Enercon Services, Inc.

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Report on Watts Bar Unit 1 Containment Building Walkdowns for Emergency Sump Strainer Issues

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Report on Watts Bar Unit 1 Walkdowns for Insulation and Debris Inside the Containment Building

PURPOSE

The purpose of the walkdowns was to identify potential debris sources, to document containment flow paths into the sump area, and to document areas around the emergency sump for future strainer enhancements.

Debris sources were identified as any materials that could contribute to the Emergency Sump Screens blockage, with emphasis on fibrous insulation materials (Attachments H and J), non-qualified coatings (Attachment G), and any other materials such that the available NPSH for ECCS and Containment Recirculation Spray Pumps would become unacceptable following a Design Basis Accident that requires recirculation from the Emergency Sump.

Containment flow paths were evaluated (Attachment F) to identify unique debris sources; interferences and obstacles applicable to debris generation; and holdup places of water volume, inactive sumps, and potential water flow paths. The physical/structural features that will affect the flow of debris and water from a potential break location to the sump were documented.

The last part of the walkdown was to document the existing emergency sump strainer and the area around the strainer (Attachment E) for the purpose of considering preliminary locations for additional strainer enhancements. The strainer and its immediate surroundings were investigated to identify potential locations and to document existing interference. The walkdown was documented with digital photographs to assist in the subsequent development of strainer enhancements, if necessary.

The walkdowns were initiated by TVA (Contract #00029353, Attachment B) to pursue Watts Bar compliance with the GSI 191 issues presently being addressed by the PWR nuclear industry. The need to perform debris generation analysis, debris transport analysis, NPSH evaluations, and evaluations of additional strainer enhancements will be determined using NRC guidance/regulations and this report as an input.

METHODOLOGY

The overall process for preliminary resolution of GSI-191 concerns consists of the following 5 tasks, as discussed in Letter JAS03-049 (Attachment A):

Task No. 1 – Preparation for Containment Walkdowns
Task No. 2 – Debris Source Walkdowns
Task No. 3 – Coatings Walkdown
Task No. 4 – Sump Area Walkdown
Task No. 5 – Walkdown Report

This report (Task No. 5) documents the completion and results of Tasks No. 1 through Task No. 5. It should be noted that further efforts are required to completely resolve the GSI-191 issue, such as the preparation of a debris generation report and debris transport analysis. These additional tasks are not included in the scope of this report.

The following approach was used to perform a comprehensive containment walkdown for possible materials that could contribute to the Emergency Sump blockage:

1. Develop a thorough understanding of the sump blockage issue.

   GSI 191: Parametric Evaluations for Pressurized Water Reactor Recirculation Sump Performance (LA-UR-01-4083) and NEI 02-01 Condition Assessment Guidelines: Debris Sources Inside PWR Containments, Revision 1 were reviewed.

2. Develop a thorough understanding of the Watts Bar Unit 1 Containment Building Layout.

   General arrangement drawings were reviewed with emphasis on major components for ease of identification of exact locations during walkdowns. Containment equipment location drawings and plan view piping drawings (by containment quadrant) were reviewed to determine the most efficient plan to complete the walkdowns. In addition to drawings, Watts Bar Unit 2 was utilized as a mockup to familiarize the walkdown team with equipment locations and general unit layout prior to entry into Unit 1.

3. Develop a thorough understanding of the types of insulation allowed for containment use for mechanical and non-mechanical applications.

   TVA Site Specific Engineering Specification N3M-936, Rev. 4, for "Installation, Modification, and Maintenance of Heat and Anti-Sweat Insulation", TVA General Engineering Specification G-82, Rev. 2, "Installation, Modification, and Maintenance of Insulation", WB-DC-30-4, "Separation/Isolation", and Engineering Design Standard DS-M17.2.2, Rev. 5, "Electrical Raceway Fire Barrier Systems" were reviewed to determine insulation classes and general installation information. Additionally, experienced TVA Insulation Craft and Engineering personnel were utilized to in order to familiarize the walkdown team with the types of insulation used at Watts Bar.

4. Review systems and components present in the Containment Building.

   Previous experience of the walkdown engineering personnel, interviews with plant personnel, review of Piping and Instrumentation Diagrams, and review of other piping layout drawings provided a general understanding of the areas to be examined. Possible insulation used on electrical components and piping penetrations was discussed with the cognizant engineering personnel. Major components insulation was confirmed by walkdowns and compared with design drawings (where available).

5. Identify ALARA, safety, and access limitations.

   All personnel involved in the walkdowns were RWP and Safety trained for work at Watts Bar Unit 1. Additionally, Watts Bar Radiation Control Personnel provided an extensive ALARA briefing prior to the first containment entry. Thereafter, Radiation Personnel were consulted prior to each entry to identify any changes that may have occurred. A pre-job briefing was given by TVA personnel to discuss the walkdown objective and methods.

   The RWP used (8010) did not allow access to the Excess Letdown / Regenerative Heat Exchanger Room or the Reactor Cavity/Keyway. Insulation materials were estimated based on drawing reviews and discussions with TVA personnel.

6. Develop an understanding of the analysis methodology for debris generation and transport mechanisms of the debris to the Emergency Sump and sump blockage.

   In addition to the activities described in 1 above, the engineering personnel involved in the walkdowns reviewed the various accident scenarios that are part of Watts Bar Unit 1 design basis to better understand the various break sizes, locations, available/required water inventories, time when recirculation pumps suction is being switched from the RWST to the emergency sump, transport phenomena and velocities, sump screen design and size of openings, containment recirculation spray heads openings, etc.

7. Review industry experience for walkdowns as well as ongoing activities.

   ENERCON personnel walkdown experience, previous strainer design experience, NEI guidance and Industry Meetings information on the subject were integrated into the walkdowns.

8. Utilize experienced personnel.

   The engineering personnel involved in the walkdowns, including those who provided leadership for the walkdown, teams were experienced engineers. The project team had extensive experience in developing debris walkdown reports and debris generation reports. Personnel experience included systems, sump designs, post Accident LOCA, MSLB and FWLB analysis, insulation types used in containment and coating systems, containment walkdowns and related emergency sump blockage issues.

The insulation craft and engineering personnel that provided assistance with the walkdowns were knowledgeable in the types of insulation used at Watts Bar and they provided invaluable understanding of the Containment building layout. They also provided insight on general insulation use inside containment as well as the history of operational modifications and repairs involving insulation modifications.

9. Provide pre-walkdown training.

   The above-mentioned knowledge was incorporated in an inspection procedure, which was used for the walkdowns. The procedure used was TVAW001-PROC-01 Rev. 0, "Containment Walkdown Procedure for Potential Sump Screen Debris Sources at Watts Bar Nuclear Plant, Tennessee Valley Authority". Procedure training was provided, as were specific pre-job briefings for each portion of the walkdowns. Mr. Robert Kirkpatrick, TVA Technical Contract Manager, provided an overall pre-job briefing upon the teams arrival on site in accordance with TVA procedures.

WALKDOWNS APPROACH

As required by the walkdown procedure, the entire containment was sub-divided into areas for ease of locating and documenting the walkdown locations. Prior to performing a walkdown , the drawings for that area were reviewed as well as the area radiation maps to ensure the most efficient and ALARA 'wise' walkdown would be performed. The walkdowns were generally segregated by containment floor elevation, RCS loop, and by compartment if there were clearly defined walls. Verbal dictation and digital pictures were utilized to collect the walkdown results and to provide input to this debris report.

For the areas not accessible for walkdowns, the insulation was documented by reviewing drawings (where available), specifications, work documents, and/or through discussions with knowledgeable insulation craft personnel.

DOCUMENTATION OF WALKDOWNS

Walkdown documentation was in accordance with TVAW001-PROC-01 Rev. 0, "Containment Walkdown Procedure for Potential Sump Screen Debris Sources at Watts Bar Nuclear Plant, Tennessee Valley Authority", and the findings documented in walkdown packages.

The completed walkdown packages are included in Attachment J and contain Attachment 1 of TVAW001-PROC-01. Attachment H is a consolidated summary of the debris quantities determined in the individual packages.

Marked-up drawings, notes, digital pictures, etc. were included in the walkdown packages to provide sufficient information to quantify the amount of insulation material. Each walkdown package was assigned a unique number in the following format:

WB1-DWD-xxxX

WB1 -- Watts Bar Unit 1
DWD -- Debris Walk-down
xxxX -- Area number xxx (see Area Map, Attachment I) and a sequential package Letter X

For example, walkdown package WB1-DWD-001A is package A of Area 001.

The walkdown packages are meant to reflect the insulation and debris present in containment at the time of the walkdown. Attachment K provides a sample package change notice form that could be used to document subsequent changes in insulation. It is meant as a guide to provide the crucial parameters that should be documented.

Specific documentation of the sump area, the coatings evaluation, and the sump flow path evaluation were provided and are included as Attachments E, F, and G.

RESULTS

1. Containment Layout

All the areas within containment were walked down with the exception of the following:

- Reactor Vessel Cavity and Keyway
- Regenerative and Excess Letdown Heat Exchanger Room
- Reactor Cavity
- Refueling canal
- Reactor Vessel and Reactor Head

These areas were inaccessible due to in-progress work activities or radiation conditions. Insulation in these areas was documented by review of plant documentation and drawings, and discussions with knowledgeable plant personnel.

