March 31, 1995

Northern States Power Company
Sherburne County Generating Plant
Scrubber Solids Pond No. 3
Site Closure/Postclosure Care Plan

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1.0 Introduction

This plan describes closure and postclosure care activities for the Northern States Power Company (NSP) Sherburne County Generating Plant (Sherco) Scrubber Solids Pond No. 3 (Pond 3) in Becker, Minnesota. Figure 1 presents the site location. The plan is divided into two sections: the closure plan—Section 2, and the postclosure care plan—Section 3.

The purpose of the closure plan is to outline the steps to be followed during closure or partial closure of the facility. Closure involves the placement of final cover over a filled portion of the facility, providing for erosion and drainage control, grading and seeding the surface, and installation of monitoring devices where applicable.

The postclosure care plan outlines inspection, maintenance, and monitoring activities to be completed during postclosure care for the facility.

2.0 Closure Plan

2.1 Notification of Pond Closure

Closure of Pond 3 will commence during the construction season following that in which the last load of waste is received, and be completed within 24 months after beginning closure. The MPCA will be notified of impending pond closure plans at least 90 days before proceeding with closure activities. Notification will include a planned closure date and a description of arrangements to be made for compliance with the closure plan. The estimated dates for closure of Pond 3 are presented in Section 2.2.

2.2 Closure Schedule

The first area to be closed will be the southern portion of Pond 3. The northern portion of Pond 3 will be closed next. Should decreased or increased filling rates, or site expansions alter the life of the facility, the scheduled closure will be adjusted as necessary. The site closure schedule is highly dependent on ash disposal and beneficial use rates. The current site closure schedule is estimated to be as follows:

Pond 3 Closure Stage	Estimated Year of Closure	Estimated Plan Area of Cover (acres)
South Side	2026 or later	47
North Side	2027 or later	47
	Total Acres	94

The majority of the final cover placement should occur during the summer and fall months of each scheduled year of cover placement until the final cover is completely installed. Areas brought to final grade but left without final cover during a given construction season will have temporary erosion controls placed as necessary until final cover is installed.

2.3 Closure Procedure

The final cover for the facility may require placement of zero to six inches of compacted random fill for finish slope grading. Once the subgrade surface is at design grades, a low-permeability geomembrane barrier layer will be placed. A 1-foot sand drainage layer will be placed over the geomembrane followed by a foot of rooting soil and 6 inches of topsoil. The topsoil layer will be vegetated. Material requirements, specific construction requirements and techniques will be detailed in the Contract Documents for final cover construction.

2.4 Certification of Closure

2.4.1 Certification of Pond Closure

A closure documentation report will be prepared and submitted to the MPCA approximately 90 days after completion of closure of each portion of the pond. The construction of the various components of the final cover will be tested and documented in accordance with testing requirements presented in the facility Construction Quality Assurance Quality Control Plan. The report will contain descriptions of the construction process, record drawings, survey and material test data, pertinent correspondence, and photographs of important aspects of the construction.

The report will be signed by the facility owner or operator and a professional engineer registered in the state of Minnesota, stating that to the best of their knowledge and according to their records, a segment of the facility cover construction has been completed in accordance with the approved plans, specifications, and permit requirements.

2.4.2 Certification of Final Closure

Upon completion of facility closure activities for the entire pond, a final closure documentation report will be prepared. In addition to the closure documentation for each phase described in Section 2.4.1, the report will include a description of the future facility use, waste types contained and waste boundary, and a survey plat certified by a land surveyor registered in Minnesota. The final closure documentation report will be submitted to the MPCA and Sherburne County Recorder. Approval of this report by the MPCA constitutes certification of final closure for the disposal facility.

2.5 Deed Notation

NSP will record a notation on the deed to the property, or on some other instrument normally examined during a title search, that will in perpetuity notify any potential purchaser of the property of any special conditions or limitations for use of the site. Upon final closure, the site may not be used for cultivated crops, heavy grazing, buildings, or any other use which might disturb the vegetative and soil cover. The notation will include appropriate construction documentation for the facility. A copy of the notation as filed with the county recorder and carrying the recorder's seal will be submitted to the MPCA with the final closure documentation report.

