TESTIMONY OF ROY A. WELLS, JR.

My name is Roy A. Wells, Jr. and I reside at 3480 Northlands, Jackson, Michigan. I am currently the Executive Director of Environmental and Project Services for Consumers Power Company, Jackson, Michigan (Consumers Power) and have worked in this capacity since January 1976.

I was graduated from Case Institute of Technology with a bachelor of science degree in electrical engineering. I received a masters of business administration degree from Western Michigan University and a masters of science degree in management from Massachusetts Institute of Technology. I have also studied at MIT as a Sloan Fellow. I am a registered professional engineer in the State of Michigan.

I have been with Consumers Power continuously since 1960 and have served as a laboratory engineer, laboratory measurements supervisor and assistant manager of general services. In 1970, I was appointed the Executive Director of Environmental Activities for Consumers Power.

The purpose of this testimony is to review the environmental impacts anticipated to occur due to construction activity at the Midland Project between approximately December 1, 1976 and September 1, 1977, and to analyze their effects on the environment. These impacts and effects are reviewed based upon the alternatives of continuation or suspension of construction during the period specified. For the reasons to be discussed, it has been concluded that the impacts of construction activity and their anticipated effects on the environment will be minimal to nonexistent and that suspension of all construction activities may, in fact, expose the environment to a higher risk of adverse impact and effect than would continuation. I have examined the environmental impacts by considering the projected construction activities for this 9-month

period as set forth in the testimony of Gilbert S. Keeley, discussing construction practices and environmental impacts with on-site workers, considering the standard construction practices at the Project, and viewing the site and its environs.

The adverse environmental impacts of continued construction while the remand proceedings are in process should be assessed in light of the construction that has already occurred. The application for the Midland construction permits was filed on January 3, 1969. The construction permits were issued on December 15, 1972, but under the exemption procedures in effect at the time authority was extended to the Applicant to engage in certain preliminary construction activities prior to their issuance. Site activities were discontinued in November of 1970 because prolonged hearings regarding the issuance of construction permits appeared to be inevitable. However, even by November of 1970, much of the adverse environmental impact of construction had already occurred. Construction was resumed after issuance of the permits in 1972 and has been continuously in progress since that date although the level of activity has varied from double-shift to minimal construction.

Virtually all of the significant construction impacts identified in the FES have already taken place. General preparation of the site, including clearing, is essentially complete, with no remaining activity planned that will result in clearing of bushes, trees, or the like. Clearing of a small amount of sod and brush is still required within the dike area on the floor of the pond but this is considered to result in an insignificant environmental impact. Site excavation for major construction activities is also essentially complete and remaining excavation will require no further clearing or site preparation activity in previously undisturbed locations. The activities to be undertaken during the period from December 1, 1976 to September 1, 1977 will result in a

very small portion of the total environmental impacts of constructing the project.

ENVIRONMENTAL IMPACTS OF CONTINUED CONSTRUCTION

The significant construction activities projected for the period of December 1, 1976 to September 1, 1977 and their anticipated impacts are classified by site location and described below. They are also identified in detail by the matrix attached as Consumers Power proposed Exhibit 9.

Auxiliary Building

Concrete placement activities are scheduled in four areas during the relevant period: (1) Control Tower area walls and slabs; (2) Fuel Pool area walls, scheduled for completion in February 1977; (3) Radwaste Equipment area walls and slabs; and (4) Solid Radwaste Addition, scheduled to begin in May 1977. The principal environmental impacts arising from these activities relate to noise, fumes and dust associated with the transport of concrete.

Containment #1 Building

Concrete placement activities are scheduled in four areas during the period: (1) Interior Concrete Cover Slab, scheduled for January and February 1977; (2) Shield Walls against the Liner Plate, scheduled for April and May 1977; (3) Containment Exterior Concrete and Placement of the Dome Cover, scheduled to begin in July 1977; and (4) Primary Pedestal, Secondary Shield Walls and Letdown Cooler Walls, scheduled to begin in August 1977. The principal environmental impacts arising from these activities relate to noise, fumes and dust associated with the transport of concrete.

