Report of W. M. Riggs on Power House

Clemson College S.C. May 29, 1903.
Dr. P.H. Mell, President
Clemson College, S.C.

Dear Sir:

As per request of the Special Trustee Committee appointed to look into the building of an Agricultural Hall Gymnasium - Steam Heat Power Plant, I beg to submit the following general report regarding the advisability of centralizing our power and heating.

The following plants are in operation on the College property:

First: - The Heat, Light & Water Plant situated in the Mechanical Building and consisting of:
2-100 H.P. Turbines 
1-85 H.P. Engine and
75-Kilowatts in Generator capacity. This plant furnishes Steam heating to the Mechanical & Chemical Departments, and Water, Light, & Power to all divisions of the College. Annual coal consumption will average about 950 tons, and the total cost of operation, including coal, labor, repairs, and materials used in the plant is about $3,675.00.

Second: - The Barracks Plant, used for heating the Old & New Barracks, College Building & Chapel. This plant consumes about 52.6 tons of coal annually, and its running expense, including coal, labor, etc., is about $2,460.00.

This is the textile heating plant, which consumes about 40 tons of coal, and cost
for coal, extra labor, supplies, etc., $313.00 per year.

Summary of Cost

All Heat, Light, and Water
Mechanical Hall, Water, & Electric Plant -- $5,567.00
Barrachal Heating Plant -- -- -- 2,460.00
Textile Heating Plant -- -- -- 313.00
Total for coal, labor, repairs, and supplies used in plants -- -- -- $8,340.00

I do not believe that by Centralizing our power we could, with our present load, save anything in the cost of the items included in the above summary. Test show that we are burning coal very efficiently in both Barrachal & Mechanical Hall plants, and I do not think that centralization is bad for the steam condensation, in the necessary long transmission mains that any coal can be saved from the present construction.

In the matter of labor we would have to employ three engineers as we now do in the Electric plant for the 24 hours' run. Three engineers who now do their own firing and receive an average of $48.33 per month, would have to be provided with firemen during two of the months for at least 6 1/2 months of the season. A competent fireman could not be had for least than $30.00 per month, which for 6 1/2 months, would be $390.00 or practically as much as the labor at the Barrachal & Textile heating plants is costing annually. In the event of a Central Plant being
Built and the present plants removed from the Mechanical Hall, the reduction in insurance would be $0.00 per $100.00. The Mechanical Hall is insured for $5,000.00 and the Barracks for $8,187.50.

In the former, the total annual saving would amount to $200.00. The premium on the Barracks is only 19.0 and this would not probably be reduced by the removal of the heating plant.

The annual premium on the insurance of the Central Plant—pulling the value of the building and machinery at $20,000.00 and the rate of premium the same as that paid on the Mechanical Hall—$25.50 per $100.00 (it would hardly be lower than that) would be $5.00. It is not increase in insurance alone that $240.00 per year.

In accounts of the long lines of trans-mission, steam flues, and the greater amount of machinery connected with the proposed new plant, the repair and depreciation charges would certainly be materially increased.

So much for the consideration of relative operating costs; the conclusion also rests on the need of certain distinct advantages in favor of the contemplated change from our present separate plants.

However, three are other weighty reasons to be considered besides running expenses.

First: We are now at the limit of our capacity. The any material increase to our demands for power or heating must be met by additions to our present equipment.
In case of the Power Plant in the Science Hall, all the room is rather limited, in which to install another engine—however it could be done.

Also our smaller stack is too small for any additional boilers. If another was added we would be compelled to put in a forced draught or build another or larger stack. To put in another boiler engine, generator and fixed draught apparatus in this way practically doubling our present capacity would cost about $6,000.00 — add to this $2,000.00 and the present plant could be made up to date and fairly representative of modern practice.

However, there exist the ever present dangers of the mechanical hall burning in several cases the plant would struggle with it and every division of the College be deprived of light and power.

There can be no doubt that the time is near at hand when addition must be made to our capacity. Otherwise we must stop all extension that require power, light or heating.

I sincerely hope that we have not yet arrived at this point. For among other desirable things we should establish an electric line to Ballonia not only for teaching purposes but to give to our students instruction in Electrical Street Railway Engineering. The electric street railway is the most important branch of the entire electrical industry, and yet in Colleges as in the Country gives the practical engineer- ing course. This is an opportunity for showing that will of hope in the near future be appreciated and embraced by our students.
Another strong point in favor of a central power or heating plant is that it could be made a valuable object lesson for our students in engineering. Our present plants cannot truly be so regarded, nor could a new plant be unless we discard some of our present machinery, which, though serviceable, is antiquated.

I have attempted to present fully both sides of the matter. It is needless to say that personally I desire to see a first-class up-to-date central plant built, which as well meet our present needs, and anticipate our future growth.

However, were it not for the probable need of the proposed Agricultural Hall, I should give it unequivocally as my opinion that the time for centralizing has not yet come, and will not until extensive repairs and renewals to boilers & machinery now in use become necessary. For example, when it becomes necessary to renew the boiler at the agricultural station.

However, if the Agricultural Hall is built, provision must be made to heat it, and this will necessitate the addition of another boiler, and the necessary industrial engravers appear like to our present plans in the Mechanic Hall.

A boiler could be bought to match the two H & P boilers now in use, and if later the centralization was effected, the cost of erection of the new boiler would be about $5,000.
The cost of Centralization will be about $26,000.00.

Sincerely submitted,

(Signed) H.M. Riggs

(In charge of Light, Heat & Water)
Department of the College.
1. Chemical & Scientific, Director (Exp. $30.00) 2000
2. Agriculture, Director 2000
3. Mechanical & Engineering, Director 2000
4. Military, Director 400

Professorships
1. English 1750
2. History 1750
3. Zoology & Virology 1750
4. Mathematics 1750

Associate Professorships
1. Chemistry (Bennett) 1500
2. Mechanical Engineering (Earle) 1500
3. Physics (Patola) 1500
4. Veterinary Science (Brown) 1500
5. Weaving & Designing (Freccell) 1500
6. Horticulture (C. E. McWhirter) 1500
7. Drawing (Lee) 1500
8. Entomology & Zoology (Chambliss) 1500
9. Botany & Bacteriology (Huntley) 1500

Assistant Professorships
1. Agricultural Sc. Analysis (Shiner) (Exp. etc.) 1350
2. Agriculture (McNair) 1200
3. Agriculture (Brown) 1200
4. Agriculture (Johnson) 1200
5. Mathematics (Walker) (Houston) 1200
6. Agriculture (Daniel) 1200
7. Mechanics Shop (Wright) 1200
8. Mechanics (Wright) 1200
9. Drawing & Designing (James) 1200
10. Mathematics (Lewis) 1200
11. Electricity (By son) 1200
12. Woodwork (Yanc) 12.00
13. Free Hand Drawing (Clark) 12.00
14. Mathematics & Physics (Edmiston) 12.00
15. English (Knight) 12.00
16. Shipping & Animal Husbandry (Smith) 12.00
17. English (Bryan) 12.00

Instructors
1. Chemistry (Henry) 9.00
2. Veterinary Science (Shealey) 9.00

Assistant
1. Woodwork (Yanc) 7.00
2. English (Parker) 7.00
3. English & Mathematics (Buckley) 7.00
4. Mathematics (Hancock) 7.00
5. Mechanics, Drawing (Bryan) 7.00
6. Faculty (Watson) 7.00