2.6 Closure Cost

The estimated cost of Pond 3 closure is presented in Table 1. The estimate includes direct and indirect costs, with a 10% contingency on each. At the time financial assurance is established for Pond 3, NSP proposes to provide an operator's bond without surety, for the present value of closure costs. Present value will be computed using investment interest rates and inflation rates approved by the MPCA.

3.0 Postclosure Care Plan

NSP will be responsible for the postclosure care of the site in accordance with permit requirements. The following subsections describe postclosure care activities.

3.1 Inspection

In the spring and autumn of each year following final closure a routine inspection of the site will be performed according to the appropriate sections in the facility Operations and Maintenance Plan (Barr Engineering Company, February 1995). The inspection will include the following activities:

- Document settlement of final cover
- Document quality of vegetation
- Document soil loss from erosion
- Document groundwater monitoring system repairs needed
- Document dewatering system damage or degradation
- Document accumulation of sediment at drainage control facilities
- Document effectiveness of site security appurtenances
- Document facility dike damage or degradation

3.2 Maintenance

Corrective measures will be taken if inspection of the site reveals problems with the dewatering system, monitoring systems, security systems, cover material, dike system, or vegetation. In the event that substantial erosion occurs, additional soil cover will be placed and compacted. Measures will be taken to prevent further occurrence of the problem.

If there are any areas where the cover vegetation is poorly established or otherwise stressed, reseeding and/or growth and development measures will be instituted to establish adequate vegetation. Damage to vegetation will be prevented by maintaining drainage channels for maximum flow capacity. Vegetation will also require routine surface care maintenance such as

mowing to prevent shrub growth. In the event vegetation cannot be established, other forms of erosion protection such as gravel (meeting filter requirements) will be placed.

Routine maintenance and repair, where necessary, will be completed on equipment crucial to evaluating and maintaining the integrity of the site. This may include, but is not limited to: monitoring wells, dewatering systems, and stormwater runoff control structures.

3.3 Groundwater Monitoring

Routine groundwater monitoring will be performed during the postclosure period in accordance with NSP's MPCA approved groundwater monitoring plan. Modifications to the monitoring plan may be implemented with the approval of the MPCA.

3.4 Reporting

A report will summarize the conditions observed, corrective actions taken, maintenance activities, and monitoring activities performed for each semiannual inspection during the postclosure period. Inspection reports will be summarized and submitted to the MPCA annually.

3.5 Pond 3 Dewatering

After closing Pond 3, operation of the dewatering system will begin. The dewatering system, which will consist of a granular drainage layer and perimeter drain pipes at the base of the site, will be operated after site closure, as described in the Engineering Report (Barr Engineering Company, February 1995).

3.6 Facility Contact

The NSP address and phone number for information regarding this site during postclosure is presented below:

Name: Northern States Power Company
Sherburne County Generating Plant (Sherco)

Address: 13999 Industrial Blvd.
Becker, Minnesota 55308

Phone: (612) 261-3133

3.7 Ultimate Land Use

The present site owner/operator, NSP, will reserve the option as to the final use of the disposal facility site (to the extent of limitations imposed by the MPCA) so long as they retain ownership. No use of the site by NSP will be considered that would be detrimental to the maintenance of adequate final cover, vegetation, surface water drainage systems, and groundwater monitoring wells. Open space or long-term wildlife easements are possible final use alternatives for the facility preferred by NSP.

3.8 Postclosure Care Cost

The estimated cost of Pond 3 postclosure care is presented in Table 2. The estimate assumes postclosure care activities are completed by independent contractors. The cost estimate also assumes a constant leachate collection rate, although this rate will decrease over time. This decrease should be considered during periodic updates of cost estimates and financial assurance.

At the time financial assurance is established for Pond 3, NSP proposes to provide an operator's bond without surety, for the present value of postclosure care costs. Present value will be computed using investment interest rates and inflation rates approved by the MPCA.