Containment #2 Building

Concrete placement activities are scheduled in three areas during this period: (1) Containment Exterior Concrete and Dome Cover Slab; (2) Primary Shield Walls, scheduled to be completed in May 1977; and (3) Letdown Cooler Walls,

scheduled only for the month of December 1976. The principal environmental impacts arising from these activities relate to noise, fumes and dust associated with the transport of concrete.

Turbine Building #1

Concrete placement activities are scheduled in two areas for this period: (1) Main and Auxiliary Bay, scheduled for December 1976 through March 1977; and (2) Exterior Wall to grade, scheduled for December 1976 through March 1977. The principal environmental impacts arising from this activity relate to noise, fumes and dust associated with the transport of concrete.

Turbine Building #2

Concrete placement activity is scheduled in one area for this period. Concrete will be placed for Elevated Slabs during the months May 1977 through July 1977. The principal environmental impacts arising from this activity relate to noise, fumes and dust associated with the transport of concrete.

The above concrete placement activities are normal in any construction project. These activities will require the transport of approximately 38,500 cu yds of concrete, necessitating approximately 5000 concrete truck trips. The impacts from these activities are minimized through the use of good construction practices. An efficient and clean concrete batch plant is operated on-site to reduce the truck traffic required offsite. With proper attention to maintenance and operating practices and the application of filters on the fly ash and cement silos, the batch plant operation is practically dust free and results in essentially no environmental impact. Washing of trucks involved in concrete transport activity is restricted to areas where the water is contained in holding ponds with sufficient holding time to allow settling of solids before releasing the water offsite. Proper maintenance of trucks and equipmen and restriction of operations to normal daytime working hours reduce the impacts of noise and

fumes to a minimal level even on-site. Considering that the residential area closest to the concrete placement activity is approximately one mile away, it is concluded that the offsite impact of noise and fumes from the concrete transport operations will be nonexistent. Likewise, dust will result in no offsite impact, as the prevailing easterly winds will direct any unusual dust movement toward the industrial area centered approximately three-quarters of a mile from the center of construction activity. On-site dust resulting from movement of the trucks between the concrete batch plant and the placement area is controlled by watering trucks used as conditions require. Dust is also reduced because the portion of the site road near the batch plant is paved.

In conclusion, the principal environmental impacts associated with concrete placement activities scheduled during the period December 1, 1976 to September 1, 1977 are identified as noise, dust and fumes. Through proper operational planning, maintenance of equipment and trucks, and the use of good construction practices, these impacts have been reduced to an insignificant quantity offsite. Therefore, continuance of these activities during the period under review will not result in any significant adverse environmental impact.

Yard and Miscellaneous Structure Work

Eight major activities in this category are scheduled to occur during the period December 1, 1976 to September 1, 1977. These are: (1) Earthwork associated with Yard Service Water Piping and Electrical Duct Work during May through August 1977; (2) Earthwork, Concrete Placement and Dewatering for the Circulating Water and Service Water Building for the period December 1976 through August 1977; (3) Earthwork associated with the Site Sewer Lift Station scheduled for two months with completion in February 1977, and earthwork by The Dow Chemical Company for piping on its land to connect its sewer treatment system to the Midland Project; (4) Earthwork and Concrete placement for the

Process Steam Tunnel and Administration Building foundation, scheduled for January to August 1977; (5) Earthwork and Concrete placement for the Circulating Water Discharge Structures and Yard Circulating Water Piping, scheduled for April through August 1977; (6) Earthwork associated with the Evaporator, Auxiliary Boiler and Water Treatment Buildings scheduled for May through August 1977; (7) Earthwork and Dewatering for the Emergency Pond Service Water Return Piping, scheduled for five months with completion in August 1977; and (8) Earthwork for Plant backfilling to grade, scheduled for May through August 1977.

