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Video Requirements Plan for the HMT Equipment
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January 31, 1995

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V.L. Birkland

January 31, 1995

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7. Abstract This document is a plan that describes the video camera requirements for the Equipment Removal System at SY-101. The video configurations described are those required for the removal of the existing SY-101 HMT mixer pump, and the installation of a spare pump.		
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VIDEO REQUIREMENTS PLAN FOR THE HMT EQUIPMENT REMOVAL SYSTEM

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ACRONYMS AND ABBREVIATIONS

BCSR	Boeing Computer Services Richland
CTF	Cold Test Facility
DACS	Data Acquisition and Control System
DOE	United States Department of Energy
ERS	Equipment Removal System
HMT	Hydrogen Mitigation Test
ME	Mitigation Equipment
NTSC	National Television Systems Committee
OTP	Operational Test Plan
PIC	Person-In-Charge
SSE	Surveillance System Engineering
SPC	Scheduling and Production Control
SMPTE	Society of Motion Picture and Television Engineers
S-VHS	Super Video Home System
TFB	Tank Farm Boundary
TS	Technical Support
VIS	BCSR Visualization Services

VIDEO REQUIREMENTS PLAN FOR THE HMT EQUIPMENT REMOVAL SYSTEM

1.0 INTRODUCTION

This document is the plan defining the video coverage requirements for the equipment removal event of the Hydrogen Mitigation Test (HMT) mixer pump currently installed in high level nuclear waste storage tank 241-SY-101. When the mixer pump fails the removal and installation of a spare pump will be a time critical event. Since the success of the HMT mixer pump has resolved the DOE safety issue it is absolutely essential that mixing be restored to the tank in a short as time possible. Therefore, the removal of the failed pump and the installation of the spare pump must be anticipated and planned well in advance. The removal, containment, transporting, and storage of the failed pump is a very complex and hazardous task. The successful completion of this task will require careful planning and monitoring. Certain events, during the removal and subsequent installation of the new pump, will require video observation and storage for safety, documenting, training, and promotional use. Furthermore, certain events will require close monitoring and observation by the event directors and key supervisory personnel for the execution of specific tasks during the equipment removal event.

2.0 SCOPE

The video system shall be composed of the following major components:

- two (2) video camera(s) located in the pit containment tent featuring pan(P), tilt(T), zoom(Z), color, and remote operation capability;
- two (2) video camera(s) located outside the of the tank farm boundary (TFB) for overall TFB observation featuring pan(P), tilt(T), zoom(Z), color, and remote operation capability;
- one (1) video camera located in the instrumentation tent, located East of the DACS trailer, outside of the SY tank farm North fence, featuring pan(P), tilt(T), zoom(Z), color, and remote operation capability;
- one (1) video camera located in the column cut-off area (South end of the tank farm) featuring pan(P), tilt(T), zoom(Z) and color capability and will be operated manually by a video cameraman;
- two (2) independent video switching networks;
- one (1) Person-in-charge (PIC) station video monitor located South of the North fence of the SY tank farm;
- a wireless communication system consisting of a base station and five (5) additional headsets;
- one (1) video SMPTE time code signal generator;

- three (3) video in-tank camera(s)(existing);
- associated cables, connectors, and ancillary equipment to support fielding of the camera(s);
- eight (8) separate Super VHS (S-VHS) format recorders;
- protection covers for all the cable runs;
- two (2) 10' x 10' tank farm compatible tents or equivalent protective enclosures; one (1) tent shall be located at the PIC station to contain the PIC video monitor, support table, and chair; one (1) tent shall be located East of the DACS trailer, outside of the SY tank farm, to contain the data logger instrument enclosure and computer, the remote crane digital readout display, the four (4) gamma detector remote digital displays, the instrumentation video back-up camera, support table, and chair (See Figure 2);
- documentation to include all equipment list(s), design documentation, operators manual, inventory list(s), spare parts list(s), maintenance documentation, status reports, training coordination, and any other documentation deemed necessary to support the ERS for the removal/installation of the HMT mixer pump.

3.0 TECHNICAL REQUIREMENTS

3.1 FUNCTIONAL

The ERS video system shall have the capability to provide all the video requirements in support of the removal of the existing HMT mixer pump and the re-installation of the spare mixer pump. These requirements and responsibilities will be as defined in this document.

