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By Facsimile and Overnight Mail

Linda Murphy
Director
Office of Ecosystem Protection
EPA Region 1
One Congress Street, Mail Code CAA
Boston, MA 02114

Re: Merrimack Station Proposal for Information Collection

Dear Ms. Murphy:

Thank you for your August 5, 2005 letter regarding the Proposal for Information ("PIC") that Public Service Company of New Hampshire ("PSNH") has submitted for Merrimack Station in Bow, New Hampshire (the "Station") under the Clean Water Act 316(b) Phase II regulations (the "Rule"). We appreciate this opportunity to engage in a dialogue with you on the various issues identified in your letter, particularly EPA Region 1's views on the applicability of the Rule's entrainment performance standards to the Station, and on a proper calculation baseline for the Station.

Applicability of the Rule's Entrainment Performance Standards

EPA Region 1 has requested that PSNH modify the PIC to include a proposal for entrainment sampling, on the grounds that the Station is subject to the Rule's entrainment performance standards. For the reasons discussed below, PSNH is not submitting a proposed entrainment

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sampling plan at this time, and is reserving its rights to submit a further revised PIC pending discussion and resolution of the issues described in this letter.¹

In PSNH's view, the Station's two cooling water intake structures ("CWISs") are not subject to the Rule's entrainment performance standards because neither CWIS meets the applicability criterion of 40 C.F.R. §125.94(b)(2)(ii)(B), in that the intake flow of each is below 5% of the mean annual flow ("MAF") of the Merrimack River. Both the Rule and the preamble to the Rule support the PIC's approach, for the Station, of (1) comparing intake flow to source water body MAF on a CWIS-by-CWIS basis, and (2) using actual intake flow data, instead of theoretical design intake flow values, in the 5% MAF calculation.

Separation v. Aggregation of Intake Flows. The Rule provides that the entrainment performance standards apply, under the compliance alternatives in 40 C.F.R. §125.94 (a)(1)(ii), (a)(2), (a)(3) and (a)(4), if a "facility" (1) "has a capacity utilization rate of 15 percent or greater," and (2) "uses cooling water withdrawn from a freshwater river or stream and the design intake flow of your cooling water intake structures is greater than five percent of the mean annual flow." 40 C.F.R. §125.94(b)(2).

While this language arguably suggests that the intake flows of all of the CWISs at a single facility must be aggregated to determine whether the entrainment performance standards apply, the Rule's definition of "capacity utilization rate" provides that where a facility has several CWISs, and each of its CWISs exclusively serves one or more generating units, the facility may calculate the capacity utilization rate – and determine the applicability of the Rule's requirements – for each such CWIS on an individual basis, rather than for all of the facility's CWISs in the aggregate. *See id.* §125.93. PSNH's position, based on this definition, is that the Rule explicitly authorizes any facility that may take this approach to capacity utilization – such as the Station, each of whose CWISs serves its own generating unit – also to determine whether the Rule's performance standards apply to each of its CWISs on an individual basis. The language of the "capacity utilization rate" definition supports this reading:

In cases where a facility has more than one intake structure, and each intake structure provides cooling water exclusively to one or more generating units, capacity utilization rate may be calculated separately for each intake structure, based on the capacity utilization of the units it services. *Applicable requirements under this subpart would then be determined separately for each intake structure.*²

¹ We nonetheless believe the Rule allows PSNH to submit a revised PIC without such a reservation of rights, as the Rule establishes an iterative process for developing the CDS.

² Moreover, where EPA intends for a facility to take its *total* design flow into account, the Rule is explicit on that point. *See, e.g.*, 40 C.F.R. §125.91(a)(2) ("An existing facility, as defined in §125.93, is a Phase II existing facility subject to this subpart if it meets each of the following criteria: ... (2) It uses or proposes to use cooling

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Id. (emphasis supplied).