The concrete placement associated with the Yard and Miscellaneous Structure work will require approximately 20,000 cu yds of concrete and necessitate approximately 2,500 total truck trips. The environmental impacts associated with these activities will be essentially the same as those previously discussed with regard to activities at the Reactor Complex, and are likewise considered to be insignificant offsite.

The earthwork required by the activities discussed in this section is predominately excavation, backfilling and leveling. The principal impacts resulting from these activities are noise and dust and, to a lesser degree, vehicle fumes. For the same reasons discussed in the preceding section, these impacts are also considered to be insignificant offsite. As most of the earthwork activities are centered around the reactor complex and yard area, the nearest residential area is approximately one mile away, and therefore the offsite impact of noise, dust and fumes is negligible.

Other potential environmental impacts from earthwork operations are soil erosion and siltation. Soil erosion has been minimized by mulching, seeding and fertilizing appropriate areas as soon as the earthwork, which may include backfilling, grading, leveling and contouring, is completed. This preventative process is applied to sections of up to a thousand feet at a time depending upon the

activity and erosion risk involved. Grass catch has been excellent and this procedure has been generally very effective. In sections where the earth is continually exposed to water, such as around holding basins and flowing streams, rip-rap is used in sizes and amounts as necessary for further stabilization. Because of these practices, soil erosion due to construction activity on-site is for all practical purposes nonexistent. Continued construction activity in the period under review will be of the same nature as that which has already occurred and will be controlled in the same manner, and should therefore have negligible environmental impact.

Siltation into County drains, Bullock Creek and the Tittabawassee River is minimized by the use of holding basins installed at strategic locations on-site. The basins are located to collect all runoff from site construction areas where there is a risk of siltation. They are large enough to allow a sufficient holding time for suspended solids, largely in the form of soil, to settle out before the water flows out of the basin over elevated rock-type weirs. To ensure their continued effectiveness, the holding ponds are dredged to prevent their filling up with silt. There are approximately 10-15 such basins now in use, and they are relocated as construction activity moves. Under normal construction and precipitation conditions, the effluent from these holding ponds is noticeably clearer than the water flowing into the site area from natural water sources such as Bullock Creek. However, the siltation impact due to construction activity will continue to be insignificant.

As noted above, some of the construction activities associated with the Yard and Miscellaneous Structure work will require dewatering. The questions of construction impact on groundwater and water tables in the area of the site were discussed in the FES; there is no anticipated adverse impact on domestic water supplies. The presence of an impervious clay layer in the site area earth produces a perched water table in the sand above the clay. Water for domestic

wells in the vicinity is drawn from an artesian aquifer which exists in the sand and gravel underlying this clay layer. Since dewatering will draw only from the perched water table, there will be no impact on water supply. Dewatering from the Circulating Water and Service Water Buildings and for the Service Water Return Piping will cause a drawdown only in the immediate locale of these facilities. The only other potential impacts of dewatering would be erosion or siltation into the local water bodies caused by runoff of the resulting water discharged above ground. Erosion and siltation are effectively controlled by discharging any significant quantities of water from dewatering operations in the yard and building areas into the cooling pond. Most of the water then evaporates and a small amount percolates into the earth. A very small percentage makes its way to a holding basin which feeds into the discharge structure to the Tittabawassee River located at the eastern side of the pond. Since the pond area is now totally enclosed, there is no possibility of this water leaving the site at any other location.

Plant Area Backfilling and Completion of Cooling Pond Dike

Four months of activity are scheduled to begin in May 1977 related to general backfilling in the Plant area and continuation of seeding, mulching and rip-rapping of the cooling pond dike. These activities all involve general earthwork with the attendant potential for environmental impact from noise, dust, soil erosion and siltation. These activities are no different from those already discussed, and their impacts will be controlled and minimized in the same manner, resulting in essentially no environmental impact.

