# STONE & WEBSTER MICHIGAN, INC.



P.O. Box 2325, Boston, Massachusetts 02107

United States Nuclear Regulatory Commission Midland Site Resident Office Route 7, Midland, Michigan May 30, 1984 J.O. No. 14358 Ref. MPF 88

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Attention: Mr. B. L. Burgess V DOCKET NO. 50-339/330 MIDLAND PLANT UNIT 1 & 2 INDEPENDENT ASSESSMENT OF UNDERPINNING REPORT NO. 88

A copy of the Independent Assessment of Underpinning Weekly Report No. 88 for the period of May 20, 1984 through May 26, 1984 is enclosed with this letter. Included as attachments are the minutes of the daily meetings held during the week between members of the Assessment Team and Site Engineering, Construction, and Quality Assurance personnel.

If you have any questions with respect to this report please contact me at (617) 589-2067.

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A. Stanley Lucks Project Manager

Enclosures ASL/pd

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# Weekly Report No. 88

May 20, 1984 through May 26, 1984

Personnel on Site

Stone & Webster Michigan, Inc.

Ρ.	Majeski	5/22	-	5/26	
D.	Benvie	5/21	-	5/24	
D.	Zito	5/21	-	5/24	
W.	Kilker	5/20	-	5/22	
L.	Rouen	5/20	-	5/22	

Parsons Brinckerhoff Michigan, Inc.

J.	Oliveira	5/23 -	5/26
В.	Metros	5/20 -	5/22

Meetings Attended

Date				
5/21	-	5/2	25	

# Represented

Stone & Webster Bechtel Consumers Power Parsons

Consumers Power

Stone & Webster

Bechtel

MPOAD

5/25

Document Control Information Meeting

Daily Assessment

Team Meeting

Purpose

# Underpinning and Remedial Soils - Construction

Piers E/W5: The north support steel and the spherical bearing installations were completed in preparation for installation of the grillage beams.

Pier Kc8: The excavation of the pier shaft continued.

Pier E17: The load transfer was completed for the middle portion of the enlarged shaft.

Piers CT 3/10: The installation of the bell reinforcing steel continued.

Pier Kc5: Concrete placement was completed. Installation of the leveling plates began.

Pier W17: No further activity was performed pending fabrication of lagging materials to support the enlarged shaft.

E/W Access Shafts: Excavation and installation of lagging continued.

SWPS: Installation of the upper level wales continued on the north and west sides. Excavation, lagging installation and backpacking continued on the east side.

BWST: Reinforcing steel, formwork installation and concrete placement continued.

Cathodic Protection: Trench excavation and backfilling work continued.

# Assessment Team Observations - Construction

Bell excavation and installation of bell bracing for piers CT 3 and Kc5 was observed by the Assessment Team Sketches showing horizontal and vertical offsets for the bells were made available to the craftsmen at the work locations. These sketches are on effective tool, ensuring that bells are excavated to the proper dimensions. During excavation of the bells, the Contractor was careful to expose small areas of the bells prior to installation of the bracing for both piers. Bracing for each bell side was installed as excavation for each section of the bell was completed. This sequence of excavation and installation of bracing for both bells assured the stability of the in-situ soil.

During mass excavation of the west access shaft, a cor rete spall was found at the corner of the buttress access shaft adjacent to one of the Level C wale bearing plates. The Contractor immediately halted excavation within the access shaft until Engineering had evaluated the impact of the spall on the Level C wales. The Assessment Team believes that the Contractor acted prudently, recognizing the potential impact of the spall on the load-carrying ability of the Level C wales. Once Engineering completed their evaluation of the spall and determined that the Level C wales had not been affected by the spall, excavation was allowed to resume.

The Assessment Team recently expressed concerns relative to the type of backpacking material and method of placement at the SWPS. The Contractor has responded to these concerns by placing clay behind the bottom portion of the lagging which effectively holds the sand backpacking material in place. Additionally, the placement method has been revised to increase the compaction of the installed materials. Based upon observations of the placement method and the backpacking completed to date, the Assessment Team is, in general, satisfied with the revised method.