In addition, the Rule's preamble clearly supports PSNH's position, noting that §125.93 allows both facilities with capacity utilization rates less than 15% and facilities with "multiple, distinct cooling water intakes that are exclusively dedicated to different generating units" to calculate the water withdrawal percentage, and thus determine the applicability of the entrainment performance standards, separately for each of their CWISs:

In accordance with the Phase II rule, facilities that operate with a capacity utilization rate of less than 15 percent are subject to the performance standard for impingement mortality only.... EPA determined that it was neither necessary nor cost-effective for these facilities to reduce entrainment where the total volume of water withdrawn and the total number of organisms that would be protected from entrainment is likely to be small. *EPA is also allowing facilities with multiple, distinct cooling water intakes that are exclusively dedicated to different generating units to determine capacity utilization and applicable performance standards separately for each intake for the same reasons.*

69 Fed. Reg. 41600 (Jul. 9, 2004) (emphasis supplied). This preamble language strongly suggests that EPA Headquarters intended that where a facility has multiple CWISs, and one of its CWISs withdraws less than 5% of the relevant river or stream MAF, that CWIS is exempt from the Rule's entrainment requirements regardless of its capacity utilization rate.³

Moreover, EPA itself has treated the Station's two CWISs separately for purposes of the Rule. Appendix A of the Rule contains information that facilities may use to calculate whether their projected costs to comply with the Rule are greater than the costs that EPA considered for a similar facility in establishing the performance standards. *See* 69 Fed. Reg. 41645-41647 (explaining steps for undertaking facility-specific compliance cost calculation); *see also* 69 Fed. Reg. 41669-41682 (Appendix A). Appendix A provides individual compliance cost information for each of the CWISs at the Station, not aggregated information for the Station as a whole. Given that EPA itself views the two CWISs as separate for purposes of the Rule, it is only fair

water intake structures with a *total design intake flow* of 50 million gallons per day (MGD) or more to withdraw cooling water from waters of the United States..." (emphasis supplied).

³ We understand that EPA Region 1 relies on other language from the preamble to support its position. *See* 69 Fed. Reg. 41636 ("Note that you would still be required to consider the total design intake flow at all structures combined in determining whether your design intake flow exceeds 5 percent of the mean annual flow of a freshwater river or stream."). The presence of these conflicting statements in the preamble raises a legitimate question regarding whether EPA Region 1's position is what EPA Headquarters intended.

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and reasonable that PSNH be able to treat them as separate for the purpose of determining whether the Rule's entrainment performance standards apply.⁴

Finally, it is significant that the Station's two generating units and their associated CWISs became operational at different points in time, years apart. As the PIC notes, Unit 1 became operational in 1960, while Unit 2 became operational in 1968. If the National Pollutant Discharge Elimination System ("NPDES") regulations had been in place when each of the two units came on line, each CWIS would have been covered under a separately issued NPDES permit, and now would be considered individually for purposes of the Rule. Given this, we see no reason why PSNH should be penalized for the fact that its units came into operation before EPA was created and authorized to issue such permits.⁵

Actual v. Design Intake Flow. PSNH used actual intake flow, as opposed to design intake flow, to calculate the percentage of MAF that each of the Station's CWISs uses, for two reasons. First, the Rule's preamble requires that "[r]epresentative historical data (from a period of time up to 10 years, if available) *must* be used to make [the] determination" of whether facilities with CWISs that are withdrawing cooling water from freshwater rivers or streams are withdrawing less than or greater than 5% MAF. 69 Fed. Reg. 41635 (emphasis supplied). To the extent that EPA Region 1's position does not accord with this requirement, there is a legitimate question regarding whether EPA Region 1's position is what EPA Headquarters intended for the Rule.

More importantly, the use of actual intake flow data is appropriate (and the use of an abstract design intake flow value is irrelevant) for three reasons that are specific to the Station and must be taken into account for any permit requirements to be found other than arbitrary and capricious. First, these data account for the fact that the actual pumping rate of each of the Station's generating units historically has been significantly less than the CWISs' design intake flow due to the pumps operating at a higher head differential than the design rating, because Hooksett Pool is maintained at a lower elevation than the design head for the pumps at each unit. The flow of the Merrimack River and, more particularly, the elevation of Hooksett Pond are controlled by the Federal Energy Regulatory Commission ("FERC")-licensed hydroelectric facilities on the river above and below the Station, and this federally mandated control of river flow and pond elevation renders the "design intake flow" of the Station's CWISs irrelevant for

⁴ Appendix A of the Rule indicates EPA's conclusion that both the entrainment and the impingement mortality performance standards apply at each of the Station's units. See Appendix A, column 11. However, the Rule also explicitly acknowledges that EPA may have incorrectly drawn this conclusion. See 69 Fed. Reg. 41647 ("because of both variability and uncertainty in the underlying parameters that determine which performance standards apply (e.g., capacity utilization rate, mean annual flow), it is possible that in some cases the performance standards that EPA projected are not correct.").

