the NSR regulations examine total emissions to the atmosphere. *For applicability determination purposes, emissions increases under NSR are determined by changes in annual emissions as expressed in tons per year (tpy).*

57 Fed. Reg. 32,314, 32,316 (July 21, 1992) (emphasis added).

This distinction was readily apparent even before the WEPCO Preamble. The Seventh Circuit in its *WEPCO* decision stated:

> Congress added a program for the Prevention of Significant Deterioration ("PSD") [in 1977] concerned with increases in total annual emissions, to ensure that operators of regulated sources in relatively unpolluted areas would not allow a decline of air quality to the minimum level permitted by NAAQS. . . . To determine whether a physical change constitutes a modification for purposes of NSPS, the EPA must determine whether the change increases the facility's *hourly rate* of emissions. 40 C.F.R. § 60.14 (1988). For PSD purposes, current EPA regulations provide that an increase in the *total amount* of emissions activates the modification provisions of the regulations. 40 C.F.R. § 52.21(b)(3) (1988).

WEPCO, 893 F.2d at 904-05 (emphasis in original).

Furthermore, as the Government points out, there is evidence in the record to demonstrate that Ohio Edison was indeed aware of the distinction in measurement of emissions under NSPS and PSD as early as 1989. In response to a letter from Ohio Edison's in-house counsel, EPA Acting Assistant Administrator Don Clay stated:

> For the purpose of determining NSPS applicability, emission increases above the baseline levels are quantified by comparing the *kilograms per hour* emitted before and after the physical or operational change . . . . For the purpose of determining PSD applicability, emission increases above the baseline are quantified by comparing the *tons per year* actually emitted during a representative time frame prior to the physical or operational change (usually two years) to the potential emissions (in *tons per year*) after the change.

(Pl. Exhibit 897, April 27 1989 at 203). This understanding is reflected in an article prepared by counsel for Ohio Edison in March 1990, (Joint Exhibit 378 - Is there Life Extension after WEPCO?), as well as in the "logic tree"[15] developed by Defendants and their outside counsel to determine when a physical change triggers NSPS or PSD compliance. (Joint Exhibit 99).

In light of the plain language of the regulations as well as Ohio Edison's apparent understanding of the issue, Ohio Edison's present contention that this Court should analyze the comparison of <u>hourly</u> emissions changes for PSD liability is rejected.

<u>Hours of Operation Exclusion</u>

Ohio Edison contends that the "hours of operation exclusion" applies to the activities at issue in this case. The exemption for increase in hours of operation is contained at 40 C.F.R. §

[15]The logic tree is a flowchart configuration consisting of a series of questions and answers based on the CAA regulations. The chart clearly contemplates that CAA compliance is triggered by emissions increases above the baseline. The chart identifies three key questions: (1) is there a physical or operational change? (2) Will there be new or increased emissions? and (3) Does an exclusion apply? (Joint Exhibit 99).

52.21(b)(2)(iii)(f). The regulation provides that a "physical change or change in the method of operation shall not include . . . [a]n increase in the hours of operation or in the production rate . . . ." The language of this regulation clearly creates an exemption to the definition of "physical change" that applies when there is an increase in hours of operation unaccompanied by physical construction to the unit itself. For example, the exemption applies when there is a temporary increase in electricity demand which, without a physical change at a unit, results in an increased output of electricity. *See WEPCO*, 893 F.2d at 916, citing 45 Fed. Reg. 52676, 52704 (1980).

As the Government points out, Ohio Edison was aware of the proper application of the hours of operation exclusion as early as January 1990, when EPA Assistant Administrator William Rosenberg wrote to Ohio Edison's general counsel, Mr. Feltner:

> [Y]ou conclude that EPA would not seek to apply NSPS or PSD due to post-demonstration emissions increase attributable solely to an increase in the hours of operation or production rate of the unit (subject to the PSD and NSPS limitations). This conclusion is consistent with EPA's PSD and NSPS regulations, to the extent that the emissions increase did not result from a physical or operational change that would subject the source to review.

(Joint Exhibit 335). This understanding is further reflected in the "logic diagram" created by Ohio Edison's counsel to evaluate whether projects trigger PSD compliance. (Joint Exhibit 99).

Furthermore, to the extent Ohio Edison argues that it remained within the operation limits of the SIP, the hours of operation exclusion is still inapplicable because the increase in hours was accompanied by a physical change. The physical changes undertaken during the eleven activities in this case were of great magnitude. The goal of increased availability was realized as a result of each activity. As a consequence, the increased hours of operation were not independent of physical changes which caused an increase in emissions.

Ohio Edison's reliance on two letters from Edward Reich, former Director of EPA's Stationary Source Enforcement, also fails to support its position. Ohio Edison relies on Reich's June 24, 1981 applicability determination as to whether General Electric would need an NSR preconstruction permit for its stationary gas turbines to convert from middle distillates to natural gas. The letter states:

> PSD review would apply to a proposed modification at an existing major stationary source if it would cause a significant net increase in actual emissions of any regulated pollutant. In the case of the gas turbine conversions outlined in your letter, PSD applicability is determined by evaluating any change in emissions rates caused by the conversions. The data contained in your letter indicate that the emission rates (hourly) after the conversion will either remain constant or decrease. Actual emissions could increase only if there is an increase in the production rate or hours of operation, both of which are specifically exempt from PSD review. (See 40 C.F.R. § 52.21(b)(2)(iii)(f)). Therefore, since there will not be any increase in emission rates or any creditable increases in actual emissions, the conversion of the gas turbines will not be subject to PSD review.

(Joint Exhibit 20).

