1 of 1

SM # 19

SEP - 6 1994

15

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 602984

2. To: (Receiving Organization) Technical Safety, K Basins Engineering	3. From: (Originating Organization) Technical Safety, K Basins Engineering	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: K Basins Engineering, Spent Nuclear Fuel Project	6. Cog. Engr.: E. N. Dodd, Jr.	7. Purchase Order No.: N/A
8. Originator Remarks: This documents the procedure to be used by Surveillance Systems Engineering to perform sludge depth measurements in the KW Sandfilter Backwash Pit.		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: KW Basin
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
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15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
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1	WHC-SD-WM-PROC-014	N/A	0	KW Basin Backwash Pit Sludge Measurement/Video	S	1	1	1

16. KEY											
Impact Level (F)		Reason for Transmittal (G)				Disposition (H) & (I)					
1, 2, 3, or 4 (see MRP 5.43)		1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)				1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged					
(G)	(H)	17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)						(G)	(H)		
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
1	1	Cog. Eng. E.N. Dodd, Jr.	<i>E.N. Dodd</i>	6/7/94	X0-36	J.P. Schmidt	<i>J.P. Schmidt</i>	6/9/94	X3-73	3	4
1	1	Cog. Mgr. C.L. Bennett	<i>C.L. Bennett</i>	6/7/94	X0-36	T.J. Ruane	<i>T.J. Ruane</i>	6/8/94		1	1
		QA									
1	1	Safety J.C. Hamrick	<i>J.C. Hamrick</i>	6/7/94	X0-226						
		Env.									
1	1	D.B. Smet	<i>D.B. Smet</i>	6-8-94	X5-52						
1	1	G.G. Lewis	<i>G.G. Lewis</i>	6/13/94	X3-60						
18. Signature of EDT Originator		19. Authorized Representative for Receiving Organization		20. Cognizant/Project Engineer's Manager		21. DOE APPROVAL (if required) Ltr. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments					
<i>E.N. Dodd, Jr.</i> 6/13/94		<i>R. H. Spieker for C.L. Bennett</i> 6/31/94		<i>C.L. Bennett</i> 6/13/94							

RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-PROC-014, REV 0

Document Title: KW BASIN BACKWASH PIT SLUDGE MEASUREMENT/VIDEO

Release Date: 9/1/94

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This document was reviewed following the
procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

* * * * *

WHC Information Release Administration Specialist:

Kara Broz

(Signature)

9/1/94

(Date)

MASTER

SUPPORTING DOCUMENT		1. Total Pages 13
2. Title KW Basin Backwash Pit Sludge Measurement/Video		3. Number WHC-SD-WM-PROC-014
		4. Rev No. 0
5. Key Words K-West, Sandfilter Backwash Pit, Depth Measurements, SFBWP, Sludge Depth, Transfer Channel, Video Record <i>KMB 9/1/94</i>		6. Author Name: E. N. Dodd, Jr. <i>E. N. Dodd, Jr.</i> Signature Organization/Charge Code 2A340/KK4LP
APPROVED FOR PUBLIC RELEASE		
7. Abstract N/A		
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MASTER

DT

KW BASIN SANDFILTER BACKWASH PIT SLUDGE MEASUREMENT/VIDEO

Obtain shift manager's (SM) signature and date for authorization to proceed with this inspection.

Signature, Shift Manager

Date

Scheduling Information:

This procedure shall be scheduled as required.

Health physics technician (HPT) support required during performance of this procedure.

Equipment location: 105-KW basin sandfilter backwash pit (SFBWP)

Introduction:

The purpose of this procedure is to gather visual and depth information and monitor underwater activities in the 105-KW SFBWP and transfer channel. Profile lighting (the use of lighting and shadows to show the surface contour) will be used to assess the contour of the sludge surface. Select measurements will also be taken to determine the actual sludge depth.

The person-in-charge (PIC) will determine if additional measurements are necessary.