⁵ In noting this, we do not concede either that the NPDES regulations properly apply to CWISs, or that EPA has the authority to impose requirements on CWISs through NPDES permits.

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purposes of accurately comparing CWIS intake flow to river MAF.⁶ Second, since 1990, EPA and the New Hampshire Department of Environmental Services' Water Division have required PSNH to use a specified head curve calculation, in reporting condenser cooling pump capacity, that accounts for the FERC license-controlled pond elevation and resulting lower pumping rate of the Station's generating units. This joint EPA-NHDES requirement also renders the concept of "design intake flow" irrelevant. Third, each of the Station's generating units historically has operated independently with respect to the scheduling of maintenance outages, and actual intake flow data appropriately reflect this reality.

Based on the foregoing, PSNH objects to EPA Region 1's interpretation of the Rule with regard to the applicability of the Rule's entrainment performance standards.

Development of a Calculation Baseline

EPA Region 1 stated in its August 5, 2005 letter that PSNH is not using a "properly derived calculation baseline" against which to measure impingement mortality and entrainment reductions at the Station. We believe that Region 1's comments on this issue are both untimely and inappropriate.

First, under the Rule, PSNH is not yet required to develop a calculation baseline for the Station. The Rule specifically provides that each facility must develop its "calculation baseline" by first conducting an Impingement Mortality and/or Entrainment Characterization Study. *See* 40 C.F.R. §125.95(b)(3) ("You must submit to the Director an Impingement Mortality and/or Entrainment Characterization Study *whose purpose is to provide information to support the development of a calculation baseline for evaluating impingement mortality and entrainment* and to characterize current impingement mortality and entrainment.") (emphasis supplied). This study neither is required to be nor can be prepared and submitted before a facility has completed the information collection activities it proposes in its PIC.

Second, as the preamble to the Rule states, "the calculation baseline in the final rule ... allows for proactive facilities (i.e., those with control technologies, operational procedures, or restoration measures *already in place*) to take credit for *existing measures*."⁷ *See* 69 Fed. Reg.

⁶ This set of circumstances will not change even if the new FERC license requires a more run-of-the-river flow regime in which inflow equals outflow.

⁷ *See also* 69 Fed. Reg. 41591 ("Under §125.94(a)(2) and (3), a Phase II existing facility may demonstrate to the Director ... that it has selected design and construction technologies, operational measures, and/or restoration measures that, *in combination with any existing design and construction technologies, operational measures, and/or restoration measures*, meet the specified performance standards in §125.94(b) and/or the requirements in §125.94(c).") (emphasis supplied); 69 Fed. Reg. 41617 ("EPA recognizes that some facilities may have control technologies *in place* that *already* reduce impingement or entrainment; *the final calculation baseline*

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41617 (emphasis supplied). EPA Region 1 makes the bald statement that the operational measures described in the Station's PIC "are all baseline operational practices that the Station has historically implemented for power plant operational reasons and not for the purpose (or partial purpose of) reducing impingement mortality and entrainment" (footnote omitted), and therefore should not count toward the Station's compliance with the Rule's impingement mortality and entrainment performance standards. In fact, the Station has operated the existing control technologies and implemented the existing operational measures described in the PIC not solely for power production purposes, but also in response to several studies, the first in 1967, of the physical, chemical and biological conditions of the Merrimack River, focusing on potential Station impacts on the local aquatic environment and explicitly addressing fisheries impacts.⁸ Moreover, these technologies and operational measures have in fact reduced impingement mortality and entrainment at the Station.⁹

Quality Assurance Plan and Standard Operating Procedures for Impingement Monitoring

PSNH and Normandeau Associates, Inc. met with Mr. David Webster, Ms. Sharon Zaya, and Mr. Eric Nelson of EPA Region 1 in Boston on September 25, 2005 to discuss the technical comments that EPA provided in its August 5, 2005 letter regarding information presented in Appendix 2 of the PIC, "Merrimack Station Quality Assurance Plan and Standard Operating Procedures for Impingement Monitoring" (April 2005). Based on the outcome of this meeting, PSNH offers the following responses to EPA's technical comments on Appendix 2, which responses are intended to revise the PIC.