As the Government points out, the foregoing statements inexplicably ignore the fact that a physical change is proposed which would exclude application of the increase in hours exemption. As the First Circuit held in *Puerto Rican Cement Co. v. USEPA*, 889 F.2d 292, 299 (1st Cir. 1989), reliance on a single determination is inappropriate when "EPA materials written both before, and after, the deviant letter are consistent with the present interpretation." In the Court's view, Defendant Ohio Edison's reliance on Mr. Reich's statements in 1981 is misplaced because they are contrary to the plain language of the Clean Air Act itself, which states that compliance is triggered by "any physical change" as well as the regulations. The Reich letter of 1981 offers no support for Defendant's reliance on an hours of operation exclusion.

The second letter authored by Mr. Reich upon which Defendant relies is a January 22, 1981 response to Charles Whitmore regarding a PSD applicability determination for Cargill, Inc.'s proposed ethanol plant in Eddyville, Iowa. The plant was to be run be electricity generated from an on-site existing power plant converted to a co-generation facility through a fuel-switch and increase in hours of operation, without a physical change at the plant. (Joint Exhibit 22). In the letter, Reich concludes that the "increase in hours of operation" and the "fuel switch" exemptions applied because the unit was capable of accommodating a fuel switch. (*Id.*). Since these issues are not pertinent to the case at bar, the letter offers no support for Ohio Edison's position.

Ohio Edison also relies on a letter from EPA Administrator Thomas to Congressman John Dingell, discussing the development of the Acid Rain provisions of the 1990 CAA Amendments for the proposition that only capacity, *i.e.*, hourly emission rate, increases can trigger NSR. Defendant's reliance on the letter (Def. Exhibit 775) is wholly misplaced because it deals with the subject of fuel-switching[16], which is a separate exemption under the NSR regulations and which, it is undisputed, does not apply to this case.

In sum, the Court concludes that Ohio Edison's present contention that the hours of operation exclusion applies to the projects at issue is misplaced and is contrary to the evidence showing Ohio Edison's own understanding of the correct interpretation and application of the regulation.

[16]Fuel-switching is an alternative, though less than complete, option to achieve a reduction in air pollution. For example, a utility may seek to avoid the large expense of a scrubber, which is designed to eliminate 90 to 95% of sulphur dioxide emissions by switching to a lower sulphur coal. The new fuel may avoid the cost of a scrubber but will still result in sulphur dioxide emissions although at a reduced level.

Analysis of Frank Graves

Ohio Edison relies on the testimony of its expert witness, Mr. Frank Graves, to counter the Government's evidence that each of the eleven projects were anticipated to significantly increase net emissions. The Court observes at the outset that Graves failed to offer any independent calculation of emissions; rather, his testimony consists of an attempt to discredit the calculations obtained by the Government's expert, Dr. Rosen. The real issue in this case is not the precision of either expert's calculations. Rather, the question is whether Ohio Edison should have anticipated that each of the eleven projects would cause a substantial increase in emissions, thereby requiring a pre-construction permit.

Graves contends that if generation at each of the Sammis units was held constant (at past baseline levels), then there would be no increase in emissions following the activities. According to Graves, "none of the Activities . . . increased the maximum production capacity of the unit, the maximum heat input (fuel consumption) capability, or the net demonstrated capacity (NDC) of the units." (Def. Exhibit 1901, *Graves Report* at 5). Graves fails, however, to consider that each of the activities did in fact achieve the stated goal of increasing unit availability.

As Plaintiff's expert, Dr. Robert Koppe, outlined in his report, Ohio Edison expected that availability of the units would improve with the activities and this actually occurred. For example, Sammis Units 1-4 experienced 66 average days per year of shut down due to planned and unplanned outages in 1985 to 1989. From 1995-1999, Units 1-4 experienced only 30 average days of shut down. Unit 5 experienced an average 60 days of shutdown from 1985 to 1989, whereas from 1995 to 1999, it averaged 39 days of shutdown. Finally, Units 6 and 7 experienced an average of 83 days of shutdown from 1985 to 1989, but from 1995 to 1999, the units were shut down an average of 47 days.[17] (Pl. Exhibit 152, *Koppe Report* at 23). The reduction in outages that followed the eleven projects was precisely the goal of the projects. Further, the additional days of operation resulted in a proportionate -- and substantial -- increase in emissions.

Graves further posits that the "utilization of a unit is not related to modest changes in the reliability of a few of its components, but rather depends on the unit's position in the system of generation units that are jointly dispatched to meet demand economically." (*Id.* at 6). In the Court's view, this statement does not accurately depict the extent of the activities involved in this case. First, the activities undertaken at the Sammis plant were anything but modest -- rather, they were of great magnitude and were undertaken at a large cost. In addition, the activities did not involve simply making a few components more reliable. Quite the contrary, the activities achieved increased availability and reliability of the unit as a whole. The activities also achieved the stated goals of extending the lives of the units by at least thirty years. The activities also allowed the units to operate a greater number of days per year, which resulted in increased emissions.[18]

Mr. Graves further contends that "[t]he potential influence of a particular component on the future utilization of a generating unit is very small compared to the influence of may exogenous factors that are highly uncertain." (Def. Exhibit 1901, *Graves Report* at 15). Graves

[17]Dr. Koppe relies on NERC GADS event data in support of these figures. (Pl. Exhibit 152, *Koppe Report* at 23 n.44).