Subsequent to the completion of the upgrading of the backpacking, surface runoff resulting from a heavy rainfall washed out the backpacking in several areas along the north side of the excavation. The Contractor replaced the backpacking material and installed backfill in the eroded areas near the ground surface. Temporary dikes and sumps were installed to prevent recurrence and plans are underway to upgrade these facilities for longer term usage.

The Assessment Team reviewed a Resident Engineering report describing a recent concrete crack survey of the BWST foundations. No new or enlarged cracks greater than 10 mils were found. Crack patterns are unchanged and there have been no significant changes in crack widths since the last survey conducted

during 1982. The Assessment Team concludes that the survey and report adequately investigated the possibility of new cracking of these structures.

The Assessment Team reviewed a report concerning the March audit of FSO's controlled documents by the FSO Quality Engineering Group. The Assessment Team concluded that FSO is maintaining it's documents in a satisfactory manner.

# Assessment Team Observations QA/QC

NIR # 26 was issued. This nonconformance concerns the closure of two NCR's related to concrete testing procedural deficiencies. The potential for hardware nonconformance was properly dispositioned. However, the Assessment Team believes that the NCRs did not adequately address implementation of corrective action to ensure future testing is properly performed.

The Assessment Team observed the control of grout mix proportions by use of a flow cone and the making of several sets of test cube samples during the grouting of the leveling plates at pier E5. Both were performed in accordance with the procedures. The area to be grouted was kept damp and excess water was removed just prior to placement. The formwork was acceptable and the temperature conditions were checked by the Quality Control Inspector. The Assessment Team verified that the Inspector was properly certified.

The Assessment Team has been following the progress of the upgrading of document control and processing FCR's. Significant progress has been noted in achieving their goals in most areas. However, the Assessment Team believes increased effort is required to finalize the revised methodology for retirement of "onetime deviations" FCR's.

#### Work Activity Packages

The following Work Activity Package (WAP) overviews are in the open response stage or have been completed during the past week.

WAP No.	Title	Status
		(Opened) (Closed)
86	Support Brackets for Kc5.89, Kc6 and Kc7 Turbine Building	5/18/84

# Nonconformance Identification Reports

The following Nonconformance Reports (NIRs) remain open or have been closed during the week.

NIR No.

Description

Status

(Opened) (Closed)

26

Closure of Procedural 5/. Deficiencies

5/25/84

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# Open Items

Items discussed during meetings are categorized as follows:

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OPEN ITEM - An item for which an action is required. The item will remain open until the required action has been taken. Tracking is required.

CLOSED ITEM - An item, usually brought forward by the Assessment Team that is discussed and adequately responded to. No tracking is required.

INFORMATION ITEM - An item brought forward to provide general background information regarding work, such as work status or an upcoming design change. No tracking is required.

OPINION ITEM - An opinion or suggestion given by the Assessment Team expressing an alternate construction or quality assurance technique. The opinion or suggestion is given as a possible alternate that may facilitate an operation.

CLOSES ITEM -XX-XX - This notation identifies an action that closes a previously identified open item. Tracking of the open item stops.

The following listing of all Open items from the Daily Meeting Notes with Bechtel and the text of the Weekly Reports. Carry-over items from past weeks which have been Closed this week are also listed.

Item No.	Description	Closure
64-10	Trend Analysis	Open
71-17	Computerized Civil Drawing Register	Open
74-21	US Testing Corrective Action	Open
79-28	SWPS Backpacking Material	88-6
79-34	SWPS Backpacking Placement	88-6
81-21	BOP Construction Verification of Soils Work	88-13
82-9	Trend Analysis	Open
86-4	Auxiliary Building Crackmapping	88-7
86-16	Vibration of BWST Concrete	Open

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Item No.	Description	Closure
87-5	Implementation of the QAP Task Force Recommendations	Open
87-10	Reverification of Previously Mapped Cracks at the BWSTs	88-8
87-15	Excavation Conveyors at the SWPS	88-10
87-24	Control Tower Instrumentation Reading	88-9
88-24	FSO Quality Engineering Group Controlled Document Audit	Open
88-25	Documentation of Buttress Access Shaft Spall Repair	Open
88-26	NCR Dispositon of a Concrete Air Entrainment Deficiency	Open

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Held at Midland Site Midland, Michigan May 21, 1984

Present For:

Consumers Power

G. Murray

J.	Fisher
J.	
0.	Kelleher
Ε.	Cvikl

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MPQAD		Stone & Webste		
J.	J. McMaster		Benvie Zito	
		W.	Kilker	

L. Rouen

Parsons Brinckerhoff B. Metros

#### PURPOSE

This meeting is held each day to discuss items regarding the Independent Soils Assessment at the Midland Plant, Units 1 & 2.

