SUPPORTING DOCUMENT

0013266

1. Total Pages 12

2. Title: Operating Procedure for Liquid Level Monitoring of the 241-S-302A Catch Tank

3. Number: WHC-SD-WM-TC-012

4. Rev. No.: 0

5. Key Words: Ultrasonic Monitoring, 200 West Area, Catch Tank Liquid Level

6. Author

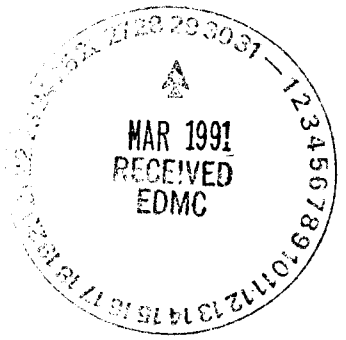
S.M. Werry
Name (Type or Print)

S M Werry
Signature

Eng. Surv. Testing W11540
Organization/Charge Code W1R15

7. Abstract

The purpose of this procedure is to provide the on-site preparation and operating instructions for the ultrasonic liquid level monitoring of the 302A Catch Tank located in the 241-S Tank Farm, 200 West Area.



8. **PURPOSE AND USE OF DOCUMENT** – This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

APPROVED FOR PUBLIC RELEASE
ow 2/12/91

PATENT STATUS – This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon request, from the U.S. Department of Energy, Patent Attorney, Richland Operations Office, Richland, WA.

DISCLAIMER – This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

9. Impact Level: 3

10. D.B. Smet
Authorized Manager's Name (Type or Print)

D B Smet
Authorized Manager's Signature

Specify Distribution Limit SP LTD

11. **RELEASE STAMP**

RELEASED
DISTRIBUTION LIMITS

☐ INTERNAL ONLY

☒ (13) SPONSOR LIMITED

☐ EXTERNAL

DATE: JAN 22 1991
STATION 12

A-6400-073 (07/90)

OPERATING PROCEDURE FOR LIQUID LEVEL MONITORING OF THE 241-S-302A CATCH TANK

1.0 PURPOSE AND SCOPE

1.1 PURPOSE

The purpose of this procedure is to provide the on-site preparation and work instructions for the liquid level monitoring activity in the 241-S-302A Catch Tank located in the 200 West area Tank Farms.

1.2 SCOPE

This procedure provides a detailed description of the major elements of the activity including safety considerations, special tools/equipment, personnel responsibilities, preinspection activities, operating instructions, equipment removal and activity documentation.

2.0 REFERENCES

Current revisions of reference documents shall be used.

1. WHC-CM-4-10 "Radiation Protection Manual"
2. WHC-CM-4-15 "Radiation Work Requirements/Permits"
3. WHC-CM-6-1 "Standard Engineering Practices"
4. WHC-SD-NR-IP-005 "302A Catch Tank Liquid Level Monitoring Plan"
5. WHC-CM-4-2 "Quality Assurance Manual"
6. WHC-SD-NR-TCP-006 "Generic CCTV Procedure"
7. WHC-CM-4-3 "Industrial Safety Manual"

3.0 SAFETY

1. All personnel accessing the 241-S 302A Catch Tank job site will have completed all hazardous waste worker training required, radiation workers training and any other training specifically required to work at 200 West Tank Farms.

2. A special Radiation Work Permit (RWP) will be prepared by Health Physics and reviewed by all personnel entering the 241-S 302A job site.

3. A Job Safety Analysis (JSA) will be required prior to the start of work. This JSA will be incorporated in the applicable work plan. Any additional permits or tests such as a Hazardous Work Permit or a Combustible Gas Monitoring Test shall be documented in the associated work package and addressed prior to the start of any work.

4. A pre-job safety meeting will be held prior to the start of work. A representative from Operations, Health Physics, Engineering Surveillance and Testing (ES&T) and any other support organization

involved in the activity will be required to attend.

4.0 SPECIAL TOOLS AND EQUIPMENT

1. A specially designed ultrasonic tool consisting of a containment cup, a polystyrene float, a metal target disk and an ultrasonic transducer (Figure 1).

2. A temperature measurement system consisting of two resistance temperature detectors, a transmitter and associated wiring (Figure 2).

3. Master Control Station consisting of a datalogger, two digital temperature indicators and an ultrasonic flaw detector (Figure 3).