[18]Dr. Rosen also makes this point in his Rebuttal Report. (Pl. Exhibit 43, *Rosen Rebuttal Report* at 10-11).

argues that unless the utility believed that the repair "was likely to cause the unit to persistently occupy a different position in the dispatch ladder under most operating environments, [it] would not impute a change in expected utilization or emissions to a component repair." (*Id.*). In the Court's view, the evidence adduced at trial demonstrates the contrary. It is clear from the documents justifying the activities, the X-176 forms, that Ohio Edison intended the repairs to increase availability and utilization of the units well into the future. Further, Ohio Edison's obligation under the CAA to project whether or not a proposed activity will result in a significant net emissions increase is eminently clear. While there may indeed be exogenous factors that influence the unit's ability to generate electricity after the project is performed, this fact does not relieve a utility, such as Ohio Edison, of the obligation to consider projected emissions increases prior to the project being undertaken. Further, Graves did not, and cannot, explain why a rational decisionmaker, such as Ohio Edison, would expend substantial amounts of money on the projects and justify these costs by predicted fewer outages, if the utilization of the units was not expected to rise.

Graves also contends that Dr. Rosen's calculations of emissions are unreliable because the heat rate factor was held constant. Ohio Edison argues that Dr. Rosen ignored projected and actual heat rate improvements from the Sammis activities. According to the Defendant, greater utilization realized from the projects would cause the heat rate to improve, which would also allegedly result in a lower emissions output. In turn, an improvement in heat rate at a Sammis unit would move it ahead in the dispatch ladder.[19] As Mr. Kaiser further explained, changes in heat rate impact the operation of the Sammis plant. The cost and quality of coal are the same, or

[19]The dispatch ladder refers to the order in which units are dispatched to generate electricity.

are constant factors for each of the Sammis units; coal costs make up between 80-90% of all operational costs at the plant. With improved heat rate, the units at Sammis would predictably move up in the order of dispatch.

As the Government points out, Dr. Rosen's calculations did not ignore the effect of heat rate on the improvements to the Sammis units. Dr. Rosen considered and rejected the heat rate improvement goals included in Ohio Edison's Five Year plans. Dr. Rosen examined monthly heat rate and utilization factors for each of the Sammis units and concluded that "even if a temporary heat rate reduction could be expected from any activity, the beneficial effect on emissions rates would be largely cancelled out by an increase in utilization / dispatch of that unit." (Pl. Exhibit 43, *Rosen Rebuttal Report* at 9). This conclusion is evident from Mr. Kaiser's testimony that heat rate improvements allow more coal to be burned at the units, (*Kaiser Testimony*, Tr. Vol. X at 199), which in turn, leads to increased emissions. As Kaiser testified, a unit with improved heat rate moves ahead in the dispatch ladder, which means it is utilized more. Increased utilization means that more coal is burned and more emissions created. In view of these certainties, Dr. Rosen's decision to hold heat rate constant is reasonable to the Court. The impact of improved heat rate resulting from the Sammis projects is indeed largely cancelled out by the increased utilization that is realized from the change in unit position on the dispatch ladder.

Moreover, Graves' claim that Dr. Rosen ignored improvements in heat rate, even if credible, misses the critical issue in this case. Dr. Rosen is not a damage expert whose precise calculations may result in specific monetary award. Instead, he has opined as to whether the eleven projects could be anticipated, pre-construction, to substantially increase emissions.

Graves essentially testified that heat rate improvement was impossible to quantify and, therefore, Rosen's methodology was flawed.

In the Court's view, Dr. Rosen made a reasonable calculation as to the effect of heat rate improvements on emissions. There is no question that an improvement in the heat rate results in fewer tons of coal to produce the same amount of electricity, which also means a decrease in emissions. To factor in heat rate improvement, Dr. Rosen kept the utilization factor constant for each unit, even though with increased reliability resulting from the improvements, the units would presumably be utilized more often. This approach is a reasonable method by which to consider heat rate improvements.

Essentially, Graves testified that it is incorrect to assume that holding utilization constant correctly adjusts for heat rate improvement. Graves opined that there is no predictable relationship between availability and utilization. To paraphrase the eminent scholar Yogi Berra, "Predictions are hard to make, particularly if they involve the future." Fundamentally, the law does require such pre-construction estimates and predictions. An expert's opinion, which essentially contradicts the language or premise of the law, is entitled to little, if any, weight. *Thorn v. Itmann Coal Company*, 3 F.3d 713, 719 (4th Cir. 1993): *Kaiser Steel Corp. v. Director OWCP*, 748 F.2d 1426, 1430 (10th Cir. 1984). To the extent Graves contends that such estimates are impossible to construct, his opinion essentially conflicts with the law.

As long as Ohio Edison could have predicted that the eleven projects would result in a substantial increase in emissions, as explained *supra*, the precise computation of such increase is not at issue. The computations derived by Dr. Rosen demonstrate that substantial increases in emissions would, and did, result from the projects. Graves, at best, challenges the precision with which the predictions as to increases in emissions were made. Significantly, Graves did not compute any allegedly offsetting reductions in emissions resulting from heat rate improvements.

The Court also finds that Dr. Rosen's decision to disregard the improved heat rate changes as projected in the Sammis Five Year Plans was reasonable. The Five Year Plans from 1986 and 1991 set forth "goals" that are unrelated to any particular project at the plant. Moreover, it is unclear which department at Ohio Edison prepared the five year plans or what the goals contained in the plans are based upon.

In contrast to the Five Year Plans, the evidence adduced at trial with respect to the particular projects undertaken shows that the primary purpose of the Sammis activities was to improve unit availability -- not simply to improve heat rate. The X-176 forms and work orders used to approve the cost of the projects make specific reference to whether the proposed projects are expected to provide improvements in heat rate. Ohio Edison marked heat rate as a justification for the projects on only two out of sixty-six such forms. (Pl. Exhibits 963 and 1136). In view of this evidence, Ohio Edison cannot persuasively contend at this juncture that heat rate improvements were a primary goal of the activities at issue. Accordingly, the Court finds Dr. Rosen's decision to hold the heat rate factor constant in calculating emissions to be reasonable.