Pond Makeup Pumphouse and River Intake Structures

Backfill earthwork and dewatering activities associated with the Makeup Pumphouse and Intake Structures are scheduled for the entire period under consideration. A cofferdam of sheet piling has been constructed at the area of interface

of the intake structure with the River, and prevents disturbance to the River by the excavation. The excavation is essentially completed; the major activity remaining is backfilling. Through the same controls as previously described and generally for the same reasons previously discussed, the remaining excavation will create minimal environmental impact from the same potentials of noise, fumes, dust, erosion and siltation. When dewatering is required for this activity, clean water will be returned directly to the River, and, when necessary, the water will be pumped to a holding basin to prevent siltation impact.

Pond Area

The major construction activity required for the cooling pond, including basin excavation and development of the dike, has been completed. Seeding, mulching, and rip-rapping of the dike to prevent soil erosion are essentially complete except about 7% of the dike which is located in the vicinity of the intake and discharge structures. The only major activities still required for the cooling pond are sod and brush removal in the interior and leveling on the interior surface. The potential impacts are noise and dust. Noise impact will be minimized by restricting working hours to daytime, and dust impact will be alleviated by watering practices as previously described. A completed discharge structure located on the eastern boundary of the pond is presently used in conjunction with a holding basin to aid in controlling the minimal water runoff from the pond area and thus siltation.

Construction Activity Generally

Other environmental impacts which may result from ongoing construction at the site are described in the following paragraphs.

Construction Work Force

Traffic congestion and a certain amount of dust, noise and fumes occur when the workers travel to and from the site. During the period under review,

the Midland Station work force will gradually escalate from an average of approximately 1,200 to 2,250 workers. Although this will result in some further increases in traffic congestion, dust, noise and fumes, the incremental impact is minimized by the fact that industrial traffic is common to the area since The Dow Chemical and Dow Corning Companies employ over 14,000 employees. In addition, the previous widening of the peripheral Poseyville Road at the entrance to the construction area will continue to mitigate congestion, and the site-associated permanent, improved (blacktopped) access road will divert traffic away from residential areas on Miller Road.

Sanitary waste is presently stored on-site in State-approved holding tanks and trucked offsite by a State-licensed hauler. Connection with The Dow Chemical Company's sanitary waste treatment plant is underway, and its completion during the period in question will cause the offsite trucking of sanitary waste to cease.

Delivery and Use of Construction Materials

Vehicles arriving with construction materials and related supplies also result in some traffic congestion, noise, dust and fumes. The congestion impact is reduced by the measures noted in the previous subsection. Deliveries occur during normal working hours which helps to keep the adverse impact of noise low. Dust is controlled by water trucks as previously discussed, and the impact of fumes is also minimal offsite.

Construction wastes will be burned on-site or handled by receptacles. The contents of the receptacles are trucked offsite to a State-approved landfill.

Esthetic Impact

The principal esthetic impact of construction activity has already occurred with site clearing and preparation. Also, some structures have been erected on-site, building foundations installed, and components and materials

have arrived. View of ongoing construction activity is obstructed by the cooling pond dike, tree screens, and distance of residences from the site. Also, the Poseyville Laydown Area abutting Poseyville Road has been fenced. Considering the surrounding industrial area, continued construction during the period in question will not have any significant additional esthetic impact.

REDRESSABILITY AND FORECLOSURE OF ALTERNATIVES

Most of the potential environmental impacts of continued construction during the relevant period and their associated effects are transitory, such as noise, dust, fumes and esthetics, and thus, redressability need not be considered. The foreclosure of alternative uses of the land has already occurred to a certain extent. As more specifically analyzed in the table attached as Consumers Power proposed Exhibit 10, it is estimated that it would cost approximately $59,000,000 to totally reverse all construction activities completed through December 1, 1976. Restoration would include removal of concrete and other structural components, backfilling and replanting. Given further concrete placement of 58,500 cu yds and additional backfill of 280,000 cu yds during the period under review, the overall cost of redressability will be increased by $42,000,000. The estimated times required for site restoration activities are also set out in proposed Exhibit 10.