No ladders or special scaffolding was required to gain access to areas. The existing platforms/scaffolding combination allowed sufficient access to all areas for inspections.

The walkdown did not include any insulation removal. The interior arrangement and insulation material for coated/jacketed insulation was determined from drawings and information obtained from the Insulation Craft personnel. Some cases existed where the insulation material could not be observed or exactly determined due to the jacket/coating. In general, the insulation was found to be in accordance with the existing design documentation. Where questions arose, Watts Bar personnel were questioned, and design documents were researched to determine the most likely type.

In accordance with the implementing procedure and HP requirements, no debris samples were taken from containment during the walkdown. Watts Bar personnel were able to provide clean samples of the 3M fire wrap used for raceway and conduit protection throughout containment and the aqua tie wraps used to secure conduit tags and grounding cables. A sample of the top deck pads for the ice condenser was also available for inspection.

It should be noted that only systems inside the crane wall can be subject to HELB (High Energy Line Break) jet forces during a LOCA.

2. Affected Systems

<u>Mechanical</u>

The following systems were walked down:

- Reactor Coolant, including RC pump seal injection and leak-off
- Residual Heat Removal
- High Head and Low Head Safety Injection
- Pressurizer Spray, including Auxiliary Spray
- Charging and Volume Control System Letdown line including the Letdown Coolers
- Component Cooling
- Ice Condenser System
- Steam Generator Blowdown System
- Sample System
- Main Steam
- Feedwater
- Primary Vent and Drains

It should be noted that the insulation at some locations had been temporarily removed to support outage work. In other locations, lead shielding blocked access to piping and equipment for observation. In all cases, we were assured that this insulation would be replaced when the work activity was completed. Discussions with TVA personnel and drawing review (where available) were used to determine the type of insulation present at these locations.

During the post outage Containment Cleanup walkdown performed by Operations on November 13, 2003, attended by two Enercon Walkdown team members, insulation was observed to be re-installed, with no deviations from specifications noted.

Mechanical insulation inside containment was found to be mostly of the reflective metal type for hot lines. Foamglass, foam plastic, and Armaflex/Rubatex was found in the ice condenser, upper containment, and the ICI room for glycol/cooling water insulation. Hot mechanical equipment (RCP's, Pressurizer, Steam Generators, etc.) was observed to be insulated with reflective metal type insulation.

Electrical

The following types of electrical equipment were generally reviewed as a part of the walkdowns:

- Cable trays
- Electrical/instrumentation panels
- Junction Boxes
- Cables
- Conduits

While performing the walkdowns no panels or boxes were found that were suspected of containing fibrous materials. Junction box penetrations appeared to be sealed, with no fibrous material used. Only conduits covered with radiant energy barriers were found. Based on these facts no panels or boxes were opened for internal inspection. Flex conduit inside containment was seen to be braided or bellows type stainless. No conduit with vinyl or other elastomeric waterproofing was observed. Cabling inside containment was found to be totally enclosed in conduit. No cable trays with exposed cabling were noted.

The condition/cleanliness of junction boxes and panels are documented with digital photos. Generally, the junction boxes appeared to be in a good state of cleanliness with only a small layer of dust/dirt present. There were, however, electrical cable Tie-Wraps used extensively to anchor conduit labels and ground wiring. Generally, these tie wraps were aqua in color, and investigation of Watts Bar Specifications showed these tie wraps to be made of Tefzel (Thomas & Betts). These tie wraps are qualified for containment use and are not expected to be a significant source of sump debris except for those that fall directly within the zone of influence of a pipe break. Data suggests that the material has a maximum continuous use temperature of 302 degrees F.

Significant quantities of 3M radiant energy barriers were observed inside the lower containment (inside the crane wall) and in the ICI room. This material was observed to cover junction boxes, conduit, and conduit supports. Quantities of this 3M material have been estimated from the installation details provided (Drawings 1-47W243-6, 1-47W243-7, and 1-47W243-8), DCN 11727-D, and Fire Operating Requirements inspection procedure 1-FOR-304-1. A sample of this material, along with material data and vendor manuals, was provided by Watts Bar personnel for observation and characterization. The material is described as a fibrous mat (short fibers) with small chips of a mica type reflective material embedded within. The mat is nominally 3/16" thick and is covered on one side with a stainless steel foil. Documentation of this material may be found in Vendor Manual WBN-VTD-M030-0020. Quantities have been tabulated in the individual walkdown packages

Several individual pieces of Min-K were found to be used as radiant energy shields to protect conduit. These were generally small (9"x 12", for example) were typically located in the accumulator or fan rooms. One piece of Min-K stainless jacketed insulation was found on a waste disposal line just outside the sump near the Loop 1-4 hatch. This section protects conduit from the potentially hot line (note, the rest of the line is not insulated). These individual occurrences were documented and included in their respective area in the individual walkdown packages.

3. Housekeeping

The effectiveness of the housekeeping could not be assessed during the initial walkdown due to the outage activities ongoing inside the Containment building. Where it was the opinion of the walkdown team members that certain transient debris could have been present prior to the ongoing outage, it was so noted and documented. Discussion with Watts Bar personnel indicated that a thorough containment walkdown is performed following each outage. The containment cleanup plan was reviewed, and two members of the Enercon walkdown team accompanied the Mode 4 Containment Cleanup walkdown performed by Watts Bar Operations on November 13, 2003. At this time, most maintenance activities had been completed, the lead shielding had been removed, and the reflective metal insulation had been reinstalled. Watts Bar personnel were observed sweeping and vacuuming containment, while the containment cleanup walkdown team picked up any loose debris such as gloves, tools, tape, paper, etc. In general, the containment was found to be clean and free of easily noticed debris. Significant accumulations of dust/dirt were not generally observed. There were some outlying examples, however. Specifically, the grating above the #4 RCP motor (at the entrance to the ice condenser and upper containment hatch) contained an accumulation of dirt and other fibrous debris. Shreds of green, nylon type fabric were observed to have fallen into the grating, along with some other fibrous debris. . This situation was observed on several other grates that were not open underneath as well (i.e., resting on structural steel). Additionally, accumulations of dirt/debris were noted in the small spaces between the RCP supports and the crane wall. Although the quantities observed are small, the type and nature of the debris warrants additional housekeeping efforts in this area. This issue was identified to Watts Bar Plant Personnel as an area for improvement.

4. Types of insulation present in Containment

The following table lists the types of insulation that are present inside the Watts Bar Unit 1 Containment. The list was developed based on the walkdowns performed by the walkdown teams, reviews of insulation design drawings, and discussions with plant personnel.

Types of Insulation found in Watts Bar Unit 1 containment are as follows:

Reflective Metal Insulation (RMI)
Min-K
Armaflex/Rubatex
Foamglass
3M Interam M20C (Radiant Energy Shield)
Marinite Board
Calcium Silicate

5. Other potential debris sources

- Rust
  Rust in significant quantities that would flake or otherwise spall off was not observed. Minor surface rust was noted on several components where coatings were damaged due to maintenance activities

- Lint
  Some minor amounts of lint were seen on junction boxes and the top surfaces of panels/electrical boxes. Generally, housekeeping with respect to dust and lint appeared to be good.

- Miscellaneous Debris
  In general, amounts of miscellaneous debris appeared to be minimal. Outage activities were extensive during the initial walkdown, and significant quantities of outage related debris such as duct tape, pens, gloves, tools, etc. were observed. During the Containment Cleanup walkdown performed later, there was very little miscellaneous debris observed. The cleanup efforts appeared to be very thorough. As noted in Item 3 above, some dirt/debris was noted to be accumulated in gratings.

- Tags/Labels

  A large number of red VT-2 flow direction labels were observed to have been placed on the reflective metal insulation jacketing. A number of these labels were observed to be peeling or delaminating. These labels were determined to be acceptable with respect to stress corrosion cracking criteria in Documents Reference 5. Reference 5 also indicated that the material of these labels deteriorates at 390 degrees F. However, no test results or other qualification data is available to support the qualification of these labels with respect to post accident containment conditions. Based upon the current condition of the labels, it must conservatively be assumed that these labels will delaminate and separate from their installed locations during a design basis event.

  In addition to the red VT-2 labels, clear printed adhesive labels were found on the reflective metal insulation. These labels are used to individually identify the insulation sections. The qualifications of these labels are not known.

  Small, round (approximately 1" in diameter) hang tags were identified extensively throughout containment. They were found on conduits and appear to be cable identifiers. The tags were made of plastic material and were generally hung with stainless steel wire. Additionally, small rectangular plastic labels were observed to be secured to conduit with aqua colored tie wraps throughout containment. Reflective tape labels were also found extensively in the raceway area for identification of conduit. Reflective tape labels were not generally observed inside the crane wall of lower containment, however, there were some noted in the upper elevations of lower containment (above the RCP's).

  Equipment tags were generally found to be a laminated stainless steel hung with stainless steel wire

  Reflective adhesive signs were also observed inside containment. These were generally used for personnel information and warning. These types of labels appeared to have been used sparingly.

- Masking/Duct Tape
  Masking tape residue possibly used as markings, were seen throughout the containment. Additionally duct tape was seen, but appeared to have been added during this outage for marking. Quantities were not significant.

- Paint
  Paint/coating condition evaluation was performed and is included separately as Attachment G.