For all of these reasons, the Court finds Dr. Rosen's conclusion to be persuasive; the criticisms offered by Graves are insufficient to cast doubt on the findings.

c. Ohio Edison's Emissions Calculations

To the extent Defendant Ohio Edison offers calculation of the emissions resulting from the eleven activities at issue, the baseline used by the Defendant is incorrect. Ohio Edison argues that it may use any two consecutive years within the five years prior to the proposed change that is representative of normal source operations for a utility, as the baseline. In particular, the Defendant states: "Hence, the two years of highest emissions in the five years preceding each Sammis Activity is a proper baseline period." (*Proposed Conclusions of Law* at ¶ 49). There is, however, no evidence to demonstrate that Defendant Ohio Edison received approval from the EPA Administrator for use of such a baseline period, as required by the regulations.

The regulations provide:

> (ii) In general, actual emissions as of a particular date shall equal the average rate, in tons per year, at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operations. The Administrator shall allow use of a different time period *upon a determination that it is more representative of normal source operation. . . .*

40 C.F.R. § 52.21(b)(21)(ii) (emphasis added). No evidence has been adduced to show that the Administrator allowed Ohio Edison to use such a different time period.

In addition, Defendant Ohio Edison's use of an "Actual to Confirmed Actual" test is not sanctioned by the CAA or the accompanying regulations and such a test is inconsistent with Defendant's obligation under the statute to project future emissions <u>prior</u> to an activity being undertaken. The statute makes it abundantly clear that PSD applicability is to be determined prior to the commencement of a project. As the United States District Court for the Southern District of Indiana recently observed, such an approach to CAA compliance would "turn the preconstruction permitting program on its head and would allow sources to construct without a permit while they wait and see if it would be proven that emissions would increase." *United*

States v. Southern Indiana Gas and Electric Co., No. IP 99-1692-C-M/F, 2002 WL 1629817 at *3 (S.D. Ind. July 18, 2002), quoting *In Re: Tennessee Valley Authority* at 111.

Defendant conceded at oral argument that its "Actual to Confirmed Actual" test is found nowhere in the regulations. Nevertheless, Defendant maintains that the test is authorized by 40 C.F.R. § 52.21(b)(2), (b)(3) and (b)(21). Ohio Edison engages in a strained reading of these regulations to support its theory, however. Defendant concedes that the analysis begins with a baseline determination of emissions under § 52.21(b)(21)(ii). For calculating post-project emissions, Defendant first looks at § 52.21(b)(3), which provides:

> (3)(i) *Net emissions increase* means the amount by which the sum of the following exceeds zero:
> (*a*) Any increase in actual emissions from a particular physical change or change in the method of operation at a stationary source; and
> (*b*) Any other increases and decreases in actual emissions at the source that are contemporaneous with the particular change and are otherwise creditable.

Defendant argues that this provision authorizes use of actual post-change emissions. Then, Defendant looks to § 52.21(b)(2)(iii)(f), which states that an "increase in the hours of operation" is excluded from the definition of physical change. From provisions (b)(2) and (b)(3), the Defendant argues that post-project emissions should be calculated by first defining the period that is representative of normal source operations. Ohio Edison then contends that present hours and conditions of operation are to be held constant to insure that if emissions increase it is only because of an increase in hourly output, or capacity, as opposed to a greater number of hours of operation. (*See* Tr. Vol. XIII at 65-68).

The Court rejects this method of analysis as contrary to the Clean Air Act. The analysis does not accurately reflect the obligation under the CAA to project future emissions and to measure those emissions in tons per year so as to determine whether PSD compliance is required. As stated above, the hours of operation exclusion applies only where there is an increase in hours of operation that is not accompanied by a physical construction project. In this case, it is undisputed that there were eleven activities or construction projects that took place at the Sammis Plant. Therefore, the hours of operation exclusion does not apply to any calculation of post-change emissions in this case. Furthermore, simply waiting to see if the actual emissions after the project increase or decrease violates the requirement of the CAA that a pre-project calculation of projected future emissions be made. The use of an Actual to Confirmed Actual test is nowhere to be found in the regulations and, if adopted, it would undermine both the language and purpose of the Clean Air Act. For these reasons, this Court rejects Defendant's proposed emissions calculation method.

The Court does note, however, that with the exception of Unit 2, each unit at the Sammis plant had at least one activity performed which did in fact result in a significant net emissions increase. The actual data is as follows:

After the Fact Emission Comparison (Pre-1992 Activities)			
Activity & Unit	**Pollutant**	**Baseline Period (Two-Year Avg. Tons per Year)**	**Two Years Post-Activity (Two-Year Avg. Tons per Year)**
Activity No. 5 **Unit 5**	SO_2	29,706	35,012
	NO_X	7,130	6,484
	PM_{10}	152	208
Activity No. 7 **Unit 6**	SO_2	53,574	64,223
	NO_X	14,250	16,768
	PM_{10}	314	364

Activity No. 10 **Unit 7**	SO_2	66,194	61,640
	NO_X	16,868	17,043
	PM_{10}	366	352
Activity No. 4 **Unit 4**	SO_2	7,789	7,386
	NO_X	5,091	5,216
	PM_{10}	126	104
Activity No. 6 **Unit 5**	SO_2	38,121	33,713
	NO_X	6,732	6,294
	PM_{10}	215	188
Activity No. 2 **Unit 2**	SO_2	7,314	6,833
	NO_X	4,978	4,876
	PM_{10}	110	95
Activity No. 11 **Unit 7**	SO_2	52,581	64,836
	NO_X	14,257	18,016
	PM_{10}	301	362
Activity No.8 **Unit 6**	SO_2	57,237	58,744
	NO_X	15,685	8,415
	PM_{10}	329	344