3.2 HARDWARE

3.2.1 IN-TENT AND INSTRUMENTATION CAMERAS

Two (2) S-VHS video camera(s) will be located in the pit containment tent. One camera will be located in the Northeast corner of the tent. The other camera will be located directly East of riser 12A. See FIGURE 1. These cameras will feature pan(P), tilt(T), zoom(Z), color, and remote operation capability. Additionally, one (1) camera will be located in the instrumentation tent located East of the DACS trailer outside of the North fence. This camera will be used as a back-up real time recorder to record the readings displayed on the four (4) gamma detector digital displays and the crane line counter digital display. All of these cameras will feature pan(P), tilt(T), zoom(Z), color, and remote operation capability and will be configured by D. Smet and his team.

The cameras, in the tent, must be at least 16' away from the edge of riser 12A in any direction. The containment tent is approximately 20'x 28'

with the 28' dimension in the East/West direction and the 241-SY-101 central pump pit will be located in the tent as shown in FIGURE 1. The cameras shall be located in the tent such that their position affords a view of the flexible receiver system/load distribution frame interface (pump will not be visible), and surrounding area including the bottom of the pump pit, to detect any waste that may be leaking from the flexible receiver system or supporting equipment.

3.2.2 TANK FARM BOUNDARY CAMERAS

Two (2) NTSC video camera(s) will be located outside of the SY tank farm for overall yard observation. One camera will be tripod mounted and located on the roof of the 242-S evaporator building, facing East. Reference FIGURE 2. Provisions will be made to insure a safe installation of the camera on the roof. The other camera will be tripod mounted and located on the spectator viewing stand located to the East of the DACS trailer. This camera will face South. All of these cameras will feature P, T, Z, color, and will be manually operated. These cameras will be configured by the BCSR Visualization Services (VIS) team. These cameras shall record information independently of the video shack S-VHS recorders and shall be the responsibility of the VIS team. However, a composite NTSC signal will be provided to the video shack for switching, transmission, or viewing.

3.2.3 COLUMN CUT-OFF/SHOT LOADING CAMERA (ROVER)

One (1) NTSC video camera will be located in the column cut-off/shot loading area. This camera will be manually operated as a rover between the column cut-off area and the shot loading area and can be operated from a fixed elevated platform located in the vicinity of the column cut-off area. Reference FIGURE 2. This camera will be configured by the VIS team. This camera will be used only during column cut-off and shot loading activities and will not supply a composite signal to the video shack.

3.2.4 VIDEO SWITCHING NETWORKS

Two (2) independent video switching networks will be provided. These networks will be controlled by and operated from the video shack.

One switching network will be used exclusively as a viewing system for the PIC. The PIC, located at a PIC station (see FIGURE 2) configured in the area South of the North fence of the SY tank farm, will have this independent switching network to select his monitor's view of any of the video camera inputs controlled from the video shack. This will include any of the three in-tank cameras, any two of the in-tent cameras, the evaporator roof camera, the viewing stand camera, or the instrumentation tent camera. The rover camera, in the column cut-off area, will not be switchable to this monitor. Switching of the cameras will be performed by the video shack operator on request from the PIC over the wireless headset.

An additional separate video switching network will allow the video shack operator to switch any of the video camera inputs, listed above, to the DACS and room D221 in the 2750 Building. The switcher will send the selected signal to the DACS and room D221 in the 2750 Building, simultaneously.

The hardware supplied for these switching networks will be installed in and controlled from the video shack.

3.2.5 PIC STATION

A PIC station will be configured in the area South of the North fence of the SY tank farm. This station will be a tented or suitable tank farm viewing area with a switchable video monitor.

3.2.6 WIRELESS COMMUNICATION SYSTEM

The PIC will have communication, via wireless headsets, to the crane operator, DACS operator, rigging supervisor, and the hydraulic trailer operator. The base station for the wireless headsets will be the video shack. The wireless headsets will be provided by D. Smet and his team. These headsets will be the same headsets as used in the performance of the OTP at the CTF.