- Other Debris
  Dust and dirt were observed in small quantities in the grating webs and in the corners of support members throughout containment. The small overall quantity indicates a relatively clean plant with respect to latent debris. There were also a small number of

penetrations through the containment vessel and crane wall that were sealed with a black silicone foam material. Quantification of the material in these spare penetrations is included in the walkdown packages. Generally, sealants for piping penetrations were not tabulated, as a review of the design documents and walkdown observations indicated that most were sealed using link-seals, RTV type material, and/or a small quantity of flexible boot seal material. Mineral wool was not observed in any penetrations, and most penetrations had splash-guards to limit jet impingement. Tabulations of the quantities of Calcium Silicate in the Feedwater and Main Steam penetrations were included in their respective loop area since these penetrations were observed to open to the area inside the crane wall. This fact is also documented in the insulation specifications. One piece of Marinite board, approximately 4" x 12", was observed in Fan Room #2. Where documentation existed, significant quantities of flexible bellows or fabric (such as the ice condenser seals to the containment vessel) were observed and tabulated.

CONCLUSIONS

1. Mechanical Insulation

The piping insulation inside containment was observed to be in accordance with the design documentation and specifications. Process piping and equipment inside containment was insulated with Reflective Metal Insulation (RMI). There were no obvious or repetitive deviations from the RMI standard within the lower containment crane wall. Glycol and cooling water lines in the upper containment and inside the ice condensers were insulated with Armaflex/Rubatex and/or foamglass. This insulation combination was also observed on the ICI room coolers in the lower containment (outside the crane wall). The Main Steam and Feedwater penetrations, which are open to the lower containment inside the crane wall, were observed to contain Calcium Silicate.

A thorough review of the design drawings for the RMI showed that there were segments of insulation fabricated with Min-K. Discussions with TVA insulators indicated that these segments were totally enclosed in stainless jacketing and were indistinguishable from the RMI except by weight. The attached walkdown packages document the quantities of Min-K as found during a review of the RMI drawings. Although not directly observed, the Min-K is conservatively assumed to exist based upon this design documentation.

2. Electrical Insulation

Significant amounts of 3M-M20C radiant energy shield, utilized to protect conduit and junction boxes, were seen inside the crane wall and in the ICI room. A single Marinite board was also observed in the #2 Fan Room. Min-K was also observed to have been used as a radiant energy shield in several locations.

Due to the large number of electrical cabinets, junction boxes, terminal boxes etc., the walkdown team did not attempt to examine each box, cabinet or panel. The walkdown team examined representative electrical components during the walkdowns to identify those potentially containing fibrous material. No junction boxes were observed to have fibrous material at the box penetrations. No cabinets, junction boxes or terminal boxes were identified that were considered to potentially contain fibrous material, therefore the walkdown team did not pursue opening any electrical boxes.

3. Other potential debris sources

The containment building was found to be generally in a clean condition. Very little rust, lint, or miscellaneous debris was observed. Several low traffic, hard to access areas had minor accumulations of dirt/dust, such as the areas between the RCP supports and the crane wall. The largest accumulation of dirt/dust/debris was observed on the platforms above the RCP motors, where grating lies on top of steel plate. In these areas, the grating webs were observed to contain dirt and fabric shreds. If procedures are revised to assure removal of this debris after outages it may not need to be considered during a CFD analysis. RTV/Silicone sealants were present in various amounts. One notable area is the ice condenser seal to the containment vessel and the keyway seal at the vessel (observable in the raceway at the 702' elevation). A clear silicone sealant in this area was observed to be separating from the fabric bellows. Non-bonded silicone or RTV beads are likely to become debris sources during a design basis event. Numerous red VT-2 labels and other adhesive labels (signs, conduit labels, etc.) were observed to be delaminating or peeling. Tie wraps in the zone of influence of a pipe break should also be considered to be potential sources of debris.

Coatings observations are documented in Attachment G.

4. FME Observations

It was noted during the walkdown that the sump area was used as a tool/electrical equipment room. It is recognized that there is limited space available for outage equipment, however it is recommended that additional precautions be taken to prevent foreign material intrusion into the sump. It was observed that the inner sump grating (which does not have an additional screen) was only partially covered (see photos in Attachments E and F) during the areas use as a tool/equipment room. It is recommended that consideration be given to constructing a solid cover for protecting the inner sump grating during outages.

REFERENCES

TVA/Watts Bar Unit 1 Documents

1. TVA Site Specific Engineering Specification N3M-936, Rev. 4, for "Installation, Modification, and Maintenance of Heat and Anti-Sweat Insulation"
2. TVA General Engineering Specification G-82, Rev. 2, "Installation, Modification, and Maintenance of Insulation"
3. TVA Contract No. 00029353 (Attachment B)
4. Fire Operating Requirements, 1-FOR-304-1, Rev. 8, "Visual Inspection of Fire Rated Assemblies Located in Unit 1 Reactor Building"
5. Central Laboratories Service Report No. 94-C0123 dated 2/7/94 for Watts Bar Nuclear Plant ISI Label Stickers.
6. TVA General Engineering Specification G-38, Rev. 18, "Installation, Modification, and Maintenance of Insulated Cables Rated up to 15000 Volts" (Section 2.2.8.1 "Cable Ties Used in Primary Containment")
7. Vendor Manual WBN-VTD-M030-0040, Rev. 0, "Applications and Specifications for 3M Interam CS-195 Composite Sheet"
8. Vendor Manual WBN-VTD-M030-0020, Rev. 1, "Applications and Characteristics of 3M Interam Brand Fire Barrier Intumescent Mat M20C
9. WB-DC-30-4, "Separation/Isolation", Appendix D "Approved Barriers"
10. Technical Instruction TI-12.14, Rev. 1, "Replacement and Upgrade of Plant Component Identification Tagging and Labeling"
11. Engineering Design Standard DS-M17.2.2, Rev. 5, "Electrical Raceway Fire Barrier Systems"
12. Technical Instruction TI-209, Rev. 0, "Plant Labeling"
13. Calculation WBN-OSG4-196, Rev. 4, "Transport Analysis for Containment Coatings"
14. Calculation WBN-OSG4-091, Rev. 9, "Maximum Containment Water Level"
15. General Engineering Specification G-29, Rev. 22, "Material Fabrication and Handling Requirements for Austenitic Stainless Steel"

Enercon Documents

1. Enercon Procedure TVAW001-PROC-01 Rev. 0, "Containment Walkdown Procedure for Potential Sump Screen Debris Sources at Watts Bar Nuclear Plant, Tennessee Valley Authority" (Attachment C)

NRC Documents

1. NUREG/CR 2403 Survey of Insulation Used in NPP and Debris Generation
2. NUREG/CR 2791 Methodology for Evaluating Insulation Debris
3. NUREG/CR 3170 Susceptibility of Fibrous Insulation Pillows/Debris

4. Generic Letter 98-04: Potential for Degradation of the Emergency Core Cooling System and Containment Recirculation Spray System after a Loss-of-Coolant Accident Because of Construction and Protective Coating Deficiencies and Foreign Material in Containment
5. Generic Letter 97-04: Assurance of Sufficient Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal Pumps
6. NRC Bulletin 93-02: Debris Plugging of Emergency Core Cooling Suction Strainers
7. NRC Information Notice: Inadequate Net Positive Suction Head in Low Pressure Safety Systems
8. NRC Staff Comments on NEI 02-01 "Condition Assessment Guidelines: Debris Sources Inside Containments" Slides by John Lehning NRR/DSSA/SPLB dated May 30,2002

Industry Documents

1. NEI 02-01 Condition Assessment Guidelines: Debris Sources Inside Containments, Rev. 1
2. ITS Corporation comments on NEI 02-01 dated August 12, 2002
3. Handout package from the NEI Meeting, July 2002

DRAWINGS USED FOR WALKDOWNS

(Note: Additional Isometrics, Conduit/Piping Plans, and Insulation Fabrication drawings are referenced in the individual walkdown packages)

