Jacobs Request #42 - Please provide a discussion as to the need for the secondary water treatment system

Wastewater treatment at the New Hampshire Clean Air Project at Merrimack Power Station originally was configured for an enhanced primary wastewater system, a $2.6M addition. It is now our understanding that the primary system will be supplemented by a secondary wastewater treatment system, a $26.2M addition. Please provide a discussion as to the need for the secondary water treatment system. Your comments should address questions like: is the secondary water treatment system actually required by today's regulations? Does PSNH believe it is a good idea to install in case there are more stringent regulatory requirements in the future?

Data Request # 42: "Please provide a discussion as to the need for the secondary water treatment system. Your comments should address questions like : is the secondary water treatment system actually required by today's regulation? Does PSNH believe it is a good idea to install in case there are more stringent regulatory requirements in the future?"

Response: Attached we are providing the document entitled "Risks in Obtaining the Remaining Operation Permit – Wet Flue Gas Desulfurization (WFGD) Discharge," dated March 2011, which provides the rationale for PSNH's decision to proceed to design, construct, and operate this secondary wastewater treatment facility.

An important preliminary point, and one that has certainly influenced our decision-making, is the current status of our National Pollutant Discharge Elimination Permit ("NPDES permit"). On March 10, 1997, PSNH submitted a timely and complete application to the EPA for the renewal of the Merrimack Station NPDES permit, issued June 25, 1992 and modified October 22, 1992. EPA is currently drafting a new NPDES permit, resulting in the station operating under an administratively continued permit until such time as a draft permit is issued. This permit status precludes the possibility of a permit modification related to a new discharge.

Regarding your specific question of whether the secondary wastewater treatment system is required by today's regulations, we offer the following: The immediate response is no. We have been making the argument to regulators that the scrubber's Primary Waste water Treatment System, supplied by Siemens Water Treatment, is the current state of the art technology for the liquid waste stream and is designed and will be operated to meet required discharge limits. This system is referred to as a Physical-Chemical process or "phys-chem" system. It includes filtration stages, various chemical treatments, clarification, and eventual pH control. This liquid has been the focus of a rigorous analysis by NHDES staff for close to a 12-month period, as referenced in the attachment. To our knowledge, this phys-chem process is what is being installed with the majority of modern scrubber systems, although EPA is requiring careful consideration at each plant of site-specific alternatives.

There has been one other facility, Kansas City Power & Light's Iatan Station in Weston, Missouri, which has installed some additional treatment equipment beyond the phys-chem treatment, and which EPA references as a new and positive treatment system example. The system at Iatan Station, furnished by Aquatech, uses a clarifier for solids settling, followed by two 50% capacity falling film evaporators to achieve waste stream volume reduction and initial concentration of the metals and other constituents of the FGD wastewater. The distillate from the evaporators is recovered for reuse. The brine concentrate is not further dewatered in a crystallizer stage, but is instead combined with fly ash and landfilled on site. Iatan Station has a 140-acre landfill on-site where it is permitted to dispose of more than 2000 tons of flyash and gypsum per day.

It is important to differentiate between Iatan and Merrimack Station, as EPA specifically requested PSNH to do. First, Iatan has its own on-site landfill which it uses for disposal of the large quantities of their brine concentrate/fly ash solid waste mixture generated by its FGD wastewater thermal dewatering system; PSNH does not have this disposal option. Second, the Iatan thermal dewatering system does not use a crystallizer or spray dryer in a second evaporation stage because it has the on-site landfill. Third, Iatan uses Powder River Basin coal as their primary fuel source while Merrimack Station traditionally uses Eastern Bituminous coal.

However, it should be noted, that the concept of secondary treatment beyond the phys-chem process, including technology to bring the effluent stream down in quantity close to or in fact to zero, is technically evolving providing potential alternatives in wastewater treatment beyond the proven phys-chem process. In August 2008, EPA issued a detailed study report focused on FGD wastewater treatment generated at coal-fired power plants in which various technology options were analyzed. Clearly EPA is considering additional regulation in this area and environmental groups are applying pressure on EPA to prohibit wastewater discharge to streams and rivers; however, we do not know if there is a timeframe for such regulations and it was not the driving force in our technology selection. To our knowledge, and as EPA has touted, there are some FGD systems with wastewater systems that function to minimize or reduce liquid effluent to zero currently in operation in Italy. We are generally familiar with that specific equipment and technology and our consultants (Burns and McDonnell Engineering) have knowledge of those systems and, in fact, worked on the somewhat analogous Iatan system described above. Certainly, these advances are far from being considered a standard within industry. As EPA and state environmental regulators have discovered, clearly, each site has its own differentiating factors which need to be factored into the equation, and it is incumbent upon each utility to make its own diligent assessment of the available technology options that would work most effectively given the constraints of its plant as well as the local and state regulatory requirements.