Comparison of Actual Emissions (Post-1992 Activities)							
Activity & Unit	**Pollutant**	**Baseline Period Two-Year Avg. (Tons/Year)**	**Five Years Post-Activity (Tons/Yr.)**				
			Year 1	Year 2	Year 3	Year 4	Year 5
Activity No. 3 Unit 3	SO_2	7,029	7,764	6,644	8,264	9,581	11,084
	NO_X	4,824	5,559	4,643	6,100	5,644	5,904
	PM_{10}	111	109	92	121	130	157

Activity No. 1 Unit 1	SO_2	7,187	7,511	7,188	9,207	11,351	9,776
	NO_X	4,824	5,239	5,327	5,514	6,072	5,005
	PM_{10}	111	104	106	127	162	126
Activity No. 9 Unit 6	SO_2	47,499	37,848	35,585	--	--	--
	NO_X	8,651	9,072	8,978	--	--	--
	PM_{10}	362	414	397	--	--	--

While the Court does not rely on these actual numbers because, as stated above, the Clean Air Act requires utilities to project increases in emissions prior to undertaking modification work, the Court simply observes that most of the projects actually did result in a significant net emissions increase.

E. Ohio SIP Permits

Defendant Ohio Edison contends that the Ohio State Implementation Plan ["SIP"][20] operating permits that they hold insulate them from PSD violations. (*Defendant's Proposed Conclusions of Law* at ¶ 41). Specifically, Ohio Edison argues that because there are no permit conditions on its hours of operation or production rate, an increase in hours of operation could not disturb the prior assessment of Sammis' environmental impact. (*Id.*). According to Ohio Edison, the Sammis activities could only create liability if the units' size, NDC and capacity to

[20]Under 42 U.S.C. § 7410(a)(2)(C), each State Implementation Plan must include a program to regulate the modification and construction of any stationery source of air pollution, in both attainment and nonattainment areas, to assure that NAAQS are achieved. Ohio Administrative Code Chapter 3745-31 includes such provisions. Thus, under the Ohio SIP, any person who wishes to modify any source of air pollutants must first apply for and obtain a permit from the Ohio EPA. OAC § 3745-31-02(A). A "modification" is any physical change in or change in the method of operation of a source of air pollutants that increases the amount of air pollutants emitted. OAC § 3745-31-01(E).

emit air pollutants increased. (*Id.* at ¶ 42).

As the Government correctly points out, the Ohio SIP permits are not PSD permits and compliance with the SIP does not necessarily comport with PSD compliance. The SIP permits are designed to ensure that the Defendant remains in attainment status with regard to NAAQS levels. 42 U.S.C. § 7410(a). Compliance with the SIP does not obviate the need to comply with the PSD provisions upon making a major modification. Further, the actual permits issued by the Ohio EPA under the SIP require Ohio Edison to notify the OEPA prior to any modification, as the term is used in the Clean Air Act. The fact that Ohio Edison obtained a state operating permit did not obviate the requirement to follow NSR / PSD requirements as to modifications.

F. Post- Oral Argument Briefing

Following the oral argument in this case, held on April 25, 2003, the Defendant filed a "Reply to the Emissions Spreadsheet Provided by the United States During Closing Argument." (Doc. #307). The Defendant contends that the projected emissions for each of the activities listed on the Spreadsheet constitutes a new emissions calculation without any evidentiary basis. The Government disputes this characterization.

During the proceedings on April 25, counsel for the United States argued that Dr. Rosen's projected future actual emissions calculations are reliable because they are "in the ballpark" of the actual post-project emissions. (Tr. Vol. XIII at 101). In support of this statement, Plaintiff tendered a demonstrative exhibit that compares Dr. Rosen's projected emissions, as listed in the Plaintiff's Proposed Findings of Fact, with the post-activity emissions. (*Id.*). Defendant Ohio Edison contends that the numbers used on the spreadsheet and in the

Plaintiffs' Proposed Findings of Fact, as calculated by Dr. Rosen, are "new" calculations that lack evidentiary support.

As the Government points out, the Defendant concedes that the emissions increases (or decreases) "come[ ] directly from the results of Dr. Rosen's Calculation Method #3 in his Rebuttal Expert Report." (*Defendant's Reply* at 2). Defendant, however, takes issue with the baseline and post-project emissions numbers identified in Plaintiffs' Proposed Findings of Fact. According to the Defendant, these "baseline and projected post-activity tonnages are not the ones calculated by Dr. Rosen . . . ." (*Id.*). In the Court's view, the Government is correct to observe that an attack on numbers identified in the Plaintiffs' Proposed Findings of Fact should have been raised in the Defendant's earlier filed responsive brief. Nevertheless, the Court will consider the Defendant's argument at this juncture.

The Court finds that the baseline emissions , the projected increase in emissions, as well as the actual post-project emissions numbers contained in Plaintiffs' Proposed Findings of Fact are based on the evidence of record in this case, in particular Plaintiffs' Exhibits 30 and 43. Thus, to the extent Defendant argues that the Plaintiffs' Proposed Findings of Fact present "new" calculations, the argument is unavailing. In addition, the Defendant's assertion that the spreadsheet presented by counsel during the closing argument constitutes a different emissions calculation is similarly unavailing. As Defendant points out, the spreadsheet is used to represent the emissions increase, not the baseline emissions or projected future actual emissions from the units. Furthermore, the spreadsheet serves a demonstrative purpose only; that is, to compare the projected emissions increase with the actual emission increase. The Court uses the exhibit for this extent only. Further, the Court notes that actual emissions data, while interesting, is not dispositive of the matter to be resolved in this case. It is the projected net emissions increase that the Defendant could have predicted prior to the projects being undertaken that determines whether there is a CAA violation.