4. Stainless steel extension poles (Figure 3).

5. A specially tooled extension pole centering and position holding device (Figure 3).

6. A video monitoring system consisting of a camera, camera control unit, video recorder and monitor (Figure 4).

7. Control and associated power cabling (Figure 5).

5.0 RESPONSIBILITIES

5.1 PROCESS SYSTEMS ENGINEERING

Process Systems Engineering (PSE) will be responsible for the required Tank Farm Job Control packages and Radiation Work Procedures required to perform work in the 241-S Tank Farm. PSE shall make the necessary schedule arrangements with support organizations in order to complete the activity without interruption, and will brief ES&T on any other pertinent information.

5.2 ENGINEERING SURVEILLANCE AND TESTING

Engineering Surveillance and Testing will be responsible for establishing an activity plan and procedure, fabrication of special tooling, procurement of equipment, acceptance testing, calibration of measurement equipment, activity performance and reporting.

1. ES&T Engineers shall implement and direct the activity, operate and troubleshoot the activity equipment, brief Tank Farm Process Systems Engineering personnel on the inspection and assist in the assignment of specific responsibilities involved in the process.

ES&T shall conduct work in a safe and As Low As Reasonably Achievable (ALARA) manner and shall report progress/status of work at the end of each shift to the manager, ES&T.

6.0 DEFINITIONS

1. Resistance Temperature Detector (RTD) - A temperature sensor that utilizes the principle that as temperature of a medium changes, resultant changes in metal resistance and output voltage are observed.

2. Data Logger - An instrument used to collect and record data. It's output may be digitally and/or hardcopy displayed.

3. Ultrasonic Transducer - A device that converts electrical energy into mechanical energy or mechanical energy into electrical energy.

4. Ultrasonic Detector - An instrument used to process and interpret electrical energy sent to and received from an ultrasonic transducer.

5. Closed Circuit Television System (CCTV) - An assembled video system used to perform remote viewing of areas to be inspected.

6. Sensing Tool - A specially designed tool used to remotely acquire information on liquid level.

7. Liquid Level Monitoring System (LLM) - A uniquely designed system that includes ultrasonic measurement and temperature sensing instruments to gather level change information.

8. Cathode Ray Tube (CRT) - A tube which allows electrons to be focused and viewed on a fluorescent screen, as in a television screen.

7.0 PREREQUISITES

1. Work will be conducted in compliance with all applicable sections of the Quality Assurance Manual, WHC-CM-4-2.

2. A mock-up demonstration will be staged. The ability of the LLM system to function as required in the 302A Catch Tank will be demonstrated and documented. An acceptance check list (Ref. WHC-SD-IP-005, Attachment 1) will be utilized to document the demonstration.

3. Health Physics (HP) support shall be arranged by PSE prior to the staging of surveillance equipment in the 241-S tank farm. Support shall be continuous throughout the activity.

4. All in-zone support shall be briefed on the activity procedure and applicable Radiation Work Procedures prior to the activity. PSE is to ensure that all testing and support personnel are qualified and/or certified as necessary to perform this work.

8.0 SURVEILLANCE PERFORMANCE

8.1 INITIAL EQUIPMENT SET UP

1. ES&T will transport all test equipment from 100N to the 200W 241-S 302A job site. All test equipment will be sheathed or protected as needed to prevent contamination.

2. ES&T will place the Master Control Station equipment in a containment area near the tank access riser. Silver paper or plastic will be used as required on the ground to control contamination.

3. ES&T will route all associated cabling in a manner which will ensure free movement of the sensing tool and stainless steel extension poles (See Figure 5).

4. The performance team will connect all LLM system cables and secure.

8.2 EQUIPMENT CHECK AND POSITIONING

1. Turn power "on" and ensure all equipment functions are operable. This equipment has been pretested and calibrated and should need fine tuning only.

2. Remove the riser cover.

NOTE: A COMBUSTIBLE GAS MONITORING TEST WILL BE PERFORMED AS REQUIRED WHEN EVER THE RISER COVER FLANGE IS REMOVED. IF COMBUSTIBLE GAS LEVELS ABOVE 0.8% ARE DETECTED, THE RISER COVER FLANGE SHALL BE REPLACED AND WORK WITHIN THE CONFINES OF THE CATCH TANK DISCONTINUED UNTIL AN ACCEPTABLE COMBUSTIBLE GAS LEVEL IS ACHIEVED.

3. Slowly insert the sensing tool into the riser.

4. Ensure that the access riser extension pole holding/centering device is in place and secured.

5. After lowering the extension pole approximately eight feet, another extension pole will be added. Using lanyarded wrenches, secure the second extension pole and continue to lower the equipment.