#### DISCUSSION

Status Items

Item 88-1 - Auxiliary Building Underpinning Activities.

Excavation of the shafts to subgrade and installation of the concrete mudmats was completed for piers CT 3/10.

Placement of concrete for piers E/W5 and grouting of the E5 lower leveling plate was completed.

Excavation of the boll and placement of the bell mudmat was completed for pier Kc5.

Excavation for pier Kc8 is in progress.

Installation of the upper and lower leveling and bearing plates for pier E17 was completed.

(INFORMATION ITEM)

Item 88-2 - SWPS Underpinning Activities.

J. Fisher reported that excavation of the SWPS east access shaft will be completed this week allowing installation of the lower level wales to begin. Excavation of the drop pit to pier No. 1 is scheduled to begin in mid-June. (INFORMATION ITEM)

New Items

Held at Midland Site Midland , Michigan May 21, 1984

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# Item 88-3 - West Buttress Access Shaft Concrete Spall.

J. Fisher reported that mass excavation in the west access shaft has been halted until Engineering has completed their investigation of the concrete spall at the corner of the west buttress access shaft wall adjacent to the Level C Wale bearing plate. E. Cvikl stated that Engineering is presently reviewing the wale construction sequence for possible influence on development of the crack. The Assessment Team requested that Resident Engineering provide the results of their investigation once it is completed. (OPEN ITEM)

# Item 88-4 - E/W8 Grillage Interference.

J. Fisher reported that removal of approximately 6 in. from the top of the concrete mudmats placed between the E/W5 piers and the containment drop pits will be required to allow installation of the grillages. (INFORMATION ITEM)

Item 88-5 - HVAC Foundation Pad.

J. Fisher reported that excavation to allow construction of the HVAC foundation pads adjacent to the Unit 2 containment will begin today. (INFORMATION ITEM)

#### Response Items

# Item 88-6 - SWPS Backpacking Material and Placement.

The Assessment Team has monitored the Contractor's recent activity related to backpacking techniques and material modifications for the SWPS east access shaft. The Assessment Team had expressed concern with the method and type of backpacking originally being used. In response to this concern, the Contractor modified the backpacking installation which included the placement of clay beneath the bottom of each lagging piece. This has proved effective in maintaining the soil installed in the remaining area of the lagging inplace. Additionally, the level of effort implemented to tamp the backpacking in-place has been satisfactory in maintaining contact between the lagging and in-situ soil. The uniform methodology being implemented by the craftspeople has resulted in a consistently acceptable installation. Based on the quality of the backpacking performed since implementation of these modifications, the Assessment Team believes that adequate bearing between the lagging and in-situ soil is being achieved , ensuring the overall stability of the excavation. The Assessment Team will continue to monitor the adequacy of the backpacking. (CLOSES ITEMS 79-28 and 79-34)

# Item 88-7 - Auxiliary Building Crackmapping.

J. McMaster provided the Assessment Team with a copy of the results of the MPQAD review of the recent crack mapping of the Auxiliary Building. The crack mapping was conducted after initial jacking of the CT 1/12 piers. Based on a review of the crackmapping Subcontractor's documentation and field activity associated with the mapping of 2000 cracks only two NCRs were issued. One was issued because of a failure by the Subcontractor to mark and record the

Held at Midland Site Midland. Michigan May 21, 1984

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elongation of one crack. The other NCR was written due to a missing signature on a data sheet. The Assessment Team believes these results demonstrate effective implementation of the crack monitoring program. (CLOSES ITEM 86-4)

Item 88-8 - Reverification of Previously Mapped Cracks at the BWSTs.