Pursuant to the requirement imposed by the AEC in the Midland FES, the intake structure has been designed to minimize impact on the fish population of the Tittabawassee River. The design of the intake opening will result in a normal intake water velocity of approximately 0.5 fps with a maximum velocity anticipated to be 1 fps. This design will provide for a "sweep velocity" across the face of the screens at the intake opening, caused by the normal water flow in the river, and will result in a minimum impact on fish from impingement. Construction of this structure began in August 1976 and will continue throughout

the period under review, with completion scheduled for November 1977. Because of the design requirements, the intake structure should not require modification. However, such modifications are never completely foreclosed. The environmental impact associated with a potential modification would be insignificant except for minor siltation impact on the River from a major rebuilding requiring installation of another cofferdam at the River interface.

The routing of the sanitary wastes from the Midland Plant to The Dow Chemical Company's treatment facility is planned for completion by April 1977. Installation of major yard sanitary systems is essentially complete. Installation of the sanitary system lift station, required to transport the wastes to Dow, is scheduled to occur during January and February 1977 with two additional months required for hook-up to Dow. Alternate approaches to handling of offsite wastes will not be foreclosed due to this activity.

ENVIRONMENTAL EFFECTS OF CONTINUED CONSTRUCTION

The following paragraphs summarize the effect on the environment of the impacts of continued construction discussed above. Since the offsite environmental impacts are essentially negligible, the effects are also insignificant.

Noise, Dust and Fumes

The amount of noise, dust and fumes is controlled as previously discussed. There are very few remaining flora or fauna on-site due to the advanced stage of construction. Nearly 100% of the required land clearing has been accomplished and only about 15% of the land within the site boundaries is undisturbed. The very small area that is undisturbed, which is in the southeast portion of the site, consists mainly of low grassy ground cover and shrubs around the extreme outer boundaries of the site and is suitable only for cover for small animals. Some wildlife is noticeable, but no unusual species are

evident and remaining construction activities will have little effect on what animals do remain. There are no unusual or unique flora to be considered since the only remaining types on-site are lowland second growth hardwoods and old field vegetation, both of which result from prior disturbance.

Offsite flora and fauna will be at most minimally affected by construction activity during this period. As described in the FES, the perimeter of the site is approximately 50% industrial area, 10% residential area and 40% residential/farming area. The prevailing winds carry the noise and dust toward the industrial area. Natural cleansing action of rainfall will tend to wash from the vegetation any small amount of dust that might be carried offsite. The fact that farming, with inherent noise and dust impact, is active in a large percent of the nonindustrial area bordering the site further supports the minimal incremental effect on offsite flora and fauna that may result from continued construction activity.

Siltation

The construction control processes for minimizing the amount of silt and turbidity entering local water bodies from holding basin effluents effectively protect aquatic life from adverse effects. The natural characteristics of the Tittabawassee River and Bullock Creek indicate normally high levels of turbidity and siltation which restrict the number of species and the density of aquatic population. Any abnormal short-term increase in the turbidity or siltation of offsite effluents due to conditions such as unusual rainfall would cause an insignificant incremental effect on aquatic life. The normal effluents, as mentioned earlier, are less turbid than the river itself. There is no reason, therefore, to expect that additional construction activities scheduled to September 1, 1977 will result in significant effects to aquatic life.

ENVIRONMENTAL IMPACTS OF SUSPENDED CONSTRUCTION

The environmental impacts associated with suspension of construction activities include soil erosion, dust, siltation and esthetics. Suspension of construction activities could well increase the risk of environmental impact. A description of the impacts associated with suspension of specific construction activities follows.