The control/video station will be setup outside the radiation area or in lowest possible exposure area to reduce personnel exposure (ALARA).

This procedure is to provide a mechanism to assist in fully characterizing the volume and surface topology of the sludge currently deposited in the sandfilter backwash pit (SFBWP). Surveillance Systems Engineering (SSE) personnel will gather visual information utilizing a closed circuit television (CCTV) color camera, mounted to stainless steel extension poles. Connections allow the camera to be connected with a pan and tilt to allow better positioning capabilities and to get good landscape profiling of the sediment surface. The information will be videotaped to a one-half inch NTSC or Y/C format. Underwater lighting will be accomplished by means of 500 watt underwater lamps.

During the performance of this procedure different locations, angles, depths, and lighting schemes will be utilized, as directed by the field lead, to provide maximum information. The grid pattern shown in the procedure will be utilized as much as practical.

Depth measurements will be accomplished using the camera in conjunction with a 30 inch scale attached to stainless steel extension poles by metal clamps. The stainless steel poles are screwed-in sections connected to provide the required total length. They are hollow with a solid metal core at the screw fitting to prevent radiation "shine" up the shaft. They are marked to show one inch increments and are standard equipment for this type of work. The steel scale is approximately one inch by one-half inch and is equipped with a knife edge to allow for easy intrusion into the sludge. The scale is incremented to one-quarter of an inch. The underwater video camera will be used to place and monitor the scale. One-half inch resolution is the goal of the depth measurements. The purpose of the scale is to minimize the intrusion into the sediment while maximizing the accuracy of the depth measurement.

Although the scale can be placed only in locations where a straight shot exists from the water surface to the sediment layer, some ability exists to reach and see beneath pit obstructions with the camera. This ability combined with depth measurement data should allow a full characterization of sludge volume.

The current operators have a lot of experience with sediment observation on the Hanford site and will exercise caution during measurements to minimize sediment disturbance. If clarity problems develop, time will be taken to allow the sediment to settle out as determined by the field lead.

A reference point will be established at or above the surface of the pit to aid in the mapping effort. This will enable the performers of the procedure to establish whether or not there is unevenness in the floor of the pit or if they are getting full penetration of the sediment layer in all areas of the pit. A string or wire may be extended from the reference point selected to allow easier measurements.

At this time it is planned that multiple measurements will be taken at selected accessible locations. Data will be recorded on all measurements independent of the video record which will also document all measurement activities. Included with the depth measurement data will be data to tie the measurement to a known physical reference point out of the pit. SSE personnel will also be verifying that as-built SFBWP dimensions match those shown on reference drawings.

Safety harnesses or other fall protection will be required for all personnel taking measurement data. Any scaffolding used will have handrails. A pre-job briefing will address fall hazards and protection. Personnel access into the pit, other than by handrailed scaffolding will be prohibited.

A radiation work permit (RWP) has been written for this activity. A pre-job briefing is required by the RWP.

References:

WHC-CM-1-6, WHC Radiological Control Manual
WHC-CM-4-3, Industrial Safety Manual
H-1-21072

Special Tools, Equipment and Supplies:

1. CCTV color camera
2. 30 feet of SS-poles connected as required
3. 500 watt ROS underwater lights
4. Camera control unit (CCU)
5. Communication equipment
6. Coaxial cable
7. VHS recorder, monitor, hand microphone and video tapes
8. Safety harness
9. Video character generator
10. Measurement device
11. Lanyards and clamps
12. Filtered water as required to rinse equipment (approximately 5 gallons per equipment exit from the basin).
13. Radioactive contamination container for gloves
14. Scaffolding and railings.

Prerequisites:

1. Comply with all RWP requirements. RWP Number L-548
2. Verify all equipment has been transported to the examination staging area.
3. Notify the Shift Manager prior to starting work.
4. Notify HP group at least one week prior to start of work for preparation of RWP.
5. Verify at least 24 hours in advance of work that HPT support is available on request.