7. Continually monitor the CRT for the appearance of a return signal until proper position is ascertained. When the return signal is observed, raise the tool slowly until the signal disappears. Then lower the tool approximately 1/2" and stop.

8. Secure the extension pole to the riser centering/holding devise by manually tightening the pole clamps.

8.3 LIQUID LEVEL MONITORING/SURVEILLANCE

1. Make a visual check to ensure that all control station equipment is functioning.

2. Insert a prelabeled video tape into the recorder. Ensure the tape is rewound and set the recorder to "record" position.

3. Record the baseline data on the Data Acquisition Check List (Attachment 1) and enter pertinent information in the daily log book.

4. After the required information is videotaped, put the recorder in "stop" position.

5. Make a visual check to ensure that all control station equipment is functioning. Note: After the initial liquid level/thermal readings are recorded, measurements will be recorded at 15 minute intervals until a reliable level pattern can be established. Manned monitoring will continue at an interval to be established for approximately four to six days or until a level pattern is characterized. If data suggests the presence of leaking, the Leak Test will be halted and an evaluation performed by the cognizant parties as to the next course of action. Repeat steps 1 thru 5 as required.

9.0 EQUIPMENT REMOVAL

All personnel involved with the removal of ES&T equipment used within the confines of the Catch Tank or risers shall adhere to decontamination procedures or instructions within the associated work package and/or 241-S Tank Farms procedures. Health Physics personnel shall continuously monitor the removal and decontamination of equipment.

1. ES&T shall be responsible for the removal of all master control station equipment from the 241-S Tank Farm job site. Control equipment taken into radiation zones shall be bagged or sealed before entry to enhance safe non-contaminated removal. All ES&T equipment shall be surveyed and released, where practical, by Health Physics prior to removal from the Tank Farm for storage.

2. Process Systems Engineering will be responsible for the disposition of contaminated equipment and cabling upon activity completion.

10.0 REPORTING

1. Following completion of the surveillance, original video tapes and data will be maintained by the Manager, Engineering Surveillance and Testing for review.

2. Duplicate tapes and data will be submitted along with a final report to the cognizant Process Systems Engineering personnel by means of an Engineering Data Transmittal (EDT).