1. The single-pressure spray wash headers at the Unit 1 CWIS traveling screens operate at 135 psi, and at the Unit 2 CWIS traveling screens at 100 psi. The floor of the debris pit receiving the debris and wash water flow from both sets of traveling screens is at elevation 196.58 feet.

would allow credit for such reductions.") (emphasis supplied); 69 Fed. Reg. 41636 ("Reductions in impingement mortality and entrainment from the calculation baseline as a result of any design and construction technologies and/or operational measures *already implemented* at your facility *should be added* to the reductions expected to be achieved by any additional design and construction technologies and operational measures that will be implemented in order to meet the applicable performance standards.") (citation omitted) (emphasis supplied); 68 Fed. Reg. 13580 ("The calculation [baseline] . . . allows [facilities] to *take credit* for fish protection technologies *already in place* at their facility.") (from March 2003 Notice of Data Availability) (emphasis supplied).

⁸ The State of New Hampshire required PSNH to perform the first of these studies starting in 1967, before Unit 2 became operational. EPA later described this study as "basically equivalent to the later Clean Water Act 316 Demonstration." See December 5, 1991 Fact Sheet for draft Merrimack Station NPDES Permit, pp. 8-9.

⁹ EPA Region 1 also requested in the August 5, 2005 letter that PSNH "modify the PIC to include proposed technologies and operational measures to demonstrate compliance" with the Rule's entrainment performance standards. This request is premature prior to EPA Region 1 and PSNH's resolving the issues outlined above.

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As noted above, Hooksett Pool is effectively a run-of-river impoundment with a full pond elevation of 190 feet, an elevation that varies little throughout the year (except during flood conditions, when water levels will exceed this elevation). The average Hooksett Pool elevation derived from observations taken at the beginning and end of each impingement sample during August 2005 was 189.7 feet (nine observations). The horizontal distance between the outlet of the debris pit and the Merrimack River shoreline at a pool elevation of 190 feet is approximately six feet. The distance along the slope of the riprap bank from the outlet of the debris pit to the shoreline at a pool elevation of 190 feet is about 16 feet.

2. While one of the sampling periods is designated as running for 13 consecutive days, the actual collection of sub-samples during that period occurs at a much greater frequency. Both long interval samples (6-days and 13-days) taken between each 24-hour impingement collection at Unit 1 and Unit 2 consist of a series of consecutively labeled bags of debris and fish that are collected at least twice per day by the plant operators and placed in a cooler (one cooler for each Unit). Therefore, these long-interval samples are not sitting in the collection baskets at the CWIS and subjected to the ambient weather conditions for more than 12 hours. If these impingement samples are likely to degrade, they would have done so due to accelerated bacterial decomposition during the warm summer temperatures. We have observed no degradation of the six-day samples collected and bagged twice per day, placed in the coolers, and processed weekly between June and October 2005. We further expect this process will work equally well for the 13-day impingement samples proposed for collection at each Unit during the winter months, when cold ambient conditions will substantially reduce the rate of bacterial decomposition. Therefore, PSNH requests that the winter (1 Nov – 15 Mar) sampling schedule remain as originally proposed in the PIC. We will collect one 24-hour sample followed by a 13-day sample during each biweekly period commencing November 1, 2005 and continuing through mid-March 2006. Sub-samples will continue to be collected in a time frame that will preserve overall sample integrity.
3. PSNH notes that its practice with regard to impingement sampling is not to state specifically that all fish will be identified to species, because on occasion, it is not practical to identify to species some young or badly decomposed or damaged fish that are similar to others without an extraordinary laboratory effort requiring autopsy of each fish to examine bony structures (assuming the fish is intact and fully developed), or DNA analysis. Furthermore, it is sometimes impractical to identify very young fish to species within the same genus without these same extraordinary laboratory efforts, because these small individuals have not yet developed the external features making it possible to distinguish them in the field (e.g. alewife and blueback herring <40 mmtl or *Lepomis* spp. (sunfish) < 30 mmtl). PSNH will make every professionally reasonable attempt to identify to species each fish collected using common and widely accepted field identification methods (with the caveat that this is not always practicable in the field processing of impingement samples as described above). Past experience indicates that less than 0.1% of the fish collected may not be identified to species.

