PDR

NSP

NORTHERN STATES POWER COMPANY

August 25, 1972

Docket No. 50-263

Mr D R Muller
Assistant Director for
  Environmental Projects
Directorate for Licensing
U S Atomic Energy Commission
Washington, DC 20545

Dear Mr Muller:

MONTICELLO NUCLEAR GENERATING PLANT E-5979
Errata Sheets and Page Substitutions
For
Responses to Comments
Draft Environmental Statement

Enclosed are 50 copies of errata sheets and page substitutions to the NSP Responses to Comments, Draft Environmental Statement for the Monticello Nuclear Generating Plant (dated August 9, 1972).

It is suggested that the attached errata pages be inserted to replace the pages now in the text in your possession and those which have been distributed by your office.

Yours very truly,

E C Ward, Director
Engineering Vice Presidential Staff

By Daniel J. Marx
Daniel J Marx, PhD
Environmental Biologist

Cc: G Charnoff
    D E Nelson

Enclosure

5023

August 21, 1972

NORTHERN STATES POWER COMPANY

Monticello Nuclear Generating Plant

Responses to Federal, State and local agency comments on the AEC Draft Environmental Statement.

ERRATA SHEET AND PAGE SUBSTITUTIONS

Attached are errata sheets for direct substitution into the text of the above document.

It is suggested that each of the attached pages be inserted to replace the pages now in the text in your possession. Old pages should be discarded.

Errata for responses to Federal, State and local agency comment on the AEC Draft Environmental Statement, Monticello Nuclear Generating Plant.

Page No.	Line No.	Errata
14	12	Change "station" to "stations"
36	23	Change "community" to "population"
38	18	Change "specie" to "species"
38	20	Replace sentences beginning "The fishes present" to read "The fishes present would not inhabit the warmest waters located at the outfall of the canal but would most likely reside in the waters a few degrees above ambient temperature. These fishes would not experience a full 27°F drop in temperature because the physical nature of the circulating water system is such that under normal shutdown, the change takes place gradually and permits the fish to seek preferred temperatures."

PERFORMANCE EVALUATION OF BWR

Page No.	Line No.	Errata
15	25	Change "peovided" to "provided"
17	27	Change "instruction to "introduction"
19	7	Change "A" to "As"
19	48	Add a comma after "plant"; delete comma after "drums"
20	20	Change "frummed" to "drummed"

(8) Comment:

> ...discrimination be made between the benthic organisms in the near shore and offshore habitats in more detail, indicating which organisms are found in each area and their percent contribution to the total populations.

Response:

The data are available to qualitatively distinguish these two habitat types. Differences in sampling techniques preclude complete quantitative comparison.

Benthic organism sampling stations have been maintained since 1969 as part of the preoperational ecological studies program. These stations 1
are located across the river at various transects including the main river channel and relatively close to each shore. It should be recognized that this part of the river is fast moving with many rapids. The shore at each side is scoured by the river and the shore location varies with the level of the river.

The Annual Report (1969-1971) on the Monticello Environmental Monitoring Program describe the abundance and distribution of benthic organisms in the river.

(9) Comment

> On page II-17, it is stated that population estimates for game fish in table II-4 were adjusted to compensate for differences in sampling programs. We suggest that a description be made of the method used to adjust the population estimates.

Response:

This method is described in NSP's Environmental Monitoring Program Annual Report 1969, Ecological Study pp 102 et seq.

(36) Comment:

> The draft statement discusses the effects of the intake structure and velocity on fish and concludes that some impingement or entrainment of small fish entering the intake canal will probably occur. These effects may become most significant during the winter when warm water is recirculated to the intake canal to prevent ice formation. Further evidence is presented showing that survival of entrained larval fish will be low. Based on the discussions in the statement, it would appear necessary to redesign the intake structure to reduce fish entrainment. Year-round closed-cycle operation would significantly reduce this problem.

Response:

The suggested redesign of the intake structure carries with it an implication that the existing intake structure should be replaced. This broad conclusion is tenuous in light of the information upon which it is based and at best the suggestion is clearly premature.

The theoretical discussion of impingement problems considers neither the actual biological community in the river nor the operating experience.

Preliminary entrainment studies at Monticello have included the intentional introduction into the circulating water system of a population of
Fathead minnows. Recapture of a portion of this experimental population 1
was accomplished by seining and netting at the outfall of the discharge canal. Of particular importance is the result that only the species artifically introduced into the system were recovered. A tentative conclusion is possible: naturally occurring species are generally not subject to entrainment into the circulating water system. This conclusion is supported by a consideration of the nature of the minnows in the river. Because of the high velocity of this natural river environment, these small species are naturally entrained by the river. They must remain near

studied. The occurrence of these low flow conditions is infrequent. Closed cycle operation is anticipated at extremely low flows, furthermore, the mixed river temperature is always limited by the MPCA discharge permit.