Buildings

The primary impact associated with suspension of concrete placement is the prolongation of the period of esthetic impact which results from unfinished construction activity. This esthetic impact involves the appearance of concrete forms, visible rebar, open excavations, etc. As noted previously, concrete placement for a number of buildings is scheduled to begin prior to December 1, 1976 and continue during the period under review. Concrete placement or the preparation for it will have started prior to December 1, 1976 for the following buildings, and will be left unfinished if a suspension occurs:

I. Auxiliary Building

A. Installation of Control Tower walls and slabs.

B. Installation of Fuel Pool area walls (to be completed February 1977).

C. Installation of Radwaste and Equipment area walls.

II. Containment Building #1

A. Installation of Interior Concrete Cover Slab

III. Containment Building #2

A. Installation of Containment Exterior and Dome Cover.

B. Installation of Primary Shield Walls (to be completed May 1977).

C. Installation of Letdown Cooler Walls.

D. Installation of Secondary Shield Walls and Reactor Vessel Pedestal.

IV. Turbine Building #1

A. Installation of Main and Auxiliary Bay.

B. Installation of Turbine Generator Pedestal Base and Column.

C. Installation of Exterior Wall to grade.

D. Installation of Exterior Wall and Feedwater Pump Pedestal.

Earthwork Activities

Two impacts associated with suspension of earthwork activities are the increased risk of erosion and siltation resulting from extended exposure of excavations and mounds of earth to runoff from rain and melting snow. Erosion would also be more severe in areas improperly dressed, mulched, seeded or rip-rapped. The continued exposure of inactive excavations and other earthwork to the natural elements would create uncontrolled erosion runoff, bypassing the drainage ditches and holding basins with resultant siltation into water bodies. Likewise, without proper attention, the holding basins would soon fill from siltation and become ineffective, allowing silt to flow almost unimpeded from drainage areas into the River.

The potential for environmental impact from dust will increase if construction activity is suspended. Without proper dust control by watering operations the ground surface would be exposed to natural wind erosion and increased dust sources would result due to the freeze-thaw cycle of winter months. In addition to the impact from dust itself, dust blowing in an uncontrolled manner would have an esthetic impact.

Another adverse environmental impact resulting from suspension of construction activity would be the continued esthetic impact of uncompleted earthwork such as open excavations, mounds of earth, and the lack of backfill and leveling.

The earthwork activities that will result in the above adverse environmental impacts if a construction suspension occurred are set forth in the first column of Exhibit 9.

I. Yard and Miscellaneous Structures

A. Installation of Yard Service Water Piping and Electrical Ductwork

B. Installation of Circ Water Building and Service Water Building Base and Walls

C. Installation of Yard Sanitary System

D. Installation of Potable Water Piping

E. Installation of Cooling Pond Piping

II. Plant Area Backfill and Completion of Cooling Pond Dike

III. Construction of Pond Makeup Pumphouse and River Intake Structures

WORK FORCE

As set forth in the testimony of Gilbert S. Keeley, if construction were suspended, a minimal work force including manual workers, engineering staff, and maintenance and security forces would be maintained at the site. Therefore, impacts associated with traffic congestion and disposal of sanitary waste would not be completely eliminated.

REDRESSABILITY

Some of the environmental impacts associated with suspending construction such as noise and dust are transitory and as such redressability need not be addressed. The increased levels of turbidity and suspended solids in natural water bodies caused by a suspension of construction could be eliminated by restarting some construction activity. As noted earlier the construction site may currently be restored at a cost of $59,000,000 and this amount would increase little, if at all, if construction were suspended.

ENVIRONMENTAL EFFECTS OF SUSPENDED CONSTRUCTION

The effects on the environment of normal construction activity were concluded to be insignificant. The insignificance was a direct result of planning and the use of construction practices directed at minimizing environmental impacts. To suspend construction and stop such practices would increase environmental effects by increasing dust, erosion, siltation and extending esthetic impact.

The effect of increased erosion would be to increase the silt loading on the River thus introducing increased levels of turbidity and suspended solids. It is very difficult to quantify this increased siltation since it will largely be the result of unpredictable quantities of rainfall and snow melt runoff during the suspension period. It is, however, a certainty that siltation will increase. Since it is difficult to predict the quantitative siltation increase, it is likewise difficult to predict its effect on aquatic life. The environmental effect of increased dust conditions is also difficult to quantify. Since the prevailing wind direction is from the west, most of the dust will be directed toward the industrial complex of the northeast and east boundary of the site. It is unlikely that offsite residential areas will be affected except during periods of extremely high winds. The flora at the site boundaries would receive an increased dust loading.