1. SD-E15.3.4, Rev. 7, "Electrical Standard Drawing, Raceways, CA & W Ident Tags (Sequoyah Nuc Plt & All Subsequent Nuc Projects"
2. 41N710-1, Rev. C, "Reactor Building Unit 1, Concrete, Floor Slab – El. 702.78, Outline, Watts Bar Nuclear Plant"
3. 47W200-2, Rev. K, "Powerhouse Unit 1, Equipment Plan, El 772.0 & Above, Watts Bar Nuclear Plant"
4. 47W200-11, Rev. 9, "Powerhouse Units 1 & 2, Equipment, Reactor Building, Watts Bar Nuclear Plant"
5. 47W200-12, Rev. 9, "Powerhouse Units 1 & 2, Equipment, Reactor Building, Watts Bar Nuclear Plant"
6. 47W200-13, Rev. 5, "Powerhouse Units 1 & 2, Equipment, Reactor Building, Watts Bar Nuclear Plant"
7. 47W200-14, Rev. 5, "Powerhouse Units 1 & 2, Equipment, Reactor Building, Watts Bar Nuclear Plant"
8. 47W600-216, Rev. K, "Reactor Building Unit 1, Electrical Instruments & Controls, Watts Bar Nuclear Power Plant"
9. 47W600-217, Rev. J, "Reactor Building Unit 1, Electrical Instruments & Controls, Watts Bar Nuclear Power Plant"
10. 47W600-218, Rev. F, "Reactor Building Unit 1, Electrical Instruments & Controls, Watts Bar Nuclear Power Plant"
11. 47W600-219, Rev. G, "Reactor Building Unit 1, Electrical Instruments & Controls, Watts Bar Nuclear Power Plant"
12. 47W331-1, Rev. G, "Powerhouse Reactor Building Unit 1, Mechanical Containment Penetrations"
13. 47W331-2, Rev. E, "Powerhouse Reactor Building Unit 1, Mechanical Containment Penetrations"
14. 47W470-4, Rev. J, "Powerhouse Reactor Building Unit 1, Mechanical Sleeves Crane Wall"
15. 47W470-8, Rev. F, "Powerhouse Reactor Building Unit 1, Mechanical Sleeves, Interior Walls and Floors"
16. 47B473-1, Rev. C, "Powerhouse Reactor Building Unit 1, Mechanical Sleeve Seals, Crane Wall"
17. 47B473-2, Rev. C, "Powerhouse Reactor Building Unit 1, Mechanical Sleeve Seals, Crane Wall"
18. 47B473-3, Rev. A, "Powerhouse Reactor Building Unit 1, Mechanical Sleeve Seals for RCP Catch Basin & Cntmt Instr Rm"
19. 47B473-4, Rev. A, "Powerhouse Reactor Building Unit 1, Mechanical Sleeve Seal, Crane Wall"
20. 47B473-5, Rev. E, "Powerhouse Reactor Building Unit 1, Mechanical Sleeve Seals, Crane Walls"
21. 47B473-6, Rev. A, "Powerhouse Reactor Building Unit 1, Mechanical Sleeve Seals, Crane Wall, Interior Walls & Floors"

22. 47B473-7, Rev. 1, "Powerhouse Reactor Building Units 1 & 2, Mechanical Sleeve Seals, Crane Wall, Interior Walls & Floors"
23. 47B473-8, Rev. A, "Powerhouse Reactor Building Unit 1, Mechanical Sleeve Seals, Crane Wall, Interior Walls & Floors"
24. 47W462-412, Rev. 4, "Reactor & Auxiliary Building Units 1 & 2, Mechanical, INS/HT Tracing, Ice Condenser System, Watts Bar Nuclear Plant"
25. 47W915-2, Rev. M, "Powerhouse Reactor Building, Unit 1, Mechanical, Heating, Ventilating, and Air Conditioning, Watts Bar Nuclear Plant"
26. 47W915-3, Rev. P, "Powerhouse Reactor Building, Unit 1, Mechanical, Heating, Ventilating, and Air Conditioning, Watts Bar Nuclear Plant"
27. 47W915-4, Rev. T, "Powerhouse Reactor Building, Unit 1, Mechanical, Heating, Ventilating, and Air Conditioning, Watts Bar Nuclear Plant"
28. 47W915-8, Rev. L, "Powerhouse Reactor Building, Unit 1, Mechanical, Heating, Ventilating, and Air Conditioning, Watts Bar Nuclear Plant"
29. 47W915-408, Rev. A, "Powerhouse Reactor Building Unit 1, Mechanical, I/HT, Heating Ventilating, and Air Conditioning, Watts Bar Nuclear Power Plant"
30. 47W2500-1, Rev. 1, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad I, El. 702.78 to 710, Watts Bar Nuclear Plant"
31. 47W2500-2, Rev. 1, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad II, El. 702.78 to 710, Watts Bar Nuclear Plant"
32. 47W2500-3, Rev. 1, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad III, El. 702.78 to 710, Watts Bar Nuclear Plant"
33. 47W2500-4, Rev. 2, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad IV, El. 702.78 to 710, Watts Bar Nuclear Plant"
34. 47W2500-5, Rev. 2, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad I, El. 710 to 720, Watts Bar Nuclear Plant"
35. 47W2500-6, Rev. 2, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad II, El. 710 to 720, Watts Bar Nuclear Plant"
36. 47W2500-7, Rev. 2, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad III, El. 710 to 720, Watts Bar Nuclear Plant"
37. 47W2500-8, Rev. 2, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad IV, El. 710 to 720, Watts Bar Nuclear Plant"
38. 47W2500-9, Rev. 1, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad I, El. 720 to 737.0, Watts Bar Nuclear Plant"
39. 47W2500-10, Rev. 2, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad II, El. 720 to 737.0, Watts Bar Nuclear Plant"
40. 47W2500-11, Rev. 1, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad III, Inside Crane Wall Elev. 734'-0" – 754"-0", Outside Crane Wall Elev. 734'-0" – 742'-0", Watts Bar Nuclear Plant"
41. 47W2500-12, Rev. 1, "Powerhouse Reactor Building Unit 1, Composite Piping, Quad IV, El. 720 to 737.0, Watts Bar Nuclear Plant"
42. 48N919, Rev. F, "Reactor Building Unit 1, Miscellaneous Steel, Sump Liner, Sheet 3, Watts Bar Nuclear Plant"
43. 1-47W814-1, Rev. 19, "Flow Diagram – Ice Condenser System"
44. 1-47W814-2, Rev. 28, "Flow Diagram – Ice Condenser System"
45. 1-47W814-3, Rev. 13, "Flow Diagram – Ice Condenser System"

46. 1-47W243-6, Rev. 0, "3M-M20C Radiant Energy Shield, Inside Primary Containment – Reactor Building"
47. 1-47W243-7, Rev. 0, "3M-M20C Radiant Energy Shield, Inside Primary Containment – Reactor Building"
48. 1-47W243-8, Rev. 0, "3M-M20C Radiant Energy Shield, Inside Primary Containment – Reactor Building"

Additional Mechanical/Electrical Insulation and Heat Tracing Drawings Reviewed for Containment Debris Applicability

1. 47W400-402, Rev. A
2. 47W400-403, Rev. A
3. 47W400-404, Rev. A
4. 47W400-405, Rev. A
5. 47W400-408, Rev. A
6. 47W400-413, Rev. B
7. 47W400-414, Rev. A
8. 47W400-415, Rev. A
9. 47W401-402, Rev. A
10. 47W401-403, Rev. B
11. 47W401-404, Rev. A
12. 47W401-405, Rev. A
13. 47W401-406, Rev. A
14. 47W406-401, Rev. 0
15. 47W406-403, Rev. 3
16. 47W427-401, Rev. B
17. 47W427-407, Rev. B
18. 47W427-408, Rev. B
19. 47W427-409, Rev. C
20. 47W432-401, Rev. C
21. 47W432-402, Rev. C
22. 47W432-406, Rev. C
23. 47W435-404, Rev. D
24. 47W437-401, Rev. A
25. 47W437-402, Rev. 3
26. 47W437-406, Rev. A
27. 47W437-407, Rev.1
28. 47W450-401, Rev. B
29. 47W450-402, Rev. C
30. 47W450-403, Rev. D
31. 47W450-404, Rev. B
32. 47W450-405, Rev. B
33. 47W450-406, Rev. B

34. 47W450-408, Rev. B
35. 47W450-411, Rev. B
36. 47W450-413, Rev. B
37. 47W450-414, Rev. B
38. 47W450-415, Rev. B
39. 47W450-416, Rev. B
40. 47W450-417, Rev. B
41. 47W450-418, Rev. B
42. 47W450-419, Rev. B
43. 47W450-420, Rev. B
44. 47W454-403, Rev. 2
45. 47W454-405, Rev. 2
46. 47W454-406, Rev. 2
47. 47W454-407, Rev. 1
48. 47W462-402, Rev. C
49. 47W462-403, Rev. B
50. 47W462-404, Rev. C
51. 47W462-405, Rev. B
52. 47W462-406, Rev. B
53. 47W462-407, Rev. C
54. 47W462-413, Rev. C
55. 47W464-402, Rev. 2
56. 47W464-403, Rev. B
57. 47W464-404, Rev. A
58. 47W464-406, Rev. B
59. 47W464-407, Rev. A
60. 47W464-408, Rev. A
61. 47W464-412, Rev. A
62. 47W464-413, Rev. 1
63. 47W464-414, Rev. A
64. 47W464-424, Rev. 0
65. 47W464-425, Rev. 1
66. 47W555-401, Rev. B
67. 47W555-402, Rev. C
68. 47W555-403, Rev. C
69. 47W555-406, Rev. B
70. 47W555-407, Rev. B
71. 47W555-408, Rev. A
72. 47W555-409, Rev. B
73. 47W555-410, Rev. D
74. 47W555-411, Rev. B
75. 47W555-412, Rev. C
76. 47W555-413, Rev. B
77. 47W555-418, Rev. B
78. 47W555-419, Rev. B
79. 47W555-425, Rev. 2

80. 47W620-401, Rev. 0
81. 47W620-402, Rev. 0
82. 47W620-403, Rev. 1
83. 47W620-404, Rev. 1
84. 47W625-401, Rev. 0
85. 47W625-402, Rev. 0
86. 47W625-404, Rev. 0
87. 47W625-405, Rev. 0
88. 47W625-406, Rev. 0
89. 47W625-407, Rev. 0
90. 47W625-409, Rev. 1
91. 47W625-411, Rev. 0
92. 47W625-412, Rev. 0
93. 47W625-414, Rev. 1
94. 47W625-415, Rev. 0

ATTACHMENT A:

LETTER JAS03-049, TVA-A03-3002 , "PROPOSAL FOR WATTS BAR CONTAINMENT DEBRIS SOURCE WALKDOWNS

ENERCON SERVICES, INC.