Table 1
NSP Sherco Pond No. 3
Final Cover Construction Cost Estimate

Description	Quantity	Unit	Unit Price	Cost
Direct Costs				
Ash Fill/Subgrade Preparation	75,000	C.Y.	$2.50	$187,500
40 Mil Geomembrane	4,012,000	S.F.	0.40	1,604,800
12" Granular Drainage Material	149,000	C.Y.	3.50	521,500
6" Rooting Soil	75,000	C.Y.	2.50	187,500
6" Topsoil	75,000	C.Y.	4.50	337,500
Turf Establishment: Seeding, Mulching & Fertilizing	92	Acre	2,000	184,000
Riprap & Filter	50	C.Y.	50.00	2,500
Coarse Filter Aggregate	1,000	C.Y.	15.00	15,000
6" Aggregate Road Surface (Class V)	6,500	C.Y.	12.00	78,000
Catch Basins	19	E.A.	2,000	38,000
Surface Water Manholes	5	E.A.	3,000	15,000
Energy Dissipating Manholes	5	E.A.	2,500	12,500
Surface Water Berm With Drain Tubing	13,700	L.F.	8.00	109,600
12" P.E. Pipe	2,150	L.F.	25.00	53,750
18" P.E. Pipe	640	L.F.	32.00	20,480
18" RCP	285	L.F.	32.00	9,120
21" RCP	105	L.F.	39.00	4,095
Dewatering Pumphouses, Pumps, and Controls	2	L.S.	30,000	60,000
Allowance for Deviation On Direct Cost (10%)				$344,085
Total Direct Costs				$3,785,000
Indirect Costs				
Temporary Facilities				N/A
Permits & Licenses (NSP)				N/A
Dam Safety Permit				N/A
Administrative & General (A&G)				N/A
Allowance for Funds Used During Construction				N/A
NSP Generation Services: Eng, Const, Mgmt, Proj Spt				N/A
Consultant & Testing				N/A
Permit Application				N/A
Construction Plans & Specs				N/A
Construction Materials Testing				N/A
Survey Checking				N/A
Construction Document Certification				N/A
Assumed to be 25% of Direct Cost				$946,250
Allowance for Deviation On Indirect Cost (10%)				$94,625
Total Indirect Costs				$1,041,000
Pond No. 3 Final Cover Total Project Cost				$4,826,000

1) All Unit Prices are 1994 Basis.

2) Cost Estimate Preparation Date is 3-1-95.

3) Total Direct, Total Indirect, and Total Project Costs are rounded to the nearest $1,000.

4) Indirect Costs are assumed to be 25 percent of direct costs, and are not itemized.

Table 2

NSP Sherco Pond 3
Summary of Estimated Annual Postclosure Care Costs

Item	Estimated Cost
Facility Inspection	$5,400
Routine Maintenance	22,300
Sedimentation Basin Maintenance	2,300
Leachate Disposal	100,000
Groundwater Monitoring	12,700
Administrative and Reporting Services	11,000
Estimated Total Annual Cost	$154,000

Notes: 1) Estimated costs are based upon 1995 unit prices.
2) Numbers in "Estimated Cost" column are rounded to the nearest $100.
3) See Tables 2-1 through 2-6.

Table 2-1

NSP Sherco Pond 3
Postclosure Care Cost Estimate

Facility Inspection

	Quantity	Unit Price	Extension
1. Engineer			
a. Number of inspections during	3		
b. Engineer time required (hrs/insp)	16		
c. Engineer unit labor cost ($/hr)		$70	
d. Engineer cost (Lines 1a x 1b x 1c)			$3,360
2. Technician			
a. Number of inspections during postclosure period (insp/yr)*	3		
b. Technician time required (hrs/insp)	16		
c. Technician unit labor costs ($/hr)		$40	
d. Technician time cost (Lines 2a x 2b x 2c)			$1,920
3. Travel Expense			
a. Number of inspections during postclosure period (insp/yr)	3		
b. Miles driven per inspection (miles/insp)	100		
c. Mileage cost ($/mile)		$0.35	
d. Travel cost (Lines 3a x 3b x 3c)			$105
4. Facility Inspection Total Annual Cost (Sum Lines 1d + 2d + 3d)			$5,385

*Number of inspections during postclosure period includes two routine annual inspections and one inspection per year after a severe storm event.