Although it is very difficult to quantify the increased environmental effect due to suspension of construction activity, all indications are that they would be more adverse than the adverse effect of continuing construction for the period under review.

Exhibit 9

MIDLAND STATION SUSPENSION HEARINGS

n - noise, trucks & equipment
f - fumes, trucks & equipment
d - dust, trucks & equipment
e - extended esthetic impact
s - soil erosion
c - siltation
w - continued temporary sanitary waste disposal

POSSIBLE ENVIRONMENTAL EFFECTS OF CONTINUED OR SUSPENDED CONSTRUCTION

(DECEMBER 1, 1976 TO SEPTEMBER 1, 1977)

DEC 1976	JAN 1977	FEB 1977	MAR 1977	APR 1977	MAY 1977	JUN 1977	JUL 1977	AUG 1977	ACTIVITIES	
nfd e	nfd e	nfd e	nfd e	nfd e	nfd e	nfd e	nfd e	nfd e	Installation of Control Tower area walls and slabs (Concrete)	AUXILIARY BUILDING
nfd e	nfd e	nfd e	e	e	e	e	e	e	Installation of Fuel Pool area walls (Concrete)	
nfd e	nfd e	nfd e	nfd e	nfd e	nfd e	nfd e	nfd e	nfd e	Installation of Radwaste and Equipment area walls and slabs (Concrete)	
					nfd e	nfd e	nfd e	nfd e	Installation of Solid Radwaste Addition (Concrete)	
e	nfd e	nfd e	e	e	e	e	e	e	Installation of Interior Concrete Cover Slab (Concrete)	CONTAINMENT BUILDING NO.1
				nfd e	nfd e	e	e	e	Installation of Shield Walls against the Liner Plate (Concrete)	
							nfd e	nfd e	Installation of Containment Exterior Concrete and the Dome Cover (Concrete)	
								nfd e	Installation of Primary Pedestal, Secondary Shield Walls and Letdown Cooler Walls (C)	
nfd e	nfd e	nfd e	e	nfd e	nfd e	nfd e	nfd e	nfd e	Installation of Containment Exterior Concrete and the Dome Cover Slab (Concrete)	CONTAINMENT BUILDING NO.2
nfd e	nfd e	nfd e	nfd e	nfd e	nfd e	e	e	e	Installation of Primary Shield Walls (Concrete)	
nfd e	e	e	e	e	e	e	e	e	Installation of Letdown Cooler Walls (Concrete)	
e	e	e	e	e	e	e	e	e	Installation of Secondary Shield Walls and R.V. Pedestal (Concrete)	
nfd e	nfd e	nfd e	nfd e	e	e	e	e	e	Installation of Main and Auxiliary Bay base mat (Concrete)	TURBINE BUILDING NO.1
e	e	e	e	e	e	e	e	e	Installation of T/G Pedestal base mat and columns (Concrete)	
nfd e	nfd e	nfd e	nfd e	e	e	e	e	e	Installation of Exterior Wall to grade (Concrete)	
e	e	e	e	e	e	e	e	e	Installation of Exterior Wall and Feedwater Pump pedestals (Concrete)	TURBINE BUILDING NO 2
					nfd e	nfd e	nfd e	e	Installation of Elevated Slabs (Concrete)	
esc	esc	esc	esc	esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	Installation of Yard Service Water piping and Electrical Ductwork (Earthwork)	YARD & MISCELLANEOUS STRUCTURES
nfd sc esc	nfd esc	nfd esc	nfd esc	nfd esc	nfd sc esc	nfd sc esc	nfd esc	nfd esc	Installation of Circ. Water Bldg & Service Water Bldg. base mats & walls (Concrete, Earthwork, Dewater)	
w c esw	w c esw	w c esw	w c esw	w c esw					Installation of Yard Sanitary System piping (Earthwork)	
esc	esc	esc	esc	esc	esc	esc	esc	esc	Installation of Potable Water piping (Earthwork)	
esc	esc	esc	esc	esc	esc	esc	esc	esc	Installation of Cooling Pond makeup and discharge piping (Earthwork)	
	nd w sc c esw	nd w sc c esw	w c esw	w c esw					Installation of Site Sewer Lift Station and sanitary system piping by Dow (Earthwork)	
	nfd sc esc	nfd sc esc	nfd sc esc	nfd sc esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	Installation of Process Steam tunnel and Admin. Building foundation (Earthwork, Concrete)	
				nd sc esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	Constr. of Circ. Water disch. structures & install. of Yard Circ. Water piping (Earthwork, Concrete)	
					nd sc esc	nd sc esc	nd sc esc	nd sc esc	Constr. of Evaporator / Aux. Boiler / Water Treatment Bldg foundations (Earthwork)	
				c esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	Installation of Emergency Pond Service Water return piping (Dewater, Earthwork)	
					nd sc esc	nd sc esc	nd sc esc	nd sc esc	Plant Backfill to grade (Earthwork)	
esc	esc	esc	esc	esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	Plt. area Backfill & completion of Cooling Pond Dike incl. seeding, mulching, and rip-rap (Earthwork)	SUB-CONTRACTS
nd sc esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	nd sc esc	Constr. of the Pond Makeup Pumphouse & River Intake structures (Earthwork, Dewater)	