500 TownPark Lane, Suite 275
Kennesaw, GA 30144-5509
(770) 919-1930
Fax. (770) 919-1932

September 16, 2003
JAS03-049, Rev. 2
Proposal No. TVA-A03-3002

Mr. David Smith
Contracts Officer
Tennessee Valley Authority
Watts Bar Nuclear Plant
P.O. Box 2000
Spring City, TN 37381

Subject: *Proposal for Watts Bar Containment Debris Source Walkdowns.*

Dear Mr. Smith,

In response to our meetings onsite on September 12th, ENERCON is pleased to provide the attached proposal for the containment walkdowns at Watts Bar (fall of 2003). Enercon is currently teamed with Westinghouse, as well as Innovative Technology Solutions and Transco Products, to provide a complete range of services for the overall resolution of the GSI-191 issue. As was discussed at our meeting, it is Enercon's understanding that TVA might contract these proposal services through Westinghouse, with Enercon being the subcontractor or TVA might award directly to Enercon. Enercon will be happy to work with TVA with either contract.

If I can be of further assistance, or if you have any questions about this information, please call me at (770) 919-1931 ext. 230.

Sincerely,

J. Aaron Smith

J. Aaron Smith, P.E.
ENERCON Project Manager

Cc
R. Bryan
Proposal File

BACKGROUND

The Enercon – Westinghouse – ITSC – Transco team has aligned its collective strengths and capabilities to resolve this issue through a solid teaming arrangement. No other single company or teaming arrangement in our industry can match the benefits offered through this proposal nor can it claim actual field experience held by our team in resolving this very issue at Davis-Besse. Our teaming guidelines express a keen focus on delivering the best value to you regardless of each company's individual benefit of performing services or products. Our bottom line goal is to properly evaluate your specific conditions and minimize the cost impacts associated with the resolution to GSI-191 one step at a time.

The concern of GSI 191 is post-LOCA blockage of ECCS screens with LOCA generated debris at PWR nuclear generating units. With a combination of small quantities of fiber and larger quantities of particulate, the NRC sponsored studies have shown that most US PWR units will experience some type of ECCS failure due to high head losses across the screens with this combination of debris. Some types of thermal insulation can be a source of fiber, other types can be a source of particulate, and still other types can be a source of both and hence insulation in general is seen as a major source of LOCA generated debris. Other types of debris include paint material that is dislodged post LOCA, dirt/dust, rust, and possible other foreign material

To determine whether a particular nuclear plant may suffer from post LOCA ECCS screen blockage, an engineering assessment needs to be performed. This assessment is complex and requires knowledge of a number of plant specific variables including the expected quantities and types of fibrous and particulate debris either generated or dislodged by the LOCA.

A required step in this assessment is the gathering of information relating to debris inside containment via a walkdown. NEI 02-01 is a guideline developed by the Nuclear Energy Institute (NEI) to provide the guidance on performing these debris source assessment walkdowns in containment.

Additionally, as part of the response to Bulletin 2003-01, many PWR utilities have committed to reviewing the containment flow and drainage paths during their upcoming outages.

SCOPE OF WORK

The following are recommended tasks of engineering services to support the walkdown of Watts Bar containment for GSI-191 concerns. The following scope of work is based a recent site meeting at Watts Bar on September 12th and ENERCON's recent walkdown experience from several Spring outages.

This scope of work is proposed to be Nuclear Safety Related and as such will be developed under the Enercon QA program, contracted to Westinghouse if desired.

TASK No. 1 - Preparation for Containment Walkdowns

We will assemble our walkdown team for site training and badging requirements.

During the week of September 22nd, the ENERCON walkdown procedure that has been used at previous walkdowns will be revised for specific requirements for Watts Bar. Additionally, we travel to Watts Bar and collect copies of applicable plant documentation such as piping isometrics, insulation specifications, existing debris transport calculations, ECCS pump NPSH calculations, sump/strainer design drawings, containment layout/floor plan drawings, and any existing coating evaluations/reports. This information will be used to prepare for the walkdowns and will help minimize time in containment and in turn help with ALARA. If any video tours are available of containment, this would also be beneficial prior to walkdowns as well. We also recommend that TVA provide the walkdown assistance of insulators experienced with the insulation inside containment. This assistance of the insulators help expedite the walkdowns, minimize ALARA and reduce open items related to insulation materials.

TASK No. 2 – Debris Source Walkdowns

ENERCON will document the walkdowns with digital photographs and videos. ENERCON will walkdown areas in Containment in accordance with the developed procedure and document the following, as a minimum. It is Enercon's understanding that items 1 and 2 below will be confirmatory in nature, as plant documentation is in very good shape. It is anticipated that most of the walkdown effort for items 1 and 2 will be in the lower elevations inside the crane wall, as this is the location of most of the insulation material. For item 3, the full containment will be walked down and foreign material will be documented.

1. Insulation Subject to Destruction
   - Location inside containment
   - Type of insulation
   - Type of fastening, jacketing or wrapping
   - Amount of insulation (length , width/thickness)

2. Cable and Cable Tray Fire proofing materials
   - Flammastic and Thermolag, etc

3. Foreign Materials
   - Other Materials are to be identified and are to be quantified in accordance with NEI 02-01 guidance (i.e. dirt, tape, tags, etc.)

This effort will be documented with walkdown packages consisting of drawing markups and photographs of each walkdown area. The walkdown effort will be supported by a team of four engineers. The duration is anticipated to be 5 days or less

Based upon previous discussions with TVA, it is anticipated that the insulation drawings are in very good shape and the walkdown effort will be more of confirmatory in nature with minimal exceptions being identified on with respect to the drawings.

The deliverable for this task will be a small summary report describing and summarizing the containment walkdown process and noting the foreign material identified as well as any fire proofing material. Attached to the report will be walkdown packages consisting of marked up drawings with photographs as needed. This small report will not itemize the piping insulation material.

TASK No. 3 – Coatings Walkdown

The coatings walkdown will consist of the following:

1. Review of existing documentation of the coatings systems used with in containment.

2. Perform a walkdown, including digital photographs, of the containment to generically identify and evaluate the condition of coatings on structures, systems and components, using NEI 02.01 as a guide.

3. Prepare a qualitative estimate of indeterminate and unqualified containment coatings.

Though most PWR utilities have good coatings programs, based upon our recent work with several utilities, this coatings walkdown and review has in most cases identified additional items that had been overlooked for years. This task provides a fresh set of eyes with respect to this industry issue.

A letter report will document the assessment and walkdown findings.

Our coating engineer will require approximately three days onsite.

TASK No. 4 – Sump Area Walkdown

ENERCON will videotape and photograph areas in and around the containment emergency sump to support as-building the sump areas for any potential modifications. In addition, we will verify the as-built condition of the strainer for future modification or structural qualification of debris loads. We will also review and record layouts of high energy piping in the vicinity of the sump area. Enercon will support this walkdown effort of the sump area with a structural engineer who has experience in sump strainer design.

In addition, the containment floor and flow paths to the sumps will be recorded with videotape and photographs to assist future debris transport analyses. ENERCON will be supported by an ITS engineer with experience in containment modeling for debris transport and will conduct this flow path walkdown. The transport engineer will walkdown and document the physical/structural features that will affect the flow of debris and water from a potential break location to the sump. The following items will be documented at a minimum:

- Verify robust barriers located inside containment.
- Verify structures and equipment impervious to jet impingement and prevent jet expansion.
- Verify major paths for containment spray flow and assess the areas covered by containment sprays
- Determine spray and drainage flowpaths to the sump
- Confirm input necessary for debris transport analysis (CFD).

These walkdowns will be documented in letter reports.

The structural engineer and transport engineer will require approximately three days onsite.

TASK No. 5 – Walkdown Report

As an overall summary to this GSI-191 containment walkdown, ENERCON will develop a detailed walkdown report with findings documented in spreadsheet format with a narrative report of the scope, basis, summary of results, etc. The detailed report will provide all of the insulation material information in a spreadsheet format that can be directly used as input for any future debris generation model. The report will also contain the letter reports of the above selected task as well as the walkdown packages for insulation as attachments, thus resulting in one overall walkdown report. ENERCON will provide to TVA the electronic files for the document and spreadsheets.

This Walkdown Report will support two topics in the overall resolution of GSI-191 issues. First, this report will be part of the design input for the debris generation and transport analyses for determining debris head loss at the emergency sump strainer. Second, this report will be part of the input in establishing a program to document and control potential debris source material (thermal insulation, fire barrier material, unqualified or degraded coatings, etc.) within containment.

DELIVERABLES

The following deliverables will be developed in accordance with Westinghouse /ENERCON's QA program:

- ENERCON Walkdown Procedure
- ENERCON Walkdown Reports

All electronic files and photographs/videos will be provided.