A realistic assessment of the potential for winter fish kill resulting from cold shock must give recognition to several considerations. Foremost is the long experience of NSP in the operation of power plants in Minnesota. This experience has shown that fish kill from cold shock does not constitute a potential impact of any real significance. There are no quantitative analyses, however, NSP has experienced only one known cold shock fish kill and it did not involve game fishes.

The discharge canal at Monticello is relatively short. It does not provide the physical accommodation wherein large numbers of fishes could congregate. This physical limitation would limit the extent of the potential impact. The fishes in the Mississippi River at Monticello are species whose thermal tolerance is significantly different from those fishes that have been the subject of reported fish kills. For example, the Menhaden is a warm water fish that cannot survive in the cold winter waters of Minnesota. This species is not present at Monticello.

The comment suggests that fishes would be subjected to an instantaneous 27°F temperature drop. The fishes present would not inhabit the warmest location at the outfall of the canal but would most likely reside in the waters a few degrees above ambient temperature. These fishes 1 would not experience a full 27°F drop in temperature because the physical nature of the circulating water system is such that under normal shutdown the change takes place gradually and permit the fish to seek preferred temperatures.

(38) Comment:

> Since the pre-operational studies did not identify spawning areas in the vicinity of the plant, a study should be made to identify and quantify such areas. Since walleye are one of the most numerous

B. System Modifications

To improve the operability of the solid radwaste system, equipment or system modifications were made or operating techniques were implemented in the start-up and early plant operating phase. The following discusses some of these modifications and the reason(s) for the change.

1. During start-up operations large masses of the anion floc agent which is a gelatinous material was found in the bottom of the collector tanks and was suspected of causing filtration problems with the radwaste filters. Subsequent laboratory testing of the filterability of the floc agents showed that a solution of the anion agent (Dow Purifloc A-22) would not flow through a vacuum milipore filter even when diluted to approximately 0.5 ppm. The cation agent (Dow Purifloc C-31) gave no filtering problems. However, because the cation agent yields only a small improvement in the settling properties of the neutrally charged Solka-floc sludges (finely ground cellulose material) and because of the natural agglomeration properties of the positively and negatively charged Powdex sludges (finely ground ion exchange resins) the need for the cation agent was examined. All floc agents have since been discontinued in the solid radwaste system.

2. Flow meters (rotameters) provided on the centrifuge inlet lines to measure the feed rate have plugged several times with small pieces of paper, cigarette butts and teflon tape which are entering the system via the floor drainage system. Coarse mesh Y-strainers have been added upstream of the flow meters to allow removal of the foreign material.

3. When centrifuging solka-floc sludge the concentration of fines in the centrifuge effluent is greater than when centrifuging the Powdex sludge. Additionally the decantate from a solka-floc slurry has a greater concentration of suspended fines than does the decantate from a Powdex slurry. Field testing has indicated that the concentration of solka-floc fines in the decantate and the centrifuge effluent can be reduced if the solka-floc sludge is admixed with Powdex sludge. To accomplish this the fuel pool and radwaste filter sludges in the waste sludge tank are now transferred to the Condensate Phase Separators and mixed with the Powdex sludges prior to the sedimentation and decantation steps. This flexibility had already been designed into the system.

4. A concrete mixing station of the screw conveyor type was added between the hopper and the drum filling station on one of the hoppers. This concrete mixing step was added so that Reactor Water Clean-up Sludge would meet the burial site requirement that any resin with radioactivity greater than 1 Ci/ft^3 must be fixed in concrete.

As can be seen in the above table Solka-floc fines do not settle as readily as does Powdex, Run No. 1 with 13 ppm compared to Run No. 3 with 81 ppm. However, the settling characteristics of Solka-floc can be improved by adding a Powdex backwash to the Solka-floc backwash and mixing and allowing the slurry to settle. The 81 ppm in the decantate from the Solka-floc slurry can be reduced to 31 ppm when mixed with Powdex (Run No. 2). Also the separation efficiency of Solka-floc does not appear to be as high as the separation efficiency for Powdex in the centrifugation step as indicated by the effluent concentrations for a Powdex feed and a mixed feed of Powdex and Solka-floc, 295 ppm and 400 ppm, respectively.

The concentration of suspended solids in the centrifuge effluent can be significantly reduced by sedimentation step for any feed material. The table shows reductions from 295 to 16 ppm and 400 ppm to 30 ppm. This was the justification for returning the centrifuge effluent to the phase separator to obtain the additional settling step. Run No. 8 indicates that the centrifuge effluent concentration can be improved even further if mixed with a Powdex backwash prior to the settling step. Run No. 9 was made to determine if the addition of a floc agent to a Powdex and Solka-floc backwash would reduce the concentration of fines in the decantate. As shown, the 30 ppm was reduced to 20 ppm; however, it was believed that the reduction was not worth the introduction of floc agents to the system. 1

The reduction from 81 ppm for a Solka-floc backwash decantate to 31 ppm when mixed with Powdex prompted the modification to the system operation to transfer the Waste Sludge Tank (primarily solka-floc) to the Condensate Phase Separators (Powdex) and mixing the two slurries and allowing them to settle.