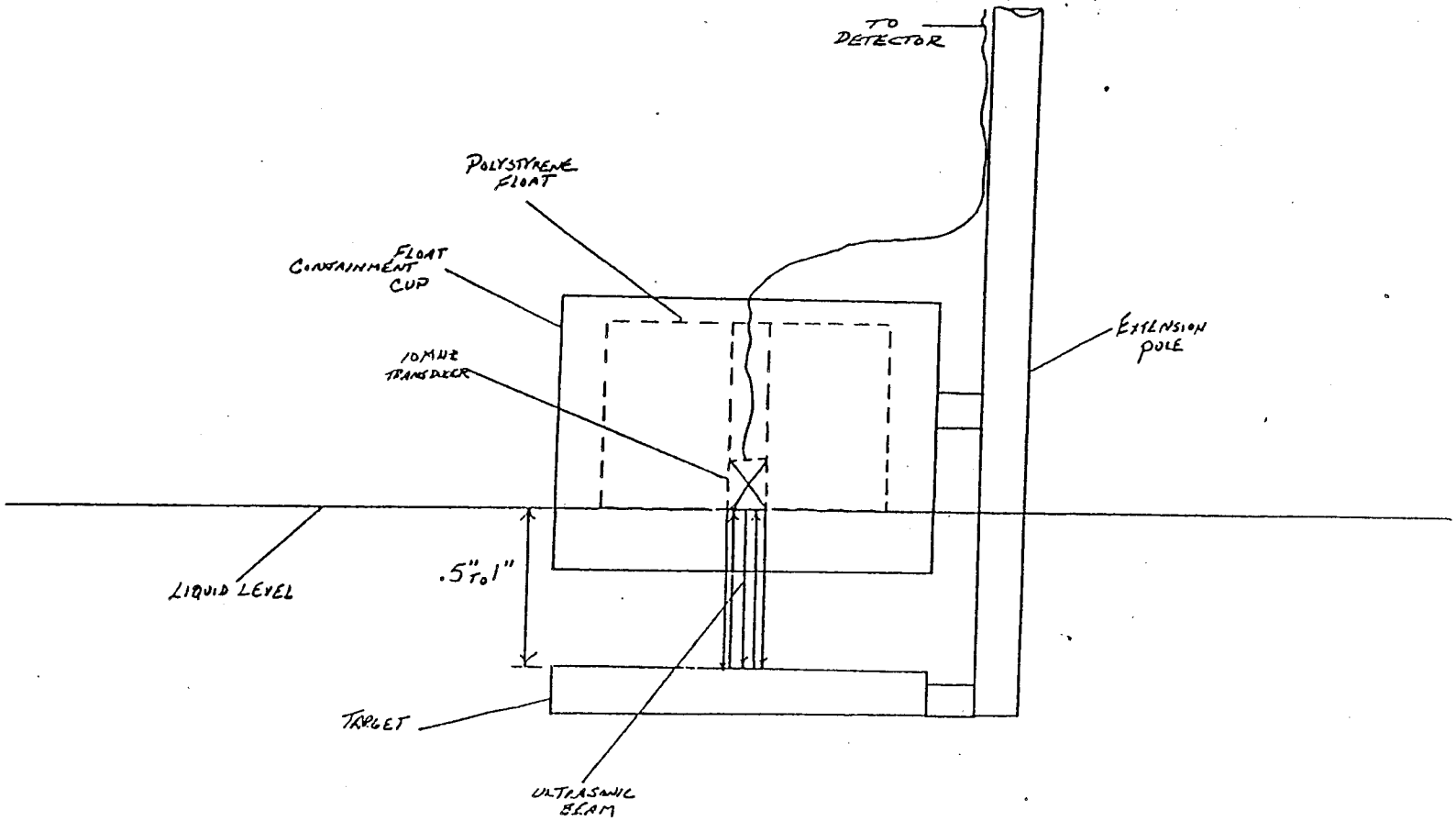
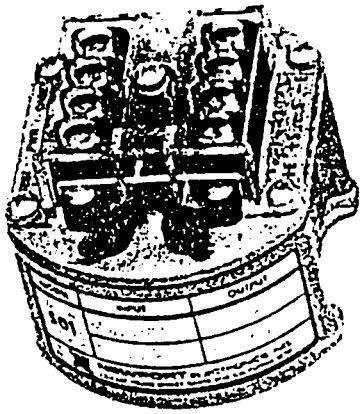
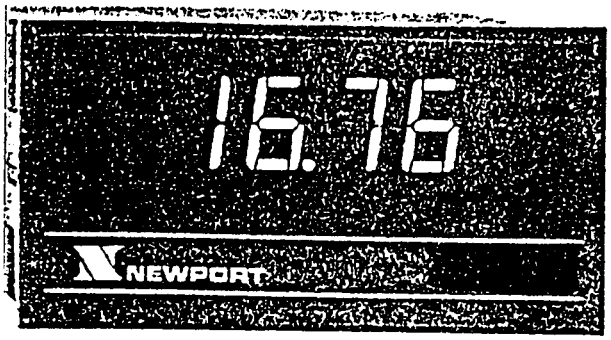


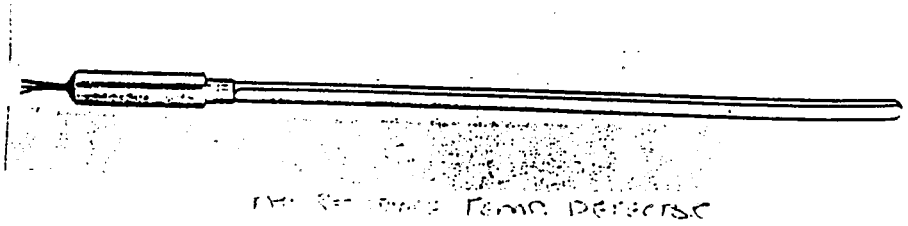
Figure 1

Ultrasonic Liquid Level
Measurement Tool Configuration





*Newport is a registered trademark of Elgin National Industries, Chicago, IL.