FACILITIES

MIDLAND PLANT PROJECT
SITE RESTORATION STUDY

Exhibit 10

ITEM NO.	ACTIVITY DESCRIPTION	ESTIMATED RESTORATION COSTS AT SPECIFIED RESTORATION DATES ($ x 1,000) 12-1-76	9-1-77	TIME (Years)
1.	Remove Dikes & Fill. Place Pond @ Previous Existing Grade. 3,350,000 CY @ $3/CY = $10,500,000 (Plus $3,000,000 Escalation)	$13,500	$13,500	2
2.	Dispose of Rip-Rap & Sand. Remove Pond Outlet Structure and Underground Utilities. (Included in Item No. 1)	0	0	2
3.	Restore Topsoil in All Areas (807,000 CY @ $6/CY)	4,800	4,800	2
4.	Seed All Areas (1,000 Acres @ $1,000/Acre)	1,000	1,000	2
5.	Restore Trees ($50/Tree x 1,000 Acres x 10 Trees/Acre)	500	500	2
6.	Rebuild Roads (5.5 Miles x $66,000/Mile)	363	363	1 *
7.	Restore 6.0 Miles of Drains (Leave Bullock Creek and Waite-Debolt Drains"As-is") (6.0 Miles x $16,000/Mile)	96	96	2
8.	Remove Railroad Bridge	200	200	1
9.	Remove Access Road Bridge	40	40	1
10.	Fences & Temporary Buildings (Salvage Value = Removal Cost)	0	0	1
11.	Transmission Lines Will Remain	0	0	0
12.	Remove Meteorological Towers	(25)	(25)	1
13.	Remove Structural Concrete to Elevation 604', Assumes On-site Buried Disposal (Leaves 20,000 CY in plate)	26,120	55,360	2-3
14.	Remove River Intake Structure	20	2,770	1
15.	Remove Power Block Backfill (Up to 280,000 CY which remains to be placed from 9-1-76 to 9-1-77) .	276	1,104	2-3
16.	Total	46,890	79,708	3 **
17.	Distributables (15% of Item #16 to cover supervision and other support efforts)	7,033	11,956	
18.	Total of Items 16 & 17	53,923	91,664	
19.	Contingency (10% of Item 18)	5,392	9,166	
20.	Rounding	315	170	
21.	Total Estimated Cost of Restoration	59,000	101,000	

Additional Assumptions:

A. Redredging of Tittabawassee River not Required

B. Salvage Value = Removal Cost for Mechanical Equipment (Pumps, Pipe, Structural Steel, Liner Plate, Etc.)

* After other site restoration

** After contracts are let.