6. Set up radioactive contamination container at the work area for disposal of contaminated gloves, etc.
7. Assign a field lead at the beginning of each day of work.
8. Perform a pre-job safety meeting including discussion of RWP requirements. Document the meeting on a completion roster. Field lead will supervise the meeting.
9. Verify that scaffolding has been erected and railings installed.

A. Equipment Setup

1. Set up control station outside of radiation area or in a low exposure area.
2. Secure camera and lighting equipment to pole.
3. Perform a function test of all equipment prior to entering the radiation area.
4. Route cabling to the backwash pit for performance of the test.
5. Lay out the backwash pit and transfer channel (Figure 2) with a grid pattern which corresponds to Figure 1.
6. Label video tape with the following:
 - a. Date.
 - b. Project name and file number.
 - c. Location.

B. Video of Sludge Surface Profile

```
*****
*
*
*
*      WARNING
*
*
*      THE TWO MAN RULE IS IN EFFECT DURING
*
*
*      PERFORMANCE OF THIS PROCEDURE
*
*****
```


1. Ensure all control cabling is clear of obstacles and is manageable.
2. Verify the camera pole handler is wearing a safety harness or applicable safety precautions have been taken to prevent falling into the backwash pit.
3. Adjust the camera lighting, focus and iris using the CCU.

```
*****  
*                                     *  
*                                     *  
*          WARNING                  *  
*                                     *  
* DO NOT ALLOW EQUIPMENT TO PENETRATE *  
*                                     *  
* THE SETTLED SLUDGE LAYER           *  
*                                     *  
*****
```

4. Place equipment into the pit using lanyards, as required, to prevent dropping into pit.
5. Adjust the camera video monitor when the system is in place in the water.
6. Set VCR to record, announce date, project name and number, and location on audio portion of the tape or engaging video overlay for same.
7. Adjust camera video monitor, lighting, focus and iris as required.
8. Visually check to see that all control station equipment is functioning.
9. Perform underwater resolution check with a 1/32 inch black line on an 18 percent neutral gray background at a distance of approximately two feet.
10. Position the camera and lighting immediately above the sludge surface at a location selected by the field lead, and adjust lighting as required for the best profiling. Utilize additional lighting as required.
11. Record camera and lighting grid locations (see Figure 1) on the audio portion of the tape or engaging video overlay for same.

**
**
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**
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**
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WARNING
HPT MUST BE PRESENT BEFORE ANY
EQUIPMENT CAN BE REMOVED FROM THE
BASIN.

12. If camera equipment adjustments are necessary or a problem arises, stop the examination until the problem is solved.

- a. **HOLD POINT:** HPT shall be present for removal of material from the basin water to perform dose rate and contamination surveys. HPT initial/date is required below if any material is removed from basin water.

Health Physics Technician Initial/Date					
/	/	/	/	/	/
/	/	/	/	/	/

- b. Equipment removed from the basin should be rinsed with filtered water when possible as directed by the HPT.
13. Manipulate the camera around the pit as designated by the field lead to get a complete picture of the backwash pit sludge profile. Record grid locations on tape.
14. Turn all equipment off and record any required documentation.

C. Sludge Measurement

NOTE: Perform the following after review of the profile lighting video and assessments have been made by the PIC to determine where actual sludge depth measurements will be taken. (Measurements will be taken as close to the center of each grid rectangle as possible, barring as-built obstructions.)

1. Shift Manager authorization required prior to proceeding with this section.

Signature, Shift Manager

Date

2. Specific locations for depth measurements are as noted on Figure 1 map. Deviations from these locations and/or additional measurement locations must be approved by the PIC and concurred with by the Technical Safety manager, and so noted on Figure 1.
3. Attach a measurement device to the camera pole, or an additional pole as required.