As we have stated above, PSNH worked closely with DES in analyzing water quality requirements to find the best way to meet them and has continued that discussion with EPA. Among the numerous options considered for instance, but by no means limited to these options, were evaporation ponds, which are commonly used in the southern and southwestern parts of the country, where the climate typically provides the opportunity for evaporation throughout the year. This is not technically feasible in the New Hampshire climate. Another alternative was deep well injection but this is not a viable alternative for PSNH due to the level of the aquifer and the potential drinking water impacts. Another option considered was a biological treatment subsystem which two utilities have added to reduce selenium due to relatively small receiving water bodies with pre-existing high concentrations of selenium. Several utilities have constructed a wetland treatment system to treat scrubber blowdown. One of these systems occupies about 30 acres with about 12.5 acres of active wetlands system with the capacity to treat up to 1.25 million gallons per day of FGD wastewater. Such a system is not technically feasible at Merrimack due to logistical constraints and the climate. The important point is that PSNH performed its thorough review of options, based on discussions and input from both DES and EPA, and analyzed many available technological options for treatment of the scrubber wastewater before making its choice.

PSNH believes installation of this treatment system is critical to satisfying its obligation to install and operate the wet flue gas desulphurization technology at Merrimack Station as soon as practicable as is statutorily required (RSA 125-O:11-18). This law requires the installation of the scrubber technology at Merrimack Station with the added direction to expedite mercury emissions reductions and includes economic incentives for early reductions. The law implicitly recognizes that a delay in the completion of the scrubber system postpones the environmental benefits that will result from the installation and operation of this emission control technology. PSNH understands the risk of any delay not only postpones the environmental benefits the Legislature sought to achieve through this law, but also adds significantly to the overall project cost. Installation of this secondary wastewater treatment equipment, will allow PSNH to manage this liquid waste stream at a greatly reduced volume, down to a possible value of zero. This avoids any delay in startup of the scrubber system that would result from the threatened appeals of the draft NPDES permit (when it is finally issued) by adversarial parties and the operational stays that would prevent the system from going online. The construction of this secondary treatment system allows the scrubber system to be installed in a timely manner, achieving mercury and SO2 reductions as soon as possible as required by the law; with a potential incremental benefit of reducing or eliminating the scrubber effluent discharge.

Insofar as avoiding the cost impact of a schedule delay, being able to proceed and sustain the critical path schedule of start-up and Unit 1 on-line operations this fall will save customers over $2 million per month in financing costs. As we have stated in the attachment, it is clear to us that certain groups wish this project to not be completed. If not completed, the station theoretically could not operate after July 1, 2013 without significant political and regulatory debate. Thus, delays in allowing start-up will undoubtedly manifest themselves in appeals of the draft NPDES Permit when it is finally issued (since appeals of new provisions stay those provisions while the appeal is pending; i.e., the scrubber could not operate during an ongoing appeal). Delays in issuance of NPDES permits are not uncommon and can take years to resolve. If the CAP has to delay start-up, it must also consider staff reductions of the current contractor experts associated with commissioning and other on-site activities. This would negatively affect continuity of current project personnel and their knowledge and a well planned ramp up to operational readiness and demonstration of guaranteed performance. Many months of delay and additional costs would be incurred. It can be easily understood that these costs could quickly grow to much more that the cost of the Secondary Water Treatment System.

As your question also asks - Does PSNH believe it is a good idea to install in case there are more stringent regulatory requirements in the future?" PSNH cannot foretell the content of future federal environmental regulation. However, based on the amount of regulatory change seen in recent years, and EPA's focus on the technology options available for the treatment of wastewater as demonstrated in its 2008 report referenced above as well as our in-depth discussions with EPA, it is not unreasonable to envision future scrubber wastewater treatment requirements like those we are proposing. It is unfortunate that we have been forced into early action but our circumstances are unique. Nevertheless, another positive outcome of our action will be that we will be identified as an industry leader and held up by many as environmental stewards.

As a result of our specific circumstances, we believe we have no choice but to proceed as we have summarized and we do so solely in our customers' best financial interests and in

accordance with the statutory direction and intent. Additionally early emissions reductions will be achieved and any liquid discharge from the scrubber system will be significantly reduced or eliminated.