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Table 2-2

NSP Sherco Pond 3
Postclosure Care Cost Estimate

Routine Maintenance

	Quantity	Unit Price	Extension
1. Mowing			
a. Mowing frequency (vis/yr)	1		
b. Area to be mowed per visit (acres/vis)	94		
c. Mowing time required (hrs/acre)	0.25		
d. Unit labor cost (including equipment, $/hr)		$40	
e. Mowing subtotal (Lines 1a x 1b x 1c x 1d)			$940
f. Mobilization/demobilization cost			$200
g. Total mowing cost (Lines 1e + 1f)			$1,140
2. Fertilizing			
a. Fertilizing frequency (vis/yr)	1		
b. Area to be fertilized (acres/vis)	10		
c. Fertilizer unit cost ($/acre)		$300	
d. Fertilizing subtotal (Lines 2a x 2b x 2c)			$3,000
e. Mobilization/demobilization cost			$200
f. Fertilizing cost (Lines 2d + 2e)			$3,200
3. Sprinkling or Irrigation			
a. Sprinkling frequency (days/yr)	5		
b. Sprinkling unit cost ($/day)		$450	
c. Sprinkling cost (Lines 3a x 3b)			$2,250
4. Security System Maintenance			
a. Security system maintenance frequency (vis/yr)	1		
b. Amount of fence needing replacement (lf/vis)	50		
c. Fencing unit cost (lf)		$6.00	
d. Fence cost (Lines 4a x 4b x 4c)			$300
e. Number of other security items needing replacement (signs, items/vis)	1		
f. Other security items unit cost ($/item)		$200	
g. Other security items replacement cost (Lines 4a x 4e x 4f)			$200
h. Security system maintenance cost (Sum Lines 4d + 4g)			$500

Table 2-2 (continued)

NSP Sherco Pond 3
Postclosure Care Cost Estimate

Routine Maintenance

	Quantity	Unit Price	Extension
5. Dewatering System Maintenance			
a. Maintenance frequency (trips/yr)	12		
b. Technician time required (hrs/trip)	8		
c. Technician unit labor cost ($/hr)		$40	
d. Maintenance cost (Lines 5a x 5b x 5c)			$3,840
e. Repair frequency (trips/yr)	1		
f. Contractor time required (hrs/trip)	16		
g. Contractor unit labor cost ($/hr)		$100	
h. Materials and equipment ($/trip)		$2,000	
i. Repair cost (Lines 5e x 5f x 5g)+(5e x 5h)			$3,600
j. Total cost (Lines 5d + 5i)			$7,440
6. Diversion Ditch Cleaning			
a. Diversion ditch cleaning frequency (vis/yr)	1		
b. Length of ditch requiring cleaning (lf/vis)	200		
c. Cleaning time required (hrs/lf)	1		
d. Unit labor cost ($/hr)		$30	
e. Diversion ditch cleaning cost (Lines 5a x 5b x 5c x 5d)			$6,000
7. Rodent Control			
a. Rodent control frequency (vis/yr)	1		
b. Area requiring rodent control (acres/vis)	94		
c. Rodent control unit cost ($/acre)		$2.50	
d. Application time required (hrs)	25		
e. Unit labor cost ($/hr)		$30	
f. Rodent control cost (Lines 6a x 6b x 6c)+(Lines 6d x 6e)			$985
8. Snow Plowing			
a. Plowing frequency (vis/yr)	5		
b. Time required for plowing (hrs/vis)	3		
c. Unit labor cost (including equipment, $/hr)		$50	
d. Snow plowing cost (Lines 7a x 7b x 7c)			$750
9. Routine Maintenance Total Annual Cost (Sum Lines 1g + 2f + 3c + 4h + 5j + 6e + 7f + 8d)			$22,265