SCHEDULE

ENERCON proposes to complete the scope of work in accordance with the milestone schedule below:

Watts Bar Walkdowns

Team Badging, Preparation, and Data Collection	September 22, 2003
Begin Walkdowns	September 29, 2003
Walkdowns complete	October 5, 2003, 7 days after start
Walkdown Report Submitted for Comment	8 weeks after walkdowns
Final Walkdown Report	2 weeks after comments received

CAPABILITIES AND EXPERIENCE

Enercon, Westinghouse, Innovative Technology Solutions Corporation (ITSC), and Transco have all individually participated in the development and impact minimization of this issue with the vast majority of the affected utilities beginning with the BWR units up to and including many of the PWR units as well. As a consequence, our companies recognized the continual morphing of requirements and direction coming from the USNRC and established a teaming arrangement whereby you will directly benefit from a level of service and capabilities effectively greater than the sum of its parts through a mutual focus on a single problem -- yours.

Each company supports this alliance through mutually contributing talent where skill sets overlap and maximizing the individual contributions from the specialities developed specifically toward this issue. The result unites significant bench strength of both breadth and depth. You will benefit from the collaborative effort of three of the nation's most respected and trusted solution providers.

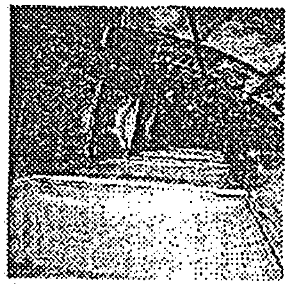
ENERCON SERVICES, INC.

Enercon is an engineering management and technical consulting firm with a Client list that includes a considerable number of engineering and electric utility companies in the United States and abroad. Enercon's total commitment to customer service has earned the company the highest respect as an engineering, management, and technical consulting firm. In-depth partnerships with industry allow Enercon to formulate innovative solutions, which support engineering, training, management services, crisis management, operations, maintenance, and licensing/regulatory affairs. Enercon maintains offices in Atlanta, GA; Pittsburgh, PA; Mt Arlington, NJ; Tulsa and Oklahoma City, OK; Dallas and Houston, TX; Oakland, CA; and Wilmington, NC.

Enercon has the requisite experience and capabilities to successfully complete the described scope of work. Recent Enercon projects which illustrate our capabilities and experience for this type of work scope include the following:

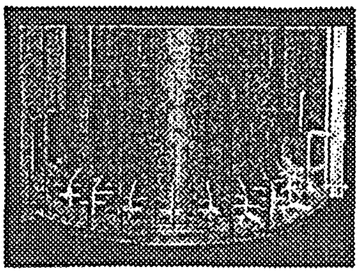
- Enercon /ITSC is currently leading the industry in resolution of PWR sump/strainer issues. Using our experience, procedures and methodology we developed for containment walk-downs at Davis-Besse, we are currently supporting Dominion at North Anna and Surry with detailed containment walk-downs of debris sources, the containment floor and flow paths to the emergency sump, and emergency sump documentation and as-built data for future modifications. Contact: Marty Badewitz, Dominion Generation, Project Manager, (804) 273-2711.

- At the Davis-Besse Nuclear Plant, Enercon developed the design and analyses to support enhancement and facilitated the replacement of the Davis-Besse ECCS sump strainer. (Contact: John Grabnar, First Energy, Design Engineering Manager, (419) 321-7680).



- ENERCON has also supported Turkey Point Unit 3 (Contact: Tim Johnson, Florida Power and Light, Engineer, (305) 246-6175), in the walk-down of their containment for sources that would potential impact the performance of the ECCS sump.

- ENERCON was one of the industry leaders in resolving the BWR ECCS strainer issues with complete analyses and designs at Perry Nuclear Power Plant (Contact: Ted Hilston, First Energy, Senior Engineer, (440) 280-5053), Clinton Power Station, and Entergy's Grand Gulf Nuclear Station (Contact Bob Gordon, Entergy, Senior Project Manager, (601) 437-6522.)



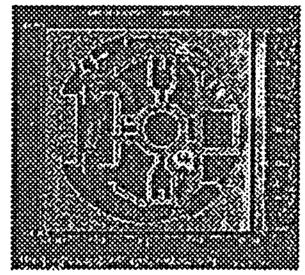
WESTINGHOUSE Westinghouse

Westinghouse has served TVA and in particular the Sequoyah and Watts Bar facilities for many years as your NSSS vendor and has developed an excellent relationship built on mutual respect and trust. As an innovator and pioneer in the nuclear power generation industry, Westinghouse currently participates and hold board status on the owner's groups directly affected by GSI-191. Their direct participation and support of NEI provides a credible industry knowledge base that the USNRC both respects and listens to.

ITS CORPORATION ITS CORPORATION

ITS Corporation is recognized as one of the country's most respected leaders in the analytical engineering community, and has been active in the resolution of ECCS Suction Strainer issues since these problems were brought to the forefront of industry attention in the early 1990's. During the past decade, ITS Corporation has addressed an ever-widening range of technical and regulatory issues in both BWR and PWR facilities. More recently, in the PWR arena under GSI-191, via a teaming arrangement with ENERCON Services, Inc., ENERCON and ITSC conceived, designed, analyzed, constructed and successfully installed an innovative, large-passive strainer for the Davis-Besse Nuclear Plant, for which all regulatory issues are expected to be satisfactorily resolved.

ITS Corporation offers a full spectrum of analytical services with regard to GSI-191 issues and will be an integral part of this project's effort. Respective analytical services include debris characterization, debris source term calculations, debris transport logic trees, computational fluid dynamics (CFD) analysis, hydraulic system and strainer head loss analysis, coupled with hands-on walk-down experience for PWRs. ITS Corporation's technical expertise in these technical areas represents a major component in the resolution of this issue and compliments the capabilities of the other team members.



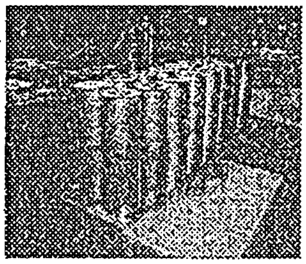
ITS Corporation – Past and Recent Clients for Suction Strainer Issues

- American Electric Power - D.C. Cook
- Entergy (Boston Edison) - Pilgrim
- Carolina Power & Light – Brunswick-1 & 2
- Commonwealth Edison – Dresden-2 & 3, La Salle-1 & 2, Quad Cities-1 & 2
- Consolidated Edison – Indian Point-2
- Detroit Edison – Fermi
- Dominion – North Anna
- Duke Engineering & Services, Incorporated
- Enercon Services, Incorporated
- Energy Northwest – Columbia Generating Station
- FirstEnergy – Davis-Besse Nuclear Plant
- IES Utilities – Duane Arnold
- Niagara Mohawk – Nine Mile Point-1
- Northern States Power – Monticello
- NYPA - Fitzpatrick
- Omaha Public Power District – Ft. Calhoun Station
- Pacific Gas & Electric – Diablo Canyon
- PSE & G – Hope Creek
- Texas Utilities Generating Co. – Comanche Peak
- Vermont Yankee Nuclear Power Station

TRANSCO PRODUCTS

- Safety Related Manufacturer
  - NUPIC Audited Part 50 Appendix B QA Program
  - TQM and ISO 9000 Certified

- Transco materials and systems are in service at every operating nuclear power station in the United States
  - Transco Metal Reflective Insulation is installed at over 90 nuclear units
  - MIRROR Metal Reflective Insulation is installed at over 60 nuclear units
  - THERMAL-WRAP Blanket Insulation System is installed at over 30 nuclear units
- Strainer Fabrication for
  - BWR's Grand Gulf and Clinton
  - PWR Davis Besse Nuclear Plant



COST/COMMERCIAL TERMS

The total fixed price cost for the above tasks is with the following breakdown by task:

Task 1 and Task 2, Preparation and Debris Source Walkdowns -
Task 3, Coatings Walkdown -
Task 4, Sump Area Walkdown -
Task 5, Walkdown Report -

These costs have been discounted and would also apply for future walkdowns supporting Sequoyah Nuclear Plant Units 1 and 2.

One invoice for the total project value will be submitted upon TVA acceptance of the final Walkdown Report.

T&M Rates
Engineer
Senior Engineer

CLARIFICATIONS/ASSUMPTIONS

The following clarifications / assumptions to the proposal are provided:

1. Bid is based on work scope as identified in this proposal, including attachments, with clarifications and exceptions as identified in this section. Changes to identified work scope requested by TVA must be accompanied by an appropriate, mutually agreed upon, scope change notice.

2. Westinghouse/ENERCON on-site personnel for outage walkdowns and document retrieval, following completion of required training, shall be badged by TVA.
3. Westinghouse/ENERCON will be provided reasonable access to containment for the walkdown effort. Excessive delays will be grounds for request of additional fees to cover lost labor and expenses.
4. Owners review and comments for each deliverable will be completed in a maximum of ten (10) working days. A single, consolidated set of TVA review comments shall be provided to the Westinghouse/ENERCON project manager.
5. Proposal is based on the team performing the walkdowns in (5) 12-hour shifts. Should the team be delayed because of outage activities or require additional time, the additional work will be performed on a time and materials basis utilizing the rates given above.