3.2.7 VIDEO TIME CODE GENERATOR

A SMPTE time code signal generator will be permanently hardwired into the Video Shack routing system to allow time code in the form of hours, minutes, seconds, and frames, to be recorded on all SSE video record decks. Recording this national standard to all surveillance videotapes will greatly improve retrievability and synchronization of all surveillance footage during subsequent engineering and operations analysis, safety reviews, and video postproduction processes. The only exceptions to this single generator system will be the VIS NTSC cameras which generate SMPTE time code internally.

3.2.8 IN-TANK CAMERAS

The existing two(2) S-VHS color and one(1) black and white cameras will be used if operational and considered integral to the video ERS.

3.2.9 MISCELLANEOUS VIDEO SUPPORT EQUIPMENT

All associated cables, connectors, and ancillary equipment to support fielding of the cameras will be considered inclusive to the ERS.

3.2.10 IN-FIELD VIDEO CABLE PROTECTORS

Since the addition of a time synchronization capability has been added

to the cameras, an additional cable will be required to each camera. This brings the total to two(2) cables per camera.

Protective covers will be provided, as part of the ERS, to protect these cables in the field.

4.0 ORGANIZATIONAL RESPONSIBILITIES

4.1 OVERALL CUSTOMER

The overall WHC internal customer, of the video system for the ERS, is the Mitigation Program. This program has the overall responsibility for the equipment, system(s), training, and all other aspects of the activities to remove the current HMT mixer pump and install the spare pump.

Cognizant Manager: M. A. Payne
Program Manager: J. W. Lentsch

4.2 MITIGATION EQUIPMENT (ME)

ME shall have the overall design engineering responsibility for the installation and operational readiness of the ERS video system. This shall include the management of the project and the coordination of the video effort with the other aspects of the ERS activity.

Cognizant Manager: C. E. Hanson
Project Engineer: G. F. Vargo, Jr.

4.3 SURVEILLANCE SYSTEM ENGINEERING (SSE)

SSE shall be responsible for the overall ERS video system. This shall include the following:

- two (2) video cameras located in the pit containment tent;
- one (1) video camera located in the instrumentation tent located East of the DACS trailer;
- one (1) SMPTE time code signal generator;
- two (2) independent video switching networks;
- one (1) PIC station video monitor;
- a wireless communication station and five (5) additional headsets
- three video in-tank camera(s) existing;
- associated cables, connectors, and ancillary equipment to support fielding of the camera(s);
- eight (8) separate super high resolution VHS format recorders;
- maintenance of all equipment listed;

- the management of all videotape documents acquired with the SSE team's surveillance cameras and switched router outputs in support of the ERS for the removal of the existing HMT mixer pump and the installation of the spare pump, as defined in the following two (2) items;
- the labeling and storage of all SSE surveillance video footage;
- the entry of all pertinent videotape data into the SSE Videotape Library system to provide quick, efficient retrievability by site users for subsequent engineering and operations analysis, safety reviews, and video postproduction work;
- all interface and coordination with ME and Videography during preparation, checkouts, installation, and operation of the video system for the ERS;
- the preparation of all equipment list(s), operators manual, inventory list(s), spare parts list(s), maintenance documentation, status reports, training coordination, and any other documentation deemed necessary to support the ERS for the removal/installation of the HMT mixer pump;
- the operation of the video shack in support of the ERS for the removal of the existing HMT mixer pump and the installation of the spare pump; this shall include the recording of all camera videos on the appropriate S-VHS recorders, the operation of the two (2) switching network(s), the operation of the wireless base station, and the in-tent and in-tank cameras.

Cognizant Manager:	D. B. Smet
Project Engineer:	S. M. Werry

4.4 VISUALIZATION SERVICES(VIS)

VIS shall coordinate with SSE and be responsible for the following:

- two (2) video camera(s) located outside the yard for overall yard observation;
- one (1) video camera located in the column cut-off area; this camera will be a rover; however, a fixed elevated platform will be available to tripod mount the camera in the vicinity of the column cut-off area;
- one (1) video synchronization generator system;
- associated cables , connectors, and ancillary equipment to support fielding of the equipment;
- the management of all videotape documents acquired with the VIS team's NTSC documentation cameras in support of the ERS for the removal of the existing HMT mixer pump and the installation of the spare pump, as defined in the following five (5) items;
- the labeling and storage of all VIS documentation video footage;
- the entry of all pertinent videotape data into the VIS videotape library database, which will provide quick, efficient

retrievability by site users for subsequent engineering and operations analysis, safety reviews, and video postproduction work;