Table 2-3

NSP Sherco Pond 3
Postclosure Care Cost Estimate

Sedimentation Basin Maintenance

	Quantity	Unit Price	Extension
1. North and South Basin Dredging (by backhoe)			
a. Dredging frequency (vis/yr)	0.5		
b. Area requiring dredging (sq ft)	20,000		
c. Sediment depth (ft)	0.5		
d. Cubic yards dredged (cy)*	370		
e. Unit labor cost (including equipment, $/cy)		$3.50	
f. Dredging cost (Lines 1a x 1d x 1e)			$648
g. Mobilization			$300
h. Basin dredging total annual cost (Lines 1f + 1g)			$948
2. East Basin Dredging (by scraper)			
a. Dredging frequency (vis/yr)	0.5		
b. Area requiring dredging (sq ft)	40,000		
c. Sediment depth (ft)	0.5		
d. Cubic yards dredged (cy)	740		
e. Unit labor cost (including equipment, $/cy)		$3.50	
f. Dredging cost (Lines 2a x 2d x 2e)			$1295
g. Mobilization			$100
h. Basin dredging total annual cost (Lines 2f + 2g)			$1395
3. Sedimentation Basin Maintenance Total Annual Cost (Sum Lines 1g + 2g)			$2,343

*Volume of material dredged includes sediment from landfill surface water runoff that must be removed to maintain effective sediment removal.

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Table 2-4

NSP Sherco Pond 3
Postclosure Care Cost Estimate

Leachate Disposal

	Quantity	Unit Price	Extension
1. Disposal			
a. Quantity of leachate (gallons/year)	2,000,000		
b. Unit transport/disposal cost ($/gallon)		$0.05	
c. Leachate disposal annual cost (Lines 1a x 1b)			$100,000

*Quantity is based on estimated average rate of liquid removal from dewatering system during initial 10-year period of Pond 3 dewatering. Actual quantity is lakely to vary significantly (plus or minus).