E. Cvikl provided the Assessment Team with a copy of an engineering report detailing the results of a reverification crack survey conducted at the existing BWST ring walls. No new cracks having widths of 10 mils or greater were found. (CLOSES ITEM 87-10)

# Item 88-9 - Control Tower Instrumentation Readings.

E. Cvikl provided the Assessment Team with a **copy** of instrumentation data associated with reserve capacity load (RCL) jacking at piers CT 1/12. Absolute and relative movement of the Control Tower was minimal during the RCL jacking of piers CT 1/12. (CLOSES ITEM 87-24)

# Item 88-10 - Excavation Conveyor at the SWPS.

J. Fisher provided the Assessment Team with the manufacturer's technical data for set up of the conveyor system at the SWPS. The conveyor presently is elevated greater than the manufacturers specified angle of  $25^{\circ}-35^{\circ}$ . To assure proper transport of excavated soil on the conveyor, side guards will be added as required to prevent rollback of soil down the conveyor. (CLOSES ITEM 87-15)

Held at Midland Site Midland , Michigan May 22, 1984

#### Present For:

Consumers Power	Bechtel	MPQAD	Stone & Webster
G. Murray	J. Fisher J. Kelleher E. Cvikl P. Goguen	None	D. Benvie D. Zito W. Kilker L. Rouen

Parsons Brinckerhoff

B. Metros

#### PURPOSE

This meeting is held each day to discuss items regarding the Independent Soils Assessment at the Midland Plant, Units 1 & 2.

#### DISCUSSION

Status Items

Item 88-11 - Auxiliary Building Underpinning Activities.

Bell excavation for piers CT 3/10 is in progress.

Reinforcing steel installation for pier Kc5 is in progress.

Excavation of the west access shaft to El. 591.5' has begun.

(INFORMATION ITEM)

## Item 88-12 - Vibration of BWST Concrete.

F. Goguen discussed modifications which will be implemented to ensure proper vibration of concrete in areas of heavy reinforcing steel congestion. Reinforcing steel will be bundled to allow passage of a pencil vibrator into congested areas. Additionally, a pea gravel concrete mix with a 5-6 inch slump will be used to ensure full penetration of the concrete into the congested areas. The Assessment Team will monitor implementation of these modifications for their effectiveness on upcoming concrete placements. (Item 86-16 remains OPEN) (INFORMATION ITEM)

#### New Items

No new items were discussed.

# Response Items

Held at Midland Site Midland , Michigan May 22, 1984

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Item 88-13 - BOP Construction Verification of Soils Work.

J. Fisher provided the Assessment Team with guidelines which will be implemented when Balance of Plant (BOP) construction verification is required related to Remedial Soils work. The FSO field engineer responsible for a particular work activity shall notify the appropriate Area and System Teams when BOP verification is required. The BOP Area and System Teams will in turn arrange for the necessary interface with MPQAD. All FSO field engineers have been provided with these guidelines and are familiar with those work activities which require BOP verification. The Assessment Team believes that these guidelines will adequately ensure BOP construction verification of Remedial Soils work as required. (CLOSES ITEM 81-21)

Held at Midland Site Midland , Michigan May 23, 1984

Present For:

Consumers Power	Bech	ntel	MPG	AD	Sto	one & Webster
J. Schaub		Fisher Kelleher Cvikl Brandes		McMaster Sevo	D. D. P.	Benvie Zito Majeski
					Par	sons Brinckerhoff
					J.	Oliveira

### PURPOSE

This meeting is held each day to discuss items regarding the Independent Soils Assessment at the Midland Plant, Units 1 & 2.

#### DISCUSSION

### Status Items

Item 88-14 - Auxiliary Building Underpinning Activities.

Installation of the jacks and jackstands for the middle portion of the enlarged E17 pier was completed.

Installation of the upper leveling plates at the jack location closest to the containments was completed for the E/W5 grillages.

Installation of reinforcing steel was completed for pier Kc5.

(INFORMATION ITEM)

Item 88-15 - SWPS Underpinning Activities.

J. Fisher reported that backpacking had been eroded from behind the lagging in several areas yesterday as a result of the heavy rainfall. Additionally, the in-situ soils were eroded from behind the wall in limited areas, particularly along the east end of the north wall. FSO will meet with the SWPS underpinning Subcontractor later today to decide on a course of action for repair of these eroded areas. (INFORMATION ITEM)

### New Item

Item 88-16 - Control of Surface Drainage at the SWPS.