In sum, the Court rejects Defendant Ohio Edison's post-oral argument contention that the Government attempts to offer a "new" emissions calculation. Since the Court considered the merits of Defendant's "Reply," the Plaintiffs' Motion for Leave to Respond to the Defendant's filing (Doc. #309) is granted.

G. Summation

For the reasons stated above, this Court concludes that the eleven Sammis Plant activities constitute "physical changes" for purposes of CAA compliance. The Court further concludes that the activities do not fall within the regulatory exemption for "routine maintenance, repair or replacement." Finally, the Court concludes, with only a few exemptions as stated above, that the Defendant should have determined that the activities would result in significant net emissions increases, for purposes of PSD compliance. In reaching this conclusion, the Court finds that evidence proffered through Drs. Rosen and Koppe as well as Ron Sahu provide a reasonable and credible basis from which to evaluate the issue of increase in emissions.

The Government has proven its case by a preponderance of the evidence and, accordingly, the Court finds with respect to all eleven projects that Ohio Edison is in violation of the CAA.

H. The Fair Notice Defense

Defendant Ohio Edison contends that it did not have fair notice of its obligations under the Clean Air Act, as amended. Specifically, Defendant contends that the definition of "routine maintenance, repair or replacement" has changed repeatedly, as has the method used to calculate emissions. As a consequence, Defendant argues that the tests for routineness and emissions were not "ascertainably certain" and therefore Ohio Edison lacked fair notice of the law. The Government disputes these contentions.

As a general rule, courts must give deference to an agency's interpretation of its own regulations. As the Supreme Court held in *Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 844 (1984), "considerable weight should be accorded to an executive department's construction of a statutory scheme it is entrusted to administer." The doctrine of fair notice, as applied in the context of a CAA civil enforcement action, was recently addressed by the United States District Court for the Southern District of Indiana in *United States v. Southern Indiana Gas and Electric Co.*, 245 F.Supp.2d 994 (S.D. Ind. 2003). The court stated, in pertinent part:

> The fair notice doctrine . . . prevents . . . deference shown to agency interpretations from "validating the application of a regulation that fails to give fair warning of the conduct it prohibits or requires." *Gates & Fox Co., Inc. v. Occupational Safety and Health Review Comm'n*, 790 F.2d 154, 156 (D.C. Cir. 1986). Though this principle arises most often in the criminal context, the fair notice concept has been recognized in the civil administrative context, and is now thoroughly incorporated into administrative law. . . .
>
> The fair notice doctrine (also called fair warning) in the administrative context is a developing concept of relatively recent vintage. The Fifth Circuit began the line of case law on fair notice when it reversed an administrative court's conclusion that the defendant had violated an OSHA regulation, holding that the defendant did not have fair warning of how OSHA was interpreting the regulation at issue. *See Diamond Roofing*, 528 F.2d at 649-50. In an oft-cited passage, the court held, "If a violation of a regulation subjects private parties to criminal or civil sanctions, a regulation cannot be construed to mean what an agency intended but

> did not adequately express . . . [the agency] has the responsibility to state with ascertainable certainty what is meant by the standards he has promulgated." *Id.* at 649 (citations omitted). The bulk of the fair warning case law comes from the D.C. Circuit, which stated the test this way: "If, by reviewing the regulations and other public statements issued by the agency, a regulated party acting in good faith would be able to identify, with 'ascertainable certainty,' the standards with which the agency expects parties to conform, then the agency has fairly notified a petitioner of the agency's interpretation." *Gen Elec.* , 53 F.3d at 1329. The inquiry is taken from the perspective of the regulated party (not the agency) and analyzes whether that party could have predicted the agency's interpretation of the regulation at the time of the conduct at issue. *See Hoechst Celanese*, 128 F.3d at 224-230.

Id. at 1010-11.

As the district court in the *SIGECO* case noted, the degree of ambiguity required for a regulation to violate the fair notice doctrine is not subject to a clear standard. Consequently, courts have considered several factors in applying the fair notice doctrine. In some cases, the plain language of the regulation itself suffices to show that the defendant had fair notice or a lack of fair notice of the administrative agency's interpretation of the regulation. *See Gates & Fox Co. v. Occupational Safety and Health Review Commission*, 790 F.2d 156 (D.C. Cir. 1986). Public statements by the agency may also be relevant to the analysis. *See Gen. Electric Co. v. United States Environmental Protection Agency*, 53 F.3d at 1324, 1329 (D.C. Cir. 1995). In addition, the consistency of such public statements may bear on whether or not the defendant had fair notice. *See Sekula v. Fed. Deposit Ins. Corp.*, 39 F.3d 448, 457 (3rd Cir. 1994). Furthermore, confusion within an enforcing agency as to the proper interpretation of a regulation is an appropriate factor to consider. *See Gen. Elec. Co.*, 53 F.3d at 1329. Finally, whether or not the defendant makes inquiry of the agency as to the meaning of a regulation is pertinent to the fair notice issue. *SIGECO*, 245 F.Supp.2d at 1011, citing *Texas Eastern Products Pipeline Co. v. Occupational Safety and Health Review Commission*, 827 F.2d 46, 50 (7th Cir. 1987).

In this case, Defendant Ohio Edison contends that the EPA's interpretation of the "routine maintenance, repair or replacement" exemption has changed over time, preventing a regulated party from gleaning fair notice as to the meaning of the law. The Defendant bears the burden of establishing such a lack of notice as the issue is raised as an affirmative defense to liability. *See Id.* at 45, n.31.

Ohio Edison first contends that a narrow interpretation of the routine maintenance exemption is "expressly contradicted by USEPA's statements in the PSD and NSPS regulations' preambles." (*Memorandum in Opposition to Plaintiffs' Proposed Findings of Fact and Conclusions of Law* at 17). A reading of the preambles does not support this assertion.