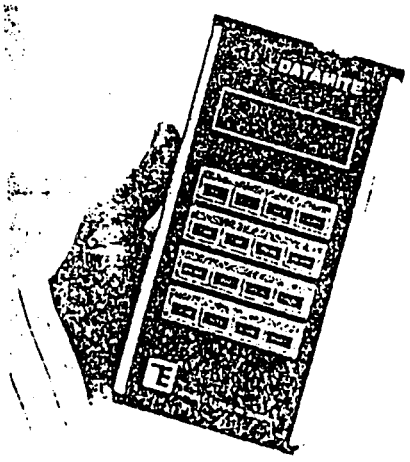


Figure 2

Typical Temperature Monitoring System

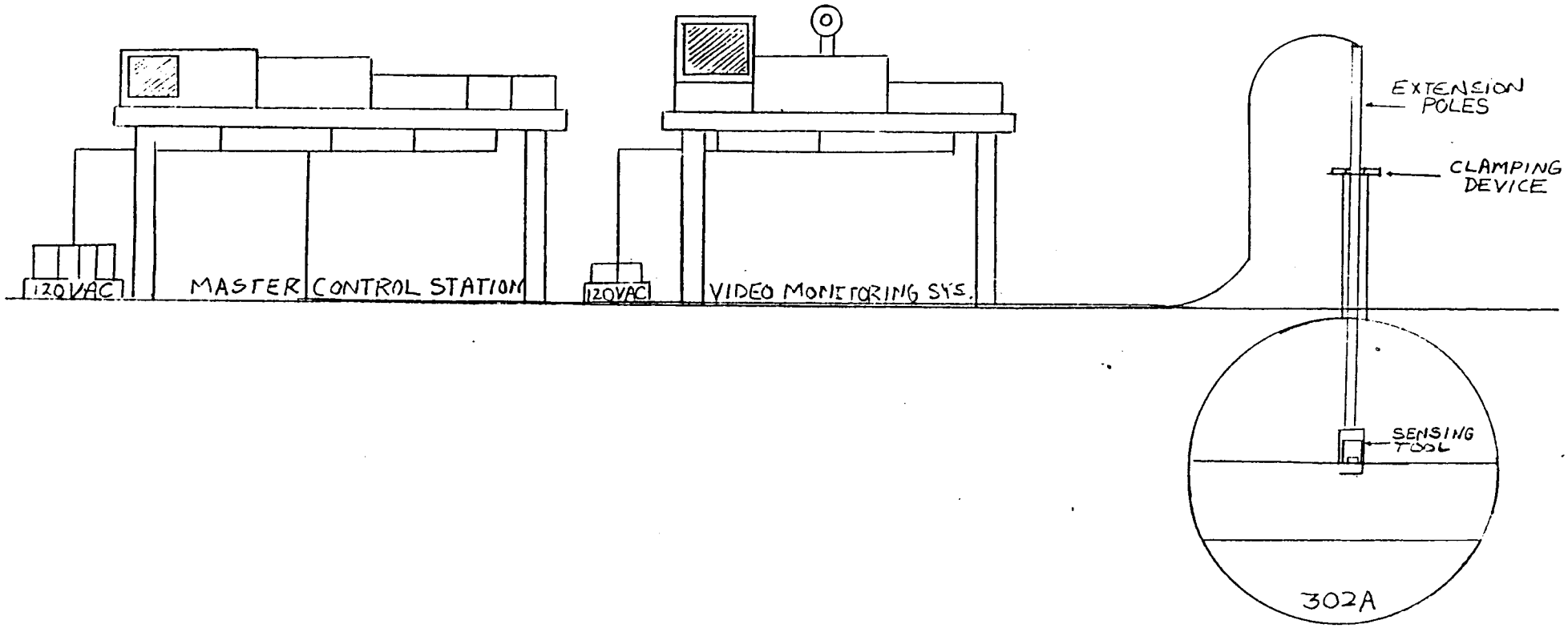
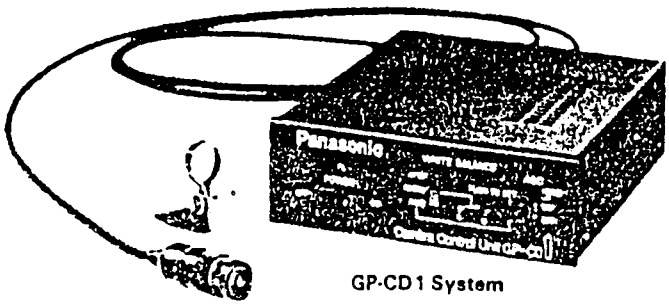
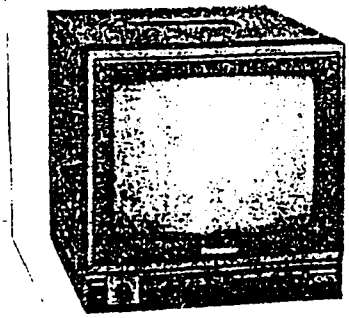