4. Layout the backwash pit with a grid pattern which corresponds to Figure 1.
5. Establish a reference point at or above the surface of the pit to aid in the mapping and measurement efforts.

```

*****
*                                     *
*                                     *
*          CAUTION                   *
*                                     *
*   Minimize disturbance of the sludge   *
*                                     *
*   during the measurement.             *
*                                     *
*****

```

6. Carefully lower the measurement device at the designated location until it just reaches the top of the sludge layer. Observe and record the distance in relation to the established pit reference point. Record the distance in Table 1.
7. Carefully insert measurement device through sludge at selected locations until contact is made with bottom of pit. Observe and record sludge depth with video camera and recording equipment.
8. Record the grid location on the video for each of the depth measurements taken on the audio portion of the video or with an encoding unit.
9. Observe and record the distance to the pit bottom in relation to the established reference point. Record this distance in Table 2.
10. If equipment adjustments are necessary or a problem arises, stop the examination until the problem is solved.
 - a. **HP HOLD POINT:** HPT shall be present for removal of material from the basin water to perform dose rate and contamination surveys. HPT initial/date is required below if any material is removed from basin water.

Health Physics Technician Initial/Date					
/	/	/	/	/	/
/	/	/	/	/	/

- b. Equipment removed from the basin should be rinsed with filtered water when possible as directed by the HPT.

11. Record depth measurements in Table 3, either during performance of the survey or during a later review of the tape.
12. Calculate differences between Table 1 and Table 2 measurements and record in Table 4.
13. Take duplicate measurements at grid locations A3, B1, C5, and F4. Record the observed sludge depth measurements below.

Grid Location	Depth Measurement		
	Top	Bottom	Video
A3			
B1			
C5			
F4			

13. Turn all equipment off and record any required documentation.

Table 1. TOP OF SLUDGE MEASUREMENTS

	1	2	3	4	5
A					
B					
C					
D					
E					
F					
G					

Table 2. BOTTOM OF SLUDGE MEASUREMENTS

	1	2	3	4	5
A					
B					
C					
D					
E					
F					
G					

Table 3. VIDEO DEPTH MEASUREMENTS

	1	2	3	4	5
A					
B					
C					
D					
E					
F					
G					

Table 4. TABLE 1/TABLE2 DEPTH DIFFERENCES

	1	2	3	4	5
A					
B					
C					
D					
E					
F					
G					

D. Completion and Notification

1. **HP HOLD POINT:** HPT shall be present for removal of any material from below the basin water surface. The HPT shall perform dose rate and contamination surveys. HPT initial/date required to verify material was surveyed. If no material was removed from the basin, the HPT shall verify this by initialing the appropriate line below. Check one:

HPT Initial/Date

a.	Completion of section B.		
	Equipment removed and surveyed	<u> </u> / <u> </u> / <u> </u>	<u> </u> / <u> </u>
	No equipment removed	<u> </u> / <u> </u> / <u> </u>	<u> </u> / <u> </u>
b.	Completion of section C.		
	Equipment removed and surveyed	<u> </u> / <u> </u> / <u> </u>	<u> </u> / <u> </u>
	No equipment removed	<u> </u> / <u> </u> / <u> </u>	<u> </u> / <u> </u>
2. Withdraw all equipment, as required, from the basin. Equipment removed from the basin should be rinsed with filtered water when possible as directed by the HPT.
3. Have HPT survey equipment prior to removing from established surface contamination area (SCA).
4. Decontaminate and stage equipment per HPT direction in accordance with RWP instructions.
5. Notify the Shift Manager, HP supervisor, 105-KW building supervisor and the SSE manager that the job has been completed. The KW basin supervisor shall notify the K Basins manager, when the job is complete.
6. Store the original copies of the video tapes in the SSE video library.

K WEST BACKWASH PIT MEASUREMENT SCHEMATIC

Figure 1

N_____

AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
301/587-8202

Centimeter

Inches

MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

**DATE
FILMED**

6 / 14 / 95

END