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4. PSNH agrees to enumerate all fish collected during the long-interval samples (6-day or 13-day), not just the migratory species. However, in accommodating EPA Region 1's request on this point, PSNH is not agreeing to perform a total census of all fish impinged throughout the year at each generating unit at the Station. EPA Region 1's position that such a total census is required ignores the commonly accepted practice of statistical sampling for impingement and entrainment. Moreover, undertaking such a total census would significantly and unreasonably increase the cost of the impingement monitoring program.

As stated earlier, sub-samples are collected frequently enough to preserve the overall sample integrity and to prevent overflow of the collection baskets. Station operators have reported, however, that debris from the traveling screen washes can exceed 30 gallons per hour at each of the Station's CWISs during the autumn period as dead aquatic vegetation is combined with deciduous leaves and pine needles from terrestrial vegetation in the cooling water withdrawn from the Merrimack River. These high debris periods typically require continuous washing of the traveling screens at each operating unit, and could produce in excess of 21 cubic yards of debris from each unit during a six-day period. It takes about three hours for a pair of biologists to process each 30-gallon bag of debris. Therefore, an estimated 950 person-hours of sample processing (including 10% quality control) would be required if PSNH were fully to accommodate EPA's request and process all fish in each six-day sample from each unit during the three weeks of high debris loads in the fall (1900 hours for processing the samples from both units during each week). Based on the foregoing, PSNH will conduct a total census when doing so is determined to be practicable, but has offered the attached sub-sampling protocol (which EPA Region 1 has accepted) as a modification to the impingement procedures in Attachment 2 of the PIC to address long-interval (6-day or 13-day) impingement samples during periods of high debris loads.

5. Dissolved oxygen ("DO") percent saturation will be calculated from the observed DO concentration and ambient water temperature obtained for each 24-hour impingement sample.
- 6A. EPA appears to misunderstand the purpose of the impingement survival study proposed in the PIC. Our understanding of the Rule with regard to the PIC and any sampling plans for new field studies required for the Comprehensive Demonstration Study is that the process is a dynamic one in which study plans may (and should) change in response to results that are revealed during the studies. In the PIC, PSNH has proposed to simulate survival off of the existing screens as one component of total impingement survival represented by a retrofitted new basic fish handling and return system (identified as technological option (2) in Section 5.2.1 of the PIC). The goal of this first phase is to understand whether the rate of fish survival would change if PSNH were to start rotating the existing screens on a continuous basis. If these survival results look to be a promising technology for increasing fish survival

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at the Station, then PSNH would examine the fish survival due to passage through the existing fish and debris return sluice during a continuous wash mode of operation as the second component of the impingement survival study. Likewise, if these results look promising, PSNH may elect to simulate a new basic fish return system in a subsequent third phase of this evaluation. Accordingly, we propose that EPA allow the procedures for this first phase of the impingement survival study to remain in the PIC unchanged, with the potential for the study to be amended at a later date after review of results from the first phase.

6B. PSNH has not proposed to study the fish return sluice component of survival in the first phase of the impingement survival evaluation presented in the PIC, because we view this part of the survival study as dynamic (see 6A).

6C. PSNH agrees to use shiners (*Notropis* sp.) or other similar “more delicate” fish species as supplemental fish for impingement survival studies proposed at the Station. All fish tested will be identified to species. Normandeau will take particular care when using live fish to test only species presently found in Hooksett Pool. Accordingly, killifish will not be tested because they are both hearty and absent from Hooksett Pool.

Past Impingement Events

EPA asked for clarification regarding our use of the term “significant” as relates to extraordinary impingement events. The Station’s current permit defines an “extraordinary impingement event” (“EIE”) as “an event when 50 or more fish at any one time, of any size and species, are either distressed or killed as a result of impingement.” The four “extraordinary events” to which EPA Region 1 refers in its August 5, 2005 letter occurred over a five-week period in the fall of 1997 (26 September, ~100-150 fish; 30 September, 103 fish; 4 October, 63 fish; and 30 October, 147 fish) and were attributed to impingement of outmigrating juvenile river herring. PSNH’s concept of a “significant” impingement episode is substantially greater than the 50 fish represented by the Station’s NPDES permit definition of an EIE. PSNH hereby revises the last sentence of the first paragraph of Section 6.1 of the PIC (on Page 8) to read “Further, while PSNH did submit four “extraordinary impingement event” (defined as greater than 50 fish) reports in the fall of 1997, there has never been an episode in the 45-year history of Merrimack Station that can be reasonably construed as significant impingement.”