120VAC
MASTER CONTROL STATION
120VAC
VIDEO MONITORING SYS.
EXTENSION POLES
CLAMPING DEVICE
SENSING TOOL
302A

Figure 3



GP-CD1 System

*Panasonic is a registered trademark of Matsushita electric Industrial Co., ltd., Kadoma-Shi, Osaka Prefecture Japan



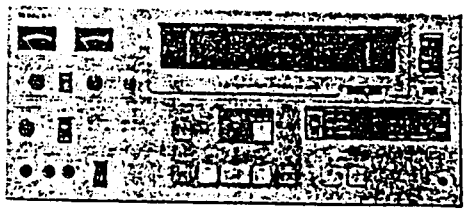


Figure 4

Miniature Color Camera and
Video Recording System

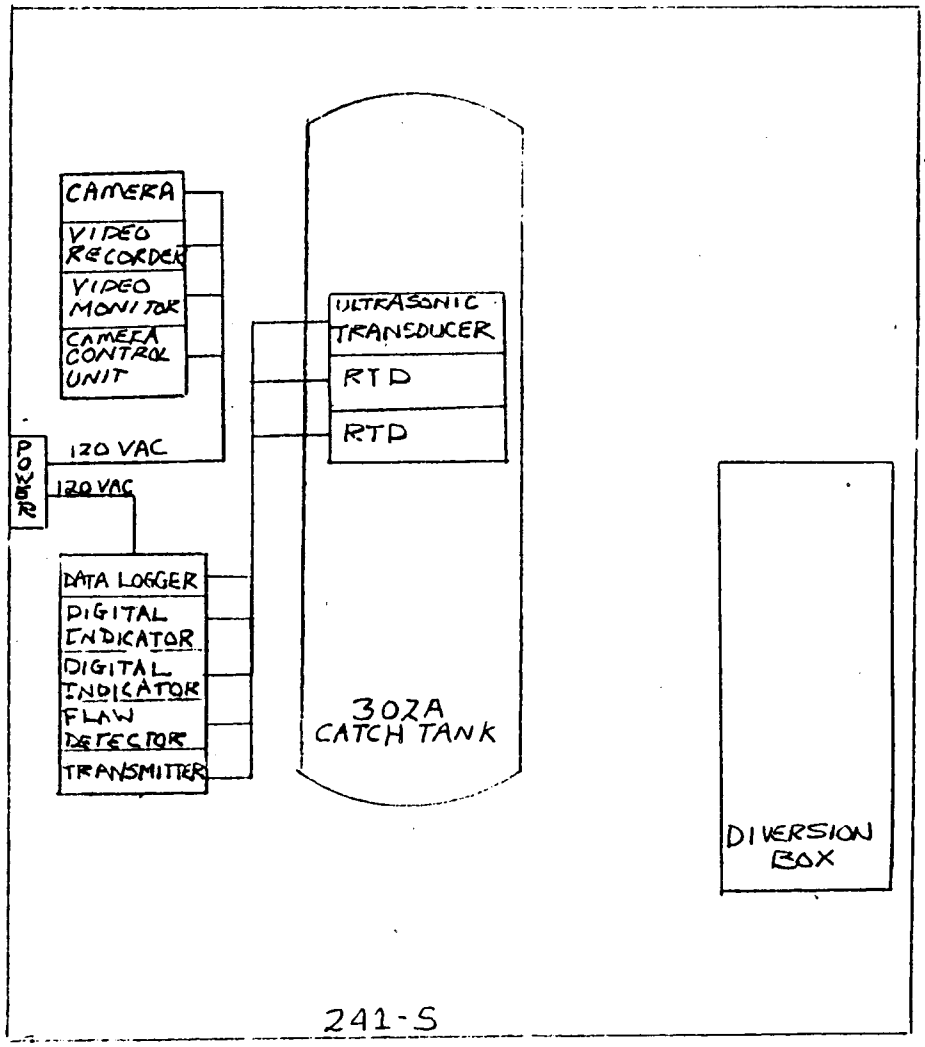


Figure 5

Typical Equipment Electrical Connections

ATTACHMENT 1

302A Catch Tank

DATA ACQUISITION CHECKLIST

BASELINE DATA

Date	Time	Liquid Level	Temperature	Comments

LIQUID LEVEL MONITORING DATA

Date	Time	Liquid Level	Temperature	Comments