Table 2-5

NSP Sherco Pond 3
Postclosure Care Cost Estimate

Groundwater Monitoring

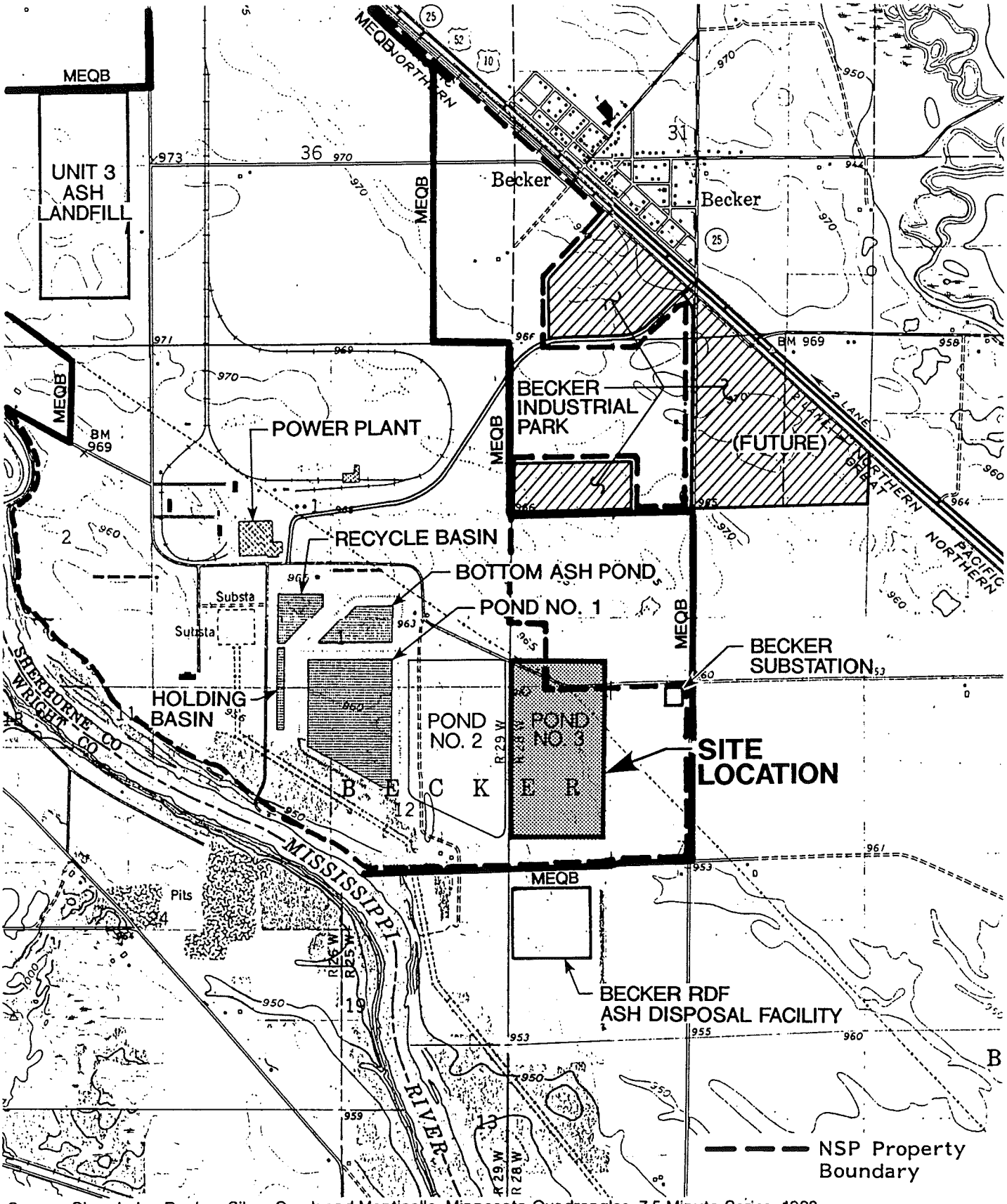
	Quantity	Unit Price	Extension
1. Groundwater Quality Analysis			
a. Groundwater quality monitoring frequency (vis/yr)	3		
b. Number of wells sampled per visit (wells/vis)	8		
c. Sample collection and preparation time required (including monitoring well inspection, hrs/well)	1.5		
d. Time required to deliver samples (hrs/vis)	12		
e. Total sample collection time (hrs/vis) (Lines 1b x 1c) + 1d)	24		
f. Technician unit labor cost (2-man crew, $/hr)		$100	
g. Sample cost ($/vis) (Lines 1e x 1f)			$2,400
h. Average contract lab fee ($/well)		$170	
i. Contract lab cost ($/vis) (Lines 1b x 1h)			$1,360
j. Groundwater quality analysis cost (Lines 1a x (1g + 1i))			$11,280
2. Monitoring Well Maintenance			
a. Maintenance frequency (vis/yr)	1		
b. Monitoring wells needing maintenance per visit (wells/vis)	1		
c. Maintenance time required (hrs/well)	2		
d. Unit labor cost ($/hr)		$100	
e. Monitoring well maintenance cost (Lines 2a x 2b x 2c x 2d)			$200
3. Monitoring Well Replacement			
a. Number of wells needing replacement during postclosure period	12		
b. Monitoring well unit cost ($/well)		$2,000	
c. Annual monitoring well replacement cost (Lines 3a x 3b/20)			$1,200
4. Groundwater Monitoring Total Annual Cost (Sum Lines 1j + 2e + 3c)			$12,680

Table 2-6

NSP Sherco Pond 3
Postclosure Care Cost Estimate

Administrative and Reporting Services

	Quantity	Unit Price	Extension
1. Engineer			
a. Engineer time required (hrs/yr)	120		
b. Engineer unit labor cost ($/hr)		$70	
c. Engineer cost (Lines 1a x 1b)			$8,400
2. Clerical			
a. Clerical time required (hrs/yr)	60		
b. Clerical unit labor cost ($/hr)		$40	
c. Clerical cost (Lines 2a x 2b)			$2,400
3. Administrative Services Total Annual Cost (Sum Lines 1c + 2c)			$10,800



Source: Clear Lake, Becker, Silver Creek and Monticello, Minnesota Quadrangles, 7.5 Minute Series, 1980.

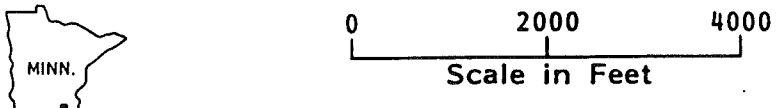


Figure 1

SITE LOCATION MAP
Sherco Generating Plant
Northern States Power Company