Table V shows a comparison between the design values and the actual values currently experienced in the system for the following parameters.

Backwash Frequency
Total Backwash Volume
Backwash Water Processed
Centrifuge Operating Time
Sludge Mass
Estimated Sludge Volume
Daily Sludge Volume
Radiation Level
Activity Level

This table is presented to show the relationships between the design and actual system parameters and to indicate, to some degree, the performance capability of the system. As can be seen on the table the backwash frequency of the Condensate Demineralizers increased by a factor of 3 for the actual over the design because of a 1/3 reduction in run length currently being experienced. This increase in backwash frequency is reflected by a corresponding tripling of the backwash water to be, processed through the radwaste filters, a tripling of the centrifuge operating time and a tripling of the sludge quantities ultimately to be drummed.

As discussed previously the use of the Floor Drain Filter 1 has been discontinued and is noted on the table. The use of the fuel pool filters to periodically process liquid radwaste has not been indicated on the table which shows the backwash frequencies for the filters in their respective services. The water used to backwash the various filters is ultimately processed through the radwaste filter. The individual batch backwash volumes have been calculated on a daily and totaled to yeild the total daily contribution of liquid radwaste from the backwash operations. This backwash source is approximately 50% of the total monthly liquid volume processed through the radwaste filter.

The individual centrifuge operating times were also calculated on a daily basis and then summed to give a total daily centrifuge operating time. The actual daily operating time for the centrifuge has decreased even though the centrifuge operating time for the condensate demineralizer system has increased three-fold. This reduction is due primarily to the use of the Condensate Phase Separators for the fuel pool and radwaste filter sludges which achieves a ten-fold increase in sludge concentration with a corresponding reduction in centrifuge operating time.

Daily sludge volumes were calculated from the various sources based on a dry bulk density of 18 lbs/ft^3. This yielded 19 drums/month for the design value and 45 drums/month for the actual with both numbers based on 5.6 ft^3 of sludge per drum. The low level drums are currently being shipped on unshielded vehicles, 60 - 90 drums per shipment. As can be seen the radiation levels for the actual drums is two orders of magnitude less than the level expected in the design phase. The low activity level in the sludges is due, in part, to the shortened condensate demineralizer runs, to lower activation product concentrations in the reactor water (an order of magnitude less than the design value) and perhaps to a higher reactor water-to-condensate separation factor for the activation products. (10^{-3} was used for the design value). As stated above the plant is operating with a fairly low offgas rate of ~/10,000 μCi/sec, after 30-min decay, which indicates low fuel leakage rates and therefore most of the activity contribution is from activation products and not fission products.

In the initial operation of the plant, drums were going into 1 storage on the remote conveyors with removable contamination of <100 dpm/100 cm^2. This contamination level was typical of the external contamination for both the drums which were not solidified and for drums which were solidified with concrete. These low levels were partially due to the low activity levels in the sludge for that early period of plant operation. However, since the early phases the plant has been operating with virtually no liquid releases and the Chemical Wastes and Laundry Drain Wastes have been mixed with dewatered Condensate Demineralizer Sludges as a method of disposal. These sludges normally leave the centrifuge at ~60% moisture and are mixed with the liquid wastes to ~70% moisture before being drummed for shipment. This sludge is somewhat more fluid than the normal centrifuge cake discharge and consequently a small amount of splashing does occur in the drumming operation. Current contamination levels are typically 700 dpm/100 cm^2 for the low level drums and 3000 dpm/100 cm^2 for the high level drums. Drums above the allowable 2200 dpm/100 cm^2 are washed down by operators. A remote drum wash down station is being considered for addition to the plant.

Dry solid wastes consisting mostly of rags, paper and other contaminated articles are compacted and drummed in 55 gal.
drums. An average of 5 drums per month of dry wastes are 1
generated in the operation of the plant.

IV. Summary and Conclusions

The Monticello Radwaste System, as designed and with the operating modifications described herein can meet the recently proposed Appendix I release limits for liquid effluents. These limits can be met by recycling the Clean and Dirty Radwaste Streams for plant reuse and routinely discharging the chemical and laundry wastes. Further studies and evaluations should be undertaken to determine the advisability and cost of achieving essentially a zero release liquid radwaste system by further processing of the Miscellaneous wastes.

The radwaste system, to date, has not limited plant availability and it is believed that the system will not limit the plant operation in the foreseeable future. The water quality of the wastes recycled within the plant has been within specified design limits and should continue as such. Decontamination factors should increase with higher fuel leakage rates and correspondingly higher enfluent activity levels. However, because of the total recycle operating mode and the continuous recirculation operation (the wastes pass through the process many times rather than a once-through approach), decontamination factors are not of particular concern. The system has performed with relatively trouble free operation with the exception of the element plugging problem and high external contamination on the 55 gal. drums.

Thus it appears from the operating experience to date that the Monticello Nuclear Station has provided for a highly effective radioactive waste control program through the use of a relatively simple radwaste system.