In summary: First - we are taking action to build a secondary wastewater treatment system to avoid substantial and unnecessary customer costs by proactively preventing prolonged delays in our critical path schedule. Delays would not only significantly increase the costs of the project but also delay the environmental benefits of the scrubber project. Second –there is no definitive mechanism to ensure that the EPA would/could proceed on a timely basis to cooperate with PSNH and the NHDES in moving forward in finalizing a draft NPDES permit since there are applicable regulations that require public participation in the lengthy NPDES permitting process. Third – the new treatment system is a new adaption of proven equipment for this application and waste stream. We have confidence that we will manage any technology challenges and achieve reliable operation of these treatment systems and thus reduce costs and delays in achieving the primary objective of reduced air emissions of mercury and sulfur as soon as possible. Lastly, as with other recently discussed environmental regulatory efforts, we will be prepared for possible future, more stringent wastewater discharge limits.

Public Service of New Hampshire

The Northeast Utilities System

Clean Air Project
Merrimack Station

Risks in Obtaining the Remaining Operating Permit
Wet Flue Gas Desulfurization (WFGD) Discharge

Background:

PSNH and the NHDES have been working collaboratively to establish the new wastewater treatment system ("WWTS") permit limits and flows from the WFGD system process. The agreed-upon limits were presented to the US EPA. The EPA, however, believes the appropriate permitting path is to merge the new WWTS outflow into the Station's NPDES permit, which is currently in the renewal process. The EPA position, requiring the WWTS discharge to be folded into the overall Station NPDES permit, will result in an extremely long permit process (many years) due to the statutory requirements regarding public involvement and the unavoidable challenges that will be brought by environmental groups with the sole goal of project delay or derailment.

Problem Definition/Development:

- The WFGD Wastewater Treatment System (WWTS) removes metals and other elements from liquid discharges of the Scrubber: dewatering of the synthetic gypsum and absorber blowdown.

- WWTS limits were developed in 2009 based on contractual effluent guarantees. PSNH, with URS experts, worked with the NHDES beginning in later 2009 to identify all wastewater design and discharge parameters. NHDES has been the controlling agency and specifies the discharge limits with EPA typically reviewing and approving NH actions.

- Lengthy and numerous dialogues between PSNH and NHDES resulted in rigorous permit conditions and parameters that were workable and acceptable to both parties. Additional meetings with the Assistant Commissioner of DES and the Attorney General's office also took place to ensure full support. This was concluded in the third quarter of 2010. This was a critical step with a positive outcome.

- Beginning in mid-2010, PSNH and DES leadership were in dialogue with the EPA to ensure they were aware of our operational needs (new effluent stream by Fall 2011).

- On November 8, PSNH arranged a meeting between EPA, NHDES, and PSNH. NHDES leadership and technical experts attended the meeting with PSNH in an effort to reinforce

their rigorous and low permit limits and to encourage action to issue authorization for the new discharge (35-70 gpm estimated) outside of the NPDES process.

- The EPA stated they did not see any clear way to assist other than to add this minor waste stream to the new NPDES draft permit which they have been working on for a number of years. The EPA indicated that they expected this Draft Permit to be issued in December, revised this to a February issuance, and it has yet to be issued. The EPA asked many technical questions in December regarding the possibility of eliminating most or all discharge from the new WWTS.

- The EPA strongly desires to use a traditional public hearing process for issuance and comment on the draft NPDES renewal permit. In follow-up discussions to the November meeting, EPA has continued to resist any expedited treatment for the Clean Air Project. The EPA is also unwilling to issue any special Operational Permit or Administrative Consent Order to assist our schedule.

- EPA was not persuaded to provide assistance despite arguments raised by NHDES and PSNH that the operation of the FGD is mandated by NH law and that project delay of a large pollution control project would not be in the public interest.

- Any other permitting options that were explored by NHDES and PSNH to get this very positive Project on line in latter 2011, over one year early, were not acceptable to EPA.

Risks:

- Environmental groups will use this traditional "whole station" renewal process to attack and cause lengthy delay (years) of the issuance of the new NPDES Permit which includes the Scrubber WWTS discharge.

- PSNH will also likely have comments on the NPDES "whole station" permit.

Action Plan:

- EPA's position was disappointing but not unanticipated. Having previously identified this risk, PSNH had been in contact with secondary water treatment system and equipment suppliers previously.

- The technical solution path is the installation of treatment systems to reduce the volume of the liquid waste to a manageable 0-5 gpm. Beneficial re-use of this remaining liquid for fly ash dust control or for use in other station processes would then be employed or disposal.

- This wastewater approach does not require EPA or DES approvals and eliminates schedule risk and intervenor caused delays of the Clean Air Project.

- PSNH hired Burns and McDonald (B&M) on November 17, 2010 to provide technical assistance based on their unique knowledge and expertise.
- B&M's analysis of our WWTS and effluent concludes that the installation of a brine concentrator and a crystallizer will reduce the liquid wastestream to 0-5 gpm which may allow for re-use. An additional crystalizer and dewatering device will also be employed to further reduce this effluent volume.

Solution Path:

- A team of PSNH, B&M, CAP Engineering, NU Purchasing and Legal was formed to obtain specifications and cost information.