P. Majeski requested FSO to provide details for future control of surface drainage in the vicinity of the SWPS to prevent reoccurrence of erosion problems experienced during yesterdays rainfall. J. Fisher will respond. (OPEN ITEM)

Held at Midland Site Midland, Michigan May 23, 1984

# Item 88-17 - Verification of Survey Layout.

J. Oliveira noted that an NCR had been written because 11 expansion anchors for the middle upper leveling plate at the E5 grillage were incorrectly located. The NCR disposition requires that , these expansion anchors be reinstalled in their correct locations. Mr. Oliveira asked if the "survey loop" is closed during the initial layout process in order to verify correct layout of a construction activity. J. Fisher will respond. (OPEN ITEM)

Item 88-18 - FSO Controlled Document Review.

J. Fisher stated that the monthly review of the FSO controlled documents for May was completed. The results of the review will be made available to the Assessment Team tomorrow. (INFORMATION ITEM)

Item 88-19 - Drift Invert Concrete.

D. Zito noted that a small portion of the concrete face for the Kc3 to Kc4 drift invert had broken off in the vicinity of the W5 pier where soil had been excavated from beneath the drift invert. The break occurred along the flange of a steel reshore member embedded in the drift concrete. Mr. Zito asked if provisions have been made to prevent this condition from occurring in other drift invert areas. J. Fisher will respond. (OPEN ITEM)

## Response Item

Item 88-20 - West Buttress Access Shaft Concrete Spall.

E. Cvikl reported that engineering has completed their evaluation of the concrete spall at the corner of the west buttress access shaft wall. The space which is adjacent to the level C wale bearing plate is superficial. extending back only to the first layer of reinforcing steel. After reviewing the construction sequence associated with the level C wale installation, it is thought that preheating of the wales and/or the bearing plates in the vicinity of the buttress access shaft may have contributed to the spalling. It is not believed that this spalling has decreased the load carrying ability of the wales. In order to verify this, the tension of the bearing plate bolts will be checked. If the actual bolt torque agrees with the design torque, this indicates that the ability of the spalled area of the wall to parry the normal load from the wales has not been diminished. Excavation in the west access shaft will then be allowed to resume. Repair of the spalled area will be accomplished in the future. (CLOSES ITEM 88-3)

Held at Midland Site Midland, Michigan May 24, 1984

Present For:

Consumers Power

G. Murray

J. Fisher J. Kalleher E. Cvikl J. Givens

Bechtel

MPQAD J. McMaster

R. Sevo

Stone & Webster

D. Benvie

D. Zito

D. Madaal

P. Majeski

Parsons Brinckerhoff

J. Oliveira

#### PURPOSE

This meeting is held each day to discuss items regarding the Independent Soils Assessment at the Midland Plant, Units 1 & 2.

DISCUSSION

Status Items

Item 88-21 - Auxiliary Building Underpinning Activities.

Concrete placement was completed for pier Kc5.

Load transfer for the middle portion of the enlarged E17 pier is scheduled for today.

(INFORMATION ITEM)

Item 88-22 - SWPS Underpinning Activities.

J. Givens discussed rework of backpacking in areas behind the soldier pile wall which had been eroded during the heavy rainfall on 5/22/84. All areas where backpacking and in-situ soil have been eroded will be reworked. Eroded areas of the in-situ soil which are accessible behind the wall will be filled in with sand placed from the top of the wall. All other eroded areas will be filled in with sand placed between the lagging pieces. All new material will be tamped into place to ensure complete filling of the voids created during the erosion process. In conjunction with filling the voids behind the soldier pile wall, backpacking directly behind and between the lagging will be accomplished with clay and sand as before. (INFORMATION ITEM)

### New Items

Item 88-23 - Central Document Control Deficiency Notification.

P. Majeski asked when deficiencies are found during review of the FSO controlled documents are these findings conveyed to the Central Document Control. J. Fisher stated that any deficiencies discovered during periodic reviews of their controlled documents are forwarded to the Central Document Control for resolution if the deficiencies involve changes to the original document. Such deficiencies include errors with the controlled document register or a missing R stamp. (CLOSED ITEM)

Held at Midland Site Midland, Michigan May 24, 1984

Item 88-24 - FSO Quality Engineering Group Controlled Document Audit.