The preamble to the 1980 regulations provides:

> With the final amendments announced here, the Part 51 and Part 52 PSD regulations now define "major modification" as any "physical change" or "change in the method of operation" at a major stationary source which would result in a "significant net emissions increase" in any pollutant subject to regulation under the Act. . . .
>
> While the new PSD regulations do not define "physical change" or "change in the method of operation," they provide that those phrases do not encompass certain specific types of events. Those types are: (1) routine maintenance, repair and replacement . . . .

45 Fed. Reg. 52676, 52698 (August 7, 1980).

The preamble to the WEPCO rule states, in relevant part:

> The EPA has always recognized that the definition of physical or operational change in section 111(a)(4) could, standing alone, encompass the most mundane activities at an industrial facility (even the repair or replacement of a single leaky pipe, or a change in the way that pipe is utilized). However, EPA has always recognized that Congress obviously did not intend to make every activity at a source subject to new source requirements.
> As a result, EPA has defined "modification" in the NSPS and NSR regulations to include common-sense exclusions from the "physical or operational change" component of the definition. For example, both sets of regulations contain similar

> exclusions for routine maintenance, repair and replacement; for increases in the hours of operation or in the production rate; and for certain types of fuel switches . . . .

57 Fed. Reg. 32314, 32316 (July 21, 1992).

The Defendant, however, relies on the following portion of the 1992 WEPCO preamble in support of its contention that the narrowness of the exemption has not been ascertainably certain:

> EPA is today clarifying that the determination of whether the repair or replacement of a particular item of equipment is "routine" under the NSR regulations, while made on a case-by-case basis, must be based on the evaluation of whether that type of equipment has been repaired or replaced by sources within the relevant industrial category.

57 Fed. Reg. 32314, 32326 (July 21, 1992).

According to the Defendant, the preamble's reference to "sources within the relevant industrial category" supports the notion that an activity is routine if it has been performed with some frequency in the industry, as opposed to at a particular unit. The Court disagrees. The preamble followed the 1990 decision of the Seventh Circuit in *WEPCO*, which made it very clear that activities performed in the industry are relevant to one factor of the four-part test used by the EPA to determine whether an activity constitutes routine maintenance -- the frequency factor. Reading the preamble with the *WEPCO* decision, it is unambiguous that the routine maintenance exemption is narrow and the analysis is to be made on a case-by-case basis, not elevating one factor of the analysis over another.

The Court further finds that the preambles reiterate the plain language of the statute and the regulation. The CAA states that "any physical change" constitutes a "modification" for purposes of statutory compliance. The language used is indeed broad and the word "any" must be given its plain meaning. To temper this expansive definition, the EPA promulgated a regulation providing an exemption for "routine maintenance, repair or replacement." The narrow extent of this exemption is apparent from the plain language of the regulation itself. The regulation does not exempt <u>any</u> maintenance, repair or replacement from statutory compliance -- rather, only <u>routine</u> maintenance is exempted. In view of this language, it is hard to fathom that Ohio Edison did not have notice that the sorts of projects undertaken at the Sammis plant would not be considered as "routine." As described *supra*, it is undisputed that the projects were undertaken at a great expense (a capitalized expense), the projects lasted for months at a time, and the stated goal of the projects was to extend the useful lives of the units well into the future. Furthermore, at least one of the projects -- the spiral furnace rebuild to Unit 5 -- was unprecedented in the industry. If any of the activities undertaken could be considered to be "routine maintenance," the regulation would vitiate the very language of the CAA itself. Such a result could not have been intended by Congress.

Further, it is beyond dispute that a regulation promulgated by an administrative agency is invalid to the extent the regulation conflicts with the language of a statute. Ohio Edison's interpretation of the term "routine maintenance, repair or replacement" is so broad as to conflict with the clear language of the Clean Air Act requiring compliance in conjunction with only a "modification."

The Court finds that the plain language of the CAA, read together with the routine maintenance exemption, make it clear that the exemption must have a narrow interpretation so as not to swallow the general rule requiring CAA compliance when a modification is made. The Court further finds that the preambles to both the 1980 and the 1992 regulations simply reiterate the plain language of the statute and the regulations. The Court concludes that Defendant Ohio Edison should have been placed on notice of the narrow scope of the routine maintenance exemption from the plain language of the statute and the regulation themselves.

Furthermore, as the Government points out, even assuming that the Defendant did not find the plain language of the statute and the regulation ascertainably certain, the narrow interpretation of the routine maintenance exemption was explained as early as 1980 by the D.C. Circuit Court of Appeals. In *Alabama Power Co. v. Costle*, the court stated:

> EPA does have discretion, in administering the [CAA's] "modification" provision, to exempt from PSD review some emission increases on grounds of de minimis or administrative necessity. . . . Implementation of the statute's definition of "modification" will undoubtedly prove inconvenient and costly to affected industries; but the clear language of the statute unavoidably imposes these costs except for de minimis increases. The statutory scheme intends to "grandfather" existing industries; but the provisions concerning modifications indicate that this is not to constitute a perpetual immunity from all standards under the PSD program. If these plants increase pollution, they will generally need a permit. Exceptions to this rule will occur when the increases are de minimis, and when the increases are offset by contemporaneous decreases of pollutants . . . .

Alabama Power Co. v. Costle, 636 F.2d 323, 400 (D.C. Cir. 1980). The Court finds that the foregoing makes it ascertainably certain that only *de minimus* activities would serve to trigger the routine maintenance exemption.