ATTACHMENT B:

TENNESSEE VALLEY AUTHORITY CONTRACT # 00029353
INCLUDING SUPPLEMENT 1

CONTRACT NO.: 00029353
CONTRACT AMOUNT: $20,000
AWARD DATE: September 18, 2003
CONTRACT TERM: 09/22/03
Through 9/30/03

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT

CONTINGENT WORK ON SERVICES

This CONTRACT, effective September 22, 2003 by and between ENERCON SERVICES, INCORPORATED, (hereinafter called "Contractor"), and the TENNESSEE VALLEY AUTHORITY (hereinafter called "TVA");

IN CONSIDERATION of the mutual covenants hereinafter contained, the parties agree to the provisions specified herein.

IN WITNESS WHEREOF, the parties hereto have caused this contract to be executed by their duly authorized officials.

TENNESSEE VALLEY AUTHORITY	ENERCON SERVCIES, INCORPORATED
Watts Bar Nuclear Plant	500 TOWNPARK LANE
P.O. Box 2000	SUITE 275
Spring City, TN 37381	KENNESAW, GA 30144-5509
ATTN: David A. Smith, WBN Contract Manager	ATTN: J. AARON SMITH
By David A. Smith	By Robert H. Bryan
Title WBN Contracts Mgr.	Title Director, Atlanta Operations
Date 9/23/03	Date 9/23/03

TERMS & CONDITIONS

WORKSCOPE
Contractor will perform the following:

TASK No. 1 - *Preparation for Containment Walkdowns*

We will assemble our walkdown team for site training and badging requirements.

During the week of September 22nd, the ENERCON walkdown procedure that has been used at previous walkdowns will be revised for specific requirements for Watts Bar. Additionally, we will travel to Watts Bar and collect copies of applicable plant documentation such as piping isometrics, insulation specifications, existing debris transport calculations, ECCS pump NPSH calculations, sump/strainer design drawings, containment layout/floor plan drawings, and any existing coating evaluations/reports. Contractor will not perform any safety or quality related activities under this contract.

COMPENSATION FOR SERVICES

For the satisfactory completion and acceptance by TVA of the deliverables described in the Work scope TVA agrees to pay Contractor the firm fixed price of Twenty thousand dollars ($20,000).
This price shall be fixed and is not subject to change except pursuant to a fully executed written supplement to this contract. Payments under this contract shall not exceed $20,000. The fixed price of $20,000 may only be adjusted based on the actual rates of performance as agreed upon by TVA pursuant to a fully executed written supplement to this contract.

TERM OF CONTRACT:

The term of this contract shall begin with its effective date and end September 30, 2004. The contract term, at TVA's option, may be extended up to 60 days beyond the original contract expiration date. The contract term shall not be increased or deemed to be increased except pursuant to a fully executed written supplement to the contract.

TERMS OF PAYMENT

Payment(s), less such discounts or deductions as are provided for in the Contract or by law, will be made by electronic fund transfer (after completing a TVA Electronic Vendor Payment Form). Payment will be made by electronic fund transfers not more than 30 calendar days after the later of (i) receipt of a proper invoice(s) by TVA at the office designated in the Contract for receipt of invoices or (ii) acceptance by TVA of the work, material, or equipment required by the Contract at the TVA location specified. Separate invoice(s) must be submitted for each payment.

Neither payment nor acceptance by TVA for the limited purpose described in this clause shall constitute a waiver of any rights under the Contract or at law, including rights under any warranty herein. Should TVA, in good faith, dispute any portion of the invoice, TVA shall pay the undisputed portion, and at the same time, shall advise the Contractor in writing of the reason(s) for disputing the invoice.

For purposes of this provision only, the following definitions shall apply:

1. "Proper invoice" includes, but is not limited to, a numbered and dated invoice, containing the TVA Contract number and release number (if applicable) and line items numbers as listed, discount or terms of payment and F.O.B. point applicable to this Contract, description of article or service, quantity, unit price, and total amount, together with supporting documentation as required by TVA.

2. "Acceptance" means receipt by TVA of the work, material, or equipment meeting the Contract requirements and acknowledgment by an authorized representative of TVA that such Contract specifications have been met. Solely for the purposes of establishing a payment date, such acceptance and acknowledgment shall be deemed to be the seventh day after the date on which, in accordance with the terms and conditions of the Contract, the property is actually delivered at the F.O.B. point or performance of the service is actually completed unless TVA actually accepted such property or services before such seventh day or unless a later acceptance period is specifically provided for elsewhere in the Contract; provided, however, such acceptance may be revoked at any time by TVA

upon the discovery of a latent defect in design, material, or workmanship, or a latent nonconformity of the work, material, or equipment to the Contract requirements.

All invoices shall be submitted to Tennessee Valley Authority, Watts Bar Nuclear Plant, Site Accounting Office ADM 1C, PO Box 2000, Spring City, TN 37381

Payments under this Contract are subject to the provisions of the Prompt Payment Act.

ASSIGNMENT

This contract or any interest therein or in any moneys due or to become due shall not be assigned, used as collateral, or otherwise disposed of without previous written consent of Contracting Officer.

WARRANTY

The warranty period will commence only after performance of work and upon acceptance of work by TVA which includes final inspection and completion of quality records review by TVA.

Contractor agrees that work performed as required for completion of this Contract shall be performed in accordance with all applicable drawings, codes and specifications and that Contractor shall be held solely responsible for all such work performed by Contractor and its subcontractors or suppliers on the jobsite or other locations. Contractor warrants that after acceptance all work performed by Contractor under this Contract, including all labor furnished, shall be free from defects in workmanship for a period of eighteen months after final acceptance of said work. If at any time after final acceptance of the work and prior to the expiration of the warranty period, Contractor or TVA discovers any defect in such workmanship, Contractor shall, upon written notice from TVA given within a reasonable time after discovery, correct such defects to the satisfaction of TVA by repairing or replacing the defective work at a time acceptable to TVA whether or not such time is in the warranty period. All costs incidental to such corrective action including reperforming, removal, disassembly, reinstallation, reconstruction, retesting and re-inspection as may be necessary to correct the defect or demonstrate that the previously defective work conforms to the requirements of the Contract shall all be borne by Contractor subject to term of this contract. Should reperforming, removal, disassembly, reinstallation, reconstruction, retesting and re-inspection of work previously performed by others be necessary to correct the defect or demonstrate that the previously defective work conforms to the requirements of the Contract, these costs shall also be borne by Contractor subject to terms of this contract.

Contractor further warrants any and all work performed as corrective action against defects in design, materials, and workmanship for a period of eighteen months following acceptance by TVA of the corrected work.

Should the Contractor refuse to correct or otherwise be unable to correct defective work, including such defective work as may have been performed by Contractor's subcontractors or suppliers, TVA reserves the right to cause the defective work to be corrected by others at the Contractor's expense. The cost of correction of Contractor's defective work by others shall be withheld from any monies due the Contractor or, if no such monies are due, shall be paid to TVA within thirty (30) days after submittal to Contractor of a detailed billing for the corrective work.

Contractor makes no other warranties, express or implied, with respect to its performance under this Contract.

AUDIT RIGHTS

Contractor shall keep accurate records and books of accounts in machine readable form supporting the items and costs billed under this agreement. TVA, or its agents, shall have the right to audit without restrictions and at no additional cost to TVA, at any time during normal working hours, all costs incurred by Contractor and billed to TVA and may examine Contractor's records specifically relating thereto. Any payments to the Contractor which are not in accordance with contract terms or are not supported by valid evidence shall be refunded to TVA. Contractor shall preserve and make available its records, both manual and those which are in machine readable form, for a period of 3 years from the date of final payment by TVA.

INDEMNITY:

The Contractor, by entering into agreement for the scope of work covered by the contract, acknowledges awareness of the location, nature and hazards of such work scope. As such, the Contractor releases TVA, its agents and employees, from all liability for Contractor's personal injuries, property damage, or loss of life or property arising out of or in any way connected with the performance of this contract. The Contractor will indemnify and defend TVA, its agents and employees, and save each of them harmless from any and all liability to Contractor's employees or any third parties for personal injuries, property damage, or loss of life or property resulting from or in any way connected with the performance of this contract. However, the foregoing indemnification shall not apply to injuries or damages to persons or property for which the proximate cause is the sole negligence of TVA, its agents or employees.

The Contractor shall bear all expenses incurred by TVA, its agents or employees, in defending all claims and action for damages arising out of the foregoing injuries, damages or losses, and shall pay all judgments that may be rendered in such actions, except where the proximate cause of such injuries, damages, or losses was the sole negligence of TVA, its agents or employees. In any action by TVA to enforce this Indemnity provision, the issue of whether injuries, damages, or losses were proximately caused by the sole negligence of TVA shall be tried de novo. Additionally, no judgment, pleading, or any other matter connected with any other action for such injuries, damages or losses shall be admissible against TVA in any such indemnity enforcement action.

The Contractor shall defend and save harmless TVA from all claims for material furnished or work done and shall promptly discharge the same and not suffer any mechanics or other liens to remain outstanding against any of the property used in connection with the work. Furthermore, the Contractor shall, on request, furnish satisfactory evidence that all persons who have done work or furnished materials have been fully paid. The Contractor shall pay TVA the cost, including overhead, of any services or materials provided by TVA to any persons, including subcontractors, engaged in carrying out any of the Contractor's obligations in connection with this contract. TVA reserves the right to withhold from any sums due the Contractor sufficient sums to satisfy all such claims. If after written notice from TVA, the Contractor fails to satisfy such claims, TVA may adjust and pay the same upon a fair and reasonable basis out of any withheld funds.