P. Majeski noted that as a result of the FSO controlled document review performed by FSO Quality Engineering group it was recommended that a more diligent effort is needed in replacing illegible and torn drawings. Mr. Majeski asked what action has or will be taken by FSO to address this recommendation. (OPEN ITEM)

Item 88-25 - Documentation of Buttress Access Shaft Spall Repair.

D. Zito asked what method is used to document the conditions and remedial measures contained in the Safety Concern Evaluation Report written due to concrete spalling on the Buttress Access Shaft wall. It was noted that the buttress access shaft is a non Q structure and therefore an NCR is not required. E. Cvikl will determine what documentation is used to document the contents of the Safety Concern Evaluation Report. (OPEN ITEM)

Item 88-26 - NCR Disposition for Concrete Air Entrainment Deficiency.

It was noted that an NCR written because a concrete air entrainment test taken during concrete placement at pier W5 was not performed at the point of placement, but rather at the back of the concrete truck J. Oliveira said the NCR disposition adequately addressed the hardware issue associated with the testing and the air entrainment test results were acceptable. However, the NCR did not address implementation of corrective action to ensure future testing is performed properly. Mr. Oliveira requested that this concern be addressed. MPQAD will respond. (OPEN ITEM)

# Item 88-27 - SWPS Instrumentation Data.

E. Cvikl provided the Assessment Team with a copy of instrumentation data readings taken before, during and after filling of the SWPS bays. A review of the data indicates that absolute downward movement of the SWPS was minimal varying from 0.01 in. at the north end of the structure to 0.04 in. at the south end. (INFORMATION ITEM)

# Response Items

Item 88-28 - Drift Invert Concrete.

J. Kelleher responded to the Assessment Team question concerning cracking of the drift invert concrete. The cracks resulted from loads applied to the invert. There may still be some localized areas where soil excavation beneath drift inverts will leave the concrete unsupported but it is not anticipated that the loads in other drift invert areas will be applied as was the case near pier W5. (CLOSES ITEM 88-19)

Held at Midland Site Midland, Michigan May 24, 1984

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Item 88-29 - Verification of Survey Layout.

J. Fisher responded to the Assessment Team question concerning verification of the survey layout for the expansion anchors at the E5 grillage Y-jack location. Initially, control points are laid out in a closed loop verifying correct location of the control points. Control points, in turn, serve as reference markers for layout of such items as these expansion anchors. Contrary to normal practice, in this particular case the anchor locations were not adequately checked with respect to the control point reference locations. (CLOSES ITEM 88-17)

Held at Midland Site Midland, Michigan May 25, 1984

# Present For:

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Cor	nsumers Power	Beck	htel	MPG	AD	Stone & Webster
G.	Murray		Fisher Kelleher Cvikl		McMaster Sevo	P. Majeski Parsons Brinckerhoff
						J. Oliveira

## PURPOSE

This meeting is held each day to discuss items regarding the Independent Soil Assessment at the Midland Plant, Units 1 & 2.

# DISCUSSION

Status Items

Item 88-30 - Auxiliary Building Underpinning Activities.

The mud mats for piers CT/3 and CT/10 will be placed today.

The loose concrete in the spall area on the corner of the West Buttress Access Shaft will be removed to eliminate a potential safety hazard. (INFORMATION ITEM)

Item 88-31 - SWPS Underpinning Activities.

The backpacking required to repair those areas washed out during the heavy rainfall this week has been completed. (INFORMATION ITEM)

New Items

There were no new items discussed.

#### Response Items

Item 88-32 - Control of Surface Drainage at the SWPS.

J. Fisher provided the Assessment Team with a sketch showing the proposed method to prevent flow of surface runoff into the SWPS Access Shaft. The Assessment Team is satisfied that the proposed berms and sumps will prevent flow into the Access Shaft in the future. (CLOSES ITEM 88-16)

Item 88-33 - NCR Disposition for Concrete Air Entrainment Deficiency.

J. McMaster indicated that since the hardware nonconformance was properly dispositioned and the individual responsible for the concrete testing is now aware of procedural requirements, it is not necessary to reopen the NCR or write a QAR. P. Majeski acknowledged the response but stated that the item will remain open pending evaluation. (Item 88-26 remains OPEN) (CLOSED ITEM)