The narrow interpretation of the routine maintenance exemption was again explained in the EPA's 1988 administrative determination regarding the proposed WEPCO modifications (the "Clay Memo"). The Clay Memo characterized the routine maintenance regulatory exemption as a "very narrow exclusion" from CAA compliance. (Clay Memo at 3). This interpretation was approved by the Seventh Circuit in *WEPCO.* In particular, the Seventh Circuit concluded that the EPA's examination of the cost, magnitude, nature and frequency of the proposed changes in determining whether the changes could be considered "routine maintenance" was not arbitrary or capricious. *WEPCO*, 893 F.2d at 913.

In the Court's view, the Clay Memo and the Seventh Circuit's subsequent *WEPCO* decision in 1990 put the regulated community on notice that the routine maintenance exemption was subject to a narrow, rather than an expansive, interpretation. More fundamentally, these interpretations are with regard to clear statutory and regulatory provisions. Agency statements are not of great significance if the statements address provisions of the law that are not ambiguous. The law has been clear that the routine maintenance exemption is a very narrow exception to the general rule that any physical change resulting in an increase in emissions triggers the obligation to comply with the CAA. Further, the language of the CAA regarding "modification" when read together with the regulatory exception for "routine maintenance, repair or replacement" is alone sufficient to make it ascertainably certain that the regulatory exemption is of a limited nature.

The Court also observes that as a member of the Utility Air Regulatory Group ["UARG"], Defendant was aware of the latest developments in environmental law, in particular those affecting electric utilities. David Feltner, then Ohio Edison's general counsel, was a representative on the UARG WEPCO Task Force which examined the effects of the EPA's administrative decision. (Tr. Vol. VI at 42). Ohio Edison was also a representative member of the Edison Electric Institute ["EEI"], which kept track of CAA issues of concern to the electric utility industry and held regular meetings to address the same. (Tr. Vol. VI at 136). In view of Defendant's participation with these electric utility groups, the Court concludes that the Defendant was aware of the EPA's narrow interpretation of the routine maintenance exemption.

The Court concludes that Ohio Edison's assertion that it lacked fair notice of the interpretation of the routine maintenance exemption is unavailing.

IV.

CONCLUSIONS

Based upon the foregoing, the Court makes the following conclusions:

First, the Court finds that Defendants are subject to the NSR/PSD program. Both Ohio Edison and Pennsylvania Power Company are "persons" within the meaning of § 302(e) of the CAA, 42 U.S.C. § 7602(e). Second, at all times relevant to this lawsuit, the Sammis Plant was a "major stationary source" for NO_x , SO_2 and PM, as defined by 40 C.F.R. § 52.21(b)(1)(i)(a). Third, at all times relevant to this lawsuit, the Sammis plant was a "source" or "facility" within the meaning of the Ohio SIP General Permit Requirements. Fourth, Ohio Edison is a "major utility" as that term is defined in the Uniform System of Accounts, 18 C.F.R. , Part 101, General Instructions 1.A(1).

The Court further concludes, for the reasons stated above, that each of the eleven activities undertaken at the Sammis plant effected a non-exempt physical change to a major source, for which compliance with the CAA was required. In reaching this conclusion, the Court adopts the EPA's interpretation of the "routine maintenance, repair or replacement" exemption.

In addition, the Court concludes that each of the eleven activities resulted in a significant net emissions increase within the meaning of 40 C.F.R. § 52.21(b)(2)(i). As explained above, the Court adopts the Actual to Projected Future Actual methodology in calculating post-project emissions. The Court finds this approach consistent with the NSR/PSD provisions of the CAA, 42 U.S.C. § 7475, and consistent with the NSR/PSD regulations.

The Court concludes that as of the dates of commencement of the various projects, each of the eleven activities would have been projected to result in significant net emissions increases of one of more regulated pollutants. The Court accepts as credible and persuasive the opinions of Plaintiffs' expert, Dr. Rosen, whose calculations yield the following:

1. Prior to commencement of construction, Activity 1 would have been projected to result in a net increase in emissions above the significance level for NOx and SO_2.

2. Prior to commencement of construction, Activity 2 would have been projected to result in a net increase in emissions above the significance level for NO_x and SO_2.

3. Prior to commencement of construction, Activity 3 would have been projected to result in a net increase in emissions above the significance level for SO_2.

4. Prior to commencement of construction, Activity 4 would have been projected to result in a net increase in emissions above the significance level for NO_x and SO_2.

5. Prior to commencement of construction, Activity 5 would have been projected to result in a net increase in emissions above the significance level for SO_2.

6. Prior to commencement of construction, Activity 6 would have been projected to result in a net increase in emissions above the significance level for NO_x and SO_2.

7. Prior to commencement of construction, Activity 7 would have been projected to result in a net increase in emissions above the significance level for SO_2.

8. Prior to commencement of construction, Activity 8 would have been projected to result in a net increase in emissions above the significance level for SO_2, and PM_{10}.

9. Prior to commencement of construction, Activity 9 would have been projected to result in a net increase in emissions above the significance level for NO_x and SO_2.

10. Prior to commencement construction, Activity 10 would have been projected to result in a net increase in emissions above the significance level for NO_x, SO_2, and PM_{10}.

11. Prior to commencement construction, Activity 11 would have been projected to result in a net increase in emissions above the significance level for NO_x and SO_2.

Activities 1 through 11 each resulted in a significant net emissions increase of one or more regulated pollutant within the meaning of 40 C.F.R. § 52.21 (b)(2)(i).

It is undisputed that the Defendant failed to obtain PSD permits for the activities at issue. For each of the activities, the Court finds the Defendants liable under the CAA. Pursuant to the Court's previous Order, the appropriate civil penalties and injunctive relief will be determined following a remedy phase trial, which will commence in March 2004.

IT IS SO ORDERED.

DATE

EDMUND A. SARGUS, JR.
UNITED STATES DISTRICT JUDGE