- the database searches in both the SSE Videotape Library System and the VIS videotape library and retrieval of original footage from these libraries as needed for video postproduction projects;
- the identification of significant scenes and sequences contained in the SSE videotape archive, the transfer of these scenes and sequences to broadcast-quality magnetic media, and the cataloguing of the extracted clips in the BCSR videotape archive system;
- the editing and duplication of training, documentary, news release, or other video presentations in which the extent and type of these presentations shall be defined, in writing from the requesting agency, at a later date;
- the preparation of all equipment list(s), operators manual, inventory list(s), spare parts list(s), maintenance documentation, status reports, training coordination, and any other documentation deemed necessary to support the ERS for the removal/installation of the HMT mixer pump;
- all interface and coordination with ME and SSE during preparation, checkouts, installation, and operation of the video system for the ERS;
- the installation, operation, and removal of the equipment listed in the first three (3) items listed above of Section 4.4.

Cognizant Manager:	D. K. Griswold
Project Manager:	S. S. Upson
Project Engineer:	D. K. Berg
Design Engineer:	R. H. Wyer

4.5 SCHEDULING AND PRODUCTION CONTROL WEST (SPC)

SPC shall coordinate with ME, SSE, and Videography and be responsible for the following:

- two (2) 10' x 10" tank farm compatible tents, or equivalent protective enclosures, to be installed at the PIC video station and at an area East 25' from the DACS trailer along the North fence of the SY farm; provisions shall be made to heat or cool the tents/enclosures depending on the season of the year; the tents shall be manufactured to a quality standard acceptable to WHC tank farm standards; appropriate viewing windows shall be provided in the tent/enclosure walls to provide for a clear unobstructed view of the SY tank farm working area;
- an elevated platform located in the vicinity of the column cut-off area; this platform will be of sufficient height and access to supply a relatively unobstructed view of the column cut-off and shot loading area(s) and the Southeast area of the SY tank farm

complex and will be constructed to the WHC and SY tank farm safety standards;

Cognizant Manager: T. L. Jennings
Coordinator: J. L. Welch

4.6 TECHNICAL SUPPORT (TS)

TS shall coordinate with ME, SSE, and Videography and be responsible for the following:

- coordination of the installation, operation, and removal of the video system regarding the ERS with WHC West tank farm Operations;
- supplier, custodian, and installer of the protection covers for all of the video and synchronization cables connected to video camera(s); this responsibility shall include the design of the safest cabling configuration.

Cognizant Manager: D. E. Deaton
Coordinator: D. R. Nunamaker

5.0 DOCUMENTATION REQUIREMENTS AND RESPONSIBILITIES

All documentation supplied to WHC will be in accordance with WHC STANDARD ENGINEERING PRACTICES manual, WHC-CM-6-1. As a minimum, the documentation package will include a copy of this work plan and a system operators manual. The operators manual will include the lists and documentation as described in SECTION 4.3 and 4.4 above. The documentation shall be of sufficient detail that the system components and hardware can be assembled and operated, at a future date, by personal not intimately familiar with the system. The exact location of all the components and hardware shall be included with the equipment lists.

6.0 DELIVERABLES

Reference Section 2.0 SCOPE for plan deliverables.

7.0 VERIFICATION AND VALIDATION

A laboratory mock-up and configuration shall be performed on the system equipment, when applicable. That is, all equipment that can be tested in a mock-up configuration shall tested. And all equipment that is already

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installed in the field, that cannot be removed and mocked-up, shall be checked and verified. This shall include the connection of all cameras, S-VHS recorders, switching networks, video monitors, cables, connectors, etc., as applicable, to verify system(s) compatibility and operation.

8.0 CONFIGURATION MANAGEMENT

The changes that are performed on the ERS, during the laboratory mock-up and configuration, will be recorded, logged, and updated into the video system documentation.

FIGURE 1

FIGURE #2