Implementation of New Impingement Monitoring Program

PSNH understands that at the meeting on September 25, 2005, EPA approved its request to implement the impingement monitoring program described in Appendix 2 of the PIC in lieu of the current permit requirement to collect one 48-hour impingement sample during each week when the Merrimack River flows drop below 900 cfs measured at Hooksett Dam. The permit-

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required 48-hour impingement sampling protocol will resume when the more extensive impingement program described in Appendix 2 of the PIC ends. PSNH requests written confirmation of EPA's approval.

Past Determinations Under Section 316(b) of the Clean Water Act

EPA Region 1 takes issue with PSNH's position that past 316(b) determinations for the Station should continue to apply. PSNH believes that for facilities where, as at the Station, there have been no significant changes in either the source water body or the facility's control technologies or operational measures since EPA's or the relevant state's last 316(b) determination based on "best professional judgment" ("BPJ"), application of the Rule does not, and should not, change the conclusions constituting that BPJ determination unless the BPJ determination was wrong.

Please note that PSNH is reserving its rights to submit a further revised PIC pending EPA and PSNH's discussion and resolution of the issues described in this letter. Many thanks for your attention to this matter. Should you have any questions or concerns, please do not hesitate to telephone me at 617/570-1612.

Very truly yours,



Elise N. Zoli

ENZ:

cc: Allan G. Palmer, PSNH
Mark T. Mattson, Normandeau Associates, Inc.
Harry T. Stewart, NHDES

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Attachment 1

2.4.2.5 Long-Interval (6-Day) Samples Collected During Periods of High Debris Loads

Plant operators report that natural debris from the traveling screen washes at the Merrimack Station Unit 1 and Unit 2 CWIS can each exceed 30 gallons per hour during the autumn period as dead aquatic vegetation is combined with deciduous leaves and pine needles from terrestrial vegetation in the cooling water withdrawn from the Merrimack River. This high debris period typically requires continuous washing of the traveling screens at each operating unit, and will produce in excess of 21 cubic yards of debris from each unit during a 6-day period. Based on past experience and current observations of the progression of the 2005 autumn season, Merrimack Station has identified the three week period from 27 October 2005 through 17 November 2005 as the most likely high debris period for this year. The following protocol describes a sub-sampling procedure to collect hourly impingement samples daily to replace the long interval (6-day) samples during this three-week high debris period in autumn 2005. A similar protocol may also be necessary during spring runoff of 2006.

- The period of high debris load at Merrimack Station Unit 1 and Unit 2 during 2005 is defined as 27 October through 17 November.
- During the 2005 period of high debris load, the impingement collection baskets will be removed from the impingement troughs at Merrimack Station Unit 1 and Unit 2 so that the wash contents will be allowed to flow back into the river during the high debris period.
- A total of six randomly selected one-hour sub-samples will be collected from each Unit to represent the long-interval (6-day) samples during the period of high debris load.
- Normandeau will randomly select a one-hour period out of every 24 hours for each day during the long interval (6-day) impingement samples to represent the sub-sample of impingement for that day at each Unit.
- A schedule will be prepared in advance identifying the randomly selected hours for each Unit on each day.
- The entire contents of fish and debris washed off of all operable traveling screens at each Unit will be collected during the randomly selected hour on each day by deploying and retrieving the impingement collection basket at the beginning and end of that hour.
- The Unit, date, beginning and end wash times represented by each one-hour sub-sample will be recorded on the tag for the bag(s) containing each one-hour sub-sample from each Unit.
- The sum of the six one-hour sub-samples from consecutive days will constitute the composite sub-sample for the long interval (6 day) sample from each Unit during periods of high debris loads.

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- All QC re-inspection will apply to the one-hour sub-samples and not to the composite sub-samples.
- The composite sub-sample for each Unit will be processed as described in Section 2.4.5. Note that all impinged fish in each composite sub-sample will be identified to the lowest practical taxon, counted, and weighed, and not just the four migratory species as was specified in Revision 0 of this SOP.
- A similar protocol may also be necessary during spring runoff.