CONTRACTOR RESPONSIBILITIES:

Contractor agrees to provide the services of qualified personnel to perform the services as more fully described elsewhere in this contract, when and as requested by TVA and agreed upon by Contractor. TVA reserves the right to assign to other contractors work related to the scope of work contained in this contract or perform the work itself if such assignment is determined to be in the best interest of TVA.

Contractor shall provide such services as authorized by the contracting officer and under the direction of the Technical Contract Manager Mr. Robert Kirkpatrick (423-365-1707).

ENVIRONMENTAL CONSIDERATIONS:

Contractor shall conduct its activities in connection with the performance of this contract in such a way as to minimize, insofar as is reasonably possible, the impact on the environment and shall assist TVA in carrying out commitments contained in the Environmental Evaluation Record and/or the Environmental Impact Statement, if such documents are applicable to the project, as well as such other environmental commitments as TVA may have made in relation to the work to be undertaken by Contractor. In considering the impact of its activities upon the environment, Contractor shall take into account such factors as, among other things, air pollution, erosion control, noise control, solid waste disposal, and waste water disposal. TVA will monitor Contractor's activities and initiate requests for corrective actions as required.

Additionally, TVA seeks to make environmental quality an integral part of the way TVA and its suppliers do business. Specifically, TVA seeks to reduce "Reportable Environmental Events" (REEs) (occurrences which violate environmental regulatory requirements, and which require notification to, or lead to enforcement action by, Federal, State, or local regulatory agencies). Contractor agrees to immediately notify TVA of any REEs which occur at any of Contractor's facilities or work sites at any location during the term of contract performance, and to provide TVA with reasonable additional information about such REEs as requested.

FACILITIES TO BE PROVIDED BY TVA:

To the extent available and to the extent Contractor's usage does not interfere with TVA's or any other Contractor's activities, to be determined solely by TVA:

1. water from TVA's water system at existing outlets;
2. electricity at existing outlets;
3. compressed air at existing outlets;
4. temporary parking facilities.

An uninterrupted supply of water, electricity, and air is not guaranteed; and TVA does not guarantee outlets to be functional. These items are provided as a matter of courtesy, and this shall not create any obligation by TVA to provide such items. It is Contractor's responsibility to obtain utility services, equipment, and materials necessary to perform the contract in the event these are not available from TVA.

DRUG-FREE WORKPLACE:

(Not applicable to contracts for commercial items as defined at 41 U.S.C. 403(12), unless contractor is an "individual" as defined below.) Public Law No. 100-690, the Drug-Free Workplace Act of 1988, prohibits TVA from entering into this contract unless the contractor certifies that it will maintain a drug-free workplace and agrees to take certain reasonable measures to assure its workplace will remain drug free. Please note that neither the statute nor this clause requires the contractor to undertake drug testing of its employees or to maintain a rehabilitation program.

(a) Definitions. As used in this provision:

"Controlled substance" means a controlled substance in schedules I through V of Section 202 of the Controlled Substances Act (21 U.S.C. § 812) and as further defined in regulation at 21 C.F.R. §§ 1308.11-1308.15.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession, or use of any controlled substance.

"Drug-free workplace" means a site, including TVA premises, for the performance of work done in connection with a specific contract at which employees of the contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a contractor directly engaged in the performance of work under a Government contract.

"Individual" means an offeror/contractor that has no more than one employee, including the offeror/contractor.

(b) Contractors Other than Individuals. The contractor, if other than an individual, as a condition of award of the contract, certifies and agrees that, with respect to all employees of the contractor employed in the performance of this contract, it shall--

(1) Publish a statement notifying such employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

(2) Establish a drug-free awareness program to inform such employees about--

(i) The dangers of drug abuse in the workplace;

(ii) The contractor's policy of maintaining a drug-free workplace;

(iii) Any available drug counseling, rehabilitation, and employee assistance programs; and

(iv) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this provision;

(4) Notify such employees in the statement required by subparagraph (b)(1) of this provision that, as a condition of continued employment on the contract, the employee will--

(i) Abide by the terms of the statement; and

(ii) Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction;

(5) Notify the Contracting Officer within ten (10) days after receiving notice under subdivision (b)(4)(ii) of this provision from an employee or otherwise receiving actual notice of such conviction;

(6) Within thirty (30) days after receiving notice under subparagraph (b)(4) of this provision of a conviction, impose the following sanctions or remedial measures on any employee who is convicted of drug abuse violations occurring in the workplace;

(i) Take appropriate personnel action against such employee, up to and including termination; or

(ii) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency; and

(7) Make a good-faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1) through (b)(6) of this provision.

(c) Individuals. The contractor, if an individual, agrees, by award of the contract, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in the performance of this contract.

(d) Enforcement. Failure of the contractor to comply with the requirements of subparagraphs (b)(1) through (b)(7) or paragraph (c) shall constitute a material breach of contract entitling TVA to suspend payments, terminate the contract, suspend or debar the contractor from Government contracting in accordance with Subsection 5152(b)(2) of the Drug-Free Workplace Act of 1988 (Public Law No. 100-690), or take such other action as may be in accordance with law or the contract.

EMPLOYEE PROTECTED ACTIVITIES:

A. Contractor shall comply with Section 211 of the Energy Reorganization Act of 1974, which prohibits discrimination against employees for engaging in certain protected activities. The Secretary of Labor has determined that "discrimination" means discharge or any other adverse actions that relate to compensation, terms, conditions, and privileges of employment, and that the term "protected activities" includes, among other things, employees raising nuclear safety or quality control complaints either internally to their employer or to the Nuclear Regulatory Commission (NRC). Contractor shall aggressively pursue or in the case of subcontractor actions ensure its subcontractors aggressively pursue any employee allegation of discrimination for engaging in protected activity with respect to work under this agreement and shall fully investigate such allegations. Within two working days after the earlier of Contractor's or its subcontractor's receipt of (i) an allegation associated with work under this agreement by an employee or former employee of Contractor or its subcontractor of discrimination because of engagement in protected activities or (ii) notice of the filing of a Section 211 complaint by any such employee or former employee, Contractor shall notify the TVA Concerns Resolution Staff Site Representative of such allegation or complaint in writing, together with a copy of any complaint. TVA's Office of the Inspector General ("TVA OIG") may, at its option, conduct an investigation of any such allegation or complaint.

Contractor shall cooperate fully with the TVA OIG in order to permit a full investigation of any such allegations, shall provide TVA any investigative reports that it may prepare as a result of any such allegation or complaint, and shall also provide to TVA a full written description of any management action taken in response to any such allegation or complaint. In circumstances where any such allegation or complaint also charges TVA employees with involvement in any discriminatory activities, TVA's Office of the General Counsel will represent TVA in any proceedings arising out of the charges, and Contractor shall cooperate fully with TVA counsel in its representation.

B. Contractor shall ensure that no agreement affecting the compensation, terms, conditions, and privileges of employment, including, but not limited to, any agreement to settle a complaint filed by an employee or former employee of the Contractor with the Department of Labor pursuant to Section 211 of the Energy Reorganization Act of 1974, as amended, may contain any provision which would prohibit, restrict, or otherwise discourage an employee or former employee from participating in any protected activity as described in the "Employee Protection" regulations of the NRC (published at 10 CFR 50.7), including, but not limited to, providing information to NRC on potential violations of NRC's regulations or other matters within NRC's regulatory responsibilities.

C. Any breach of this provision shall be a material breach of the agreement. In the event NRC imposes a civil penalty against TVA as a result of a breach of this provision, such a civil penalty is considered by the parties to be direct and not special or consequential damages.

D. Contractor agrees to place this provision, along with the flow-down requirement of this sentence, in all subcontracts of any tier entered into pursuant to this agreement, unless TVA consents in writing to exclude a particular subcontract or class of subcontracts.

E. Nothing in this agreement shall in any way limit the TVA OIG's authority under the Inspector General Act, as amended, including the authority to subpoena documents.

F. Contractor shall also comply with all requirements of TVA's [illegible] concerns [illegible] specified in Nuclear Power Standard Programs and Processes 1.0 that address contractor responsibilities for concerns.

G. In order to ensure consistent handling of Section 211 complaints involving TVA projects, upon execution of this agreement, Contractor shall, at its expense, promptly retain the services of the legal counsel designated by TVA to provide counsel to Contractor with respects to all complaints filed under Section 211.

<u>INSURANCE:</u>

Unless otherwise specified in this contract, the Contractor shall secure and maintain in effect, at all times during the performance of work, insurance coverages with limits not less than those set forth below with insurers and under forms of policies satisfactory to TVA. The Contractor shall deliver to TVA no later than ten (10) days after execution of the purchase order, and in any event prior to commencement of work on a TVA site, a completed Certificate of Insurance, attached hereto. Contractor shall also furnish certified copies of the policies to the Contracting Officer promptly upon TVA's request.

The insurance to be provided hereunder shall be written by one or more nationally reputable insurance companies authorized to do business in Tennessee, which shall be either Lloyds Companies reasonably acceptable to TVA or rated "A" or better by A.M. Best Company.

Coverage	Minimum Amounts and Limits
1. Workers Compensation	Statutory requirements
2. Employer's Liability	$100,000 each occurrence
General Liability	
3. Bodily Injury and Property Damage	$500,