- Competitive equipment pricing have been obtained.

- A release for early engineering and long lead time materials was made in early January 2011 once vendor selection and firm pricing were available. In parallel, contract terms were finalized.

- Aggressively develop a schedule to seek an in service date of late 2011 to support start-up.

Alternatives and Risk Mitigations:

- Continue to pursue a special permit or consent order with the EPA for a minor permit solution even in the face of a highly unlikely outcome.

- Contract for possible liquid waste discharge to area town wastewater treatment works (POTW). This may be a feasible bridge mechanism if the secondary treatment equipment schedule slips.

Summary:

Option	Risk	Comment
1. Continue to seek EPA special permit	High	EPA has said they do not believe a special permit is acceptable to them. New NPDES permit approval will not be in place until 2012-14 due to challenges.
2. Collect liquid wastes in a tank and truck to disposal locations without added treatment	High	The only high volume disposal locations are area POTWs. These are public facilities and even if community approvals are obtained, they are not under our control so changes could occur due to others.
3. Additional on-site treatment of wastewater	Low	Technology is available but time is critical to get equipment ordered and fabricated in order to meet our schedule. Schedule risk is moderate but currently expected to be acceptable.

Conclusions:

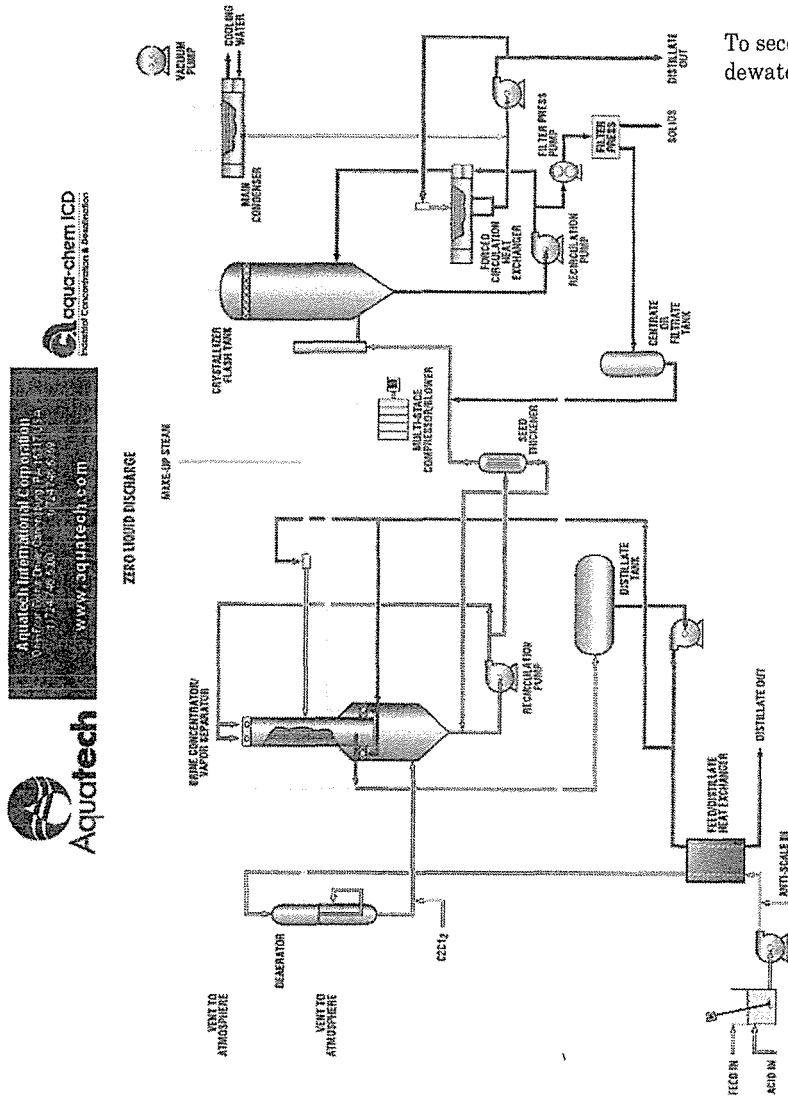
- Take action now to install a technical solution so PSNH can control outcome, cost, and schedule.
- Take immediate step to mitigate schedule concerns, competitively select the equipment supplier and bid the installation.
- Proceed with procuring engineering, design, and installation of a secondary water treatment system.

Cost Analysis:

This system is estimated to be $20-26 million design revision. The cost benefit would be realized by an avoidance of a lengthy project delay. Costs associated with such a delay will outweigh the added cost.

Schedule:

- The addition of this equipment in combination with liquid waste disposal is currently not expected to affect critical path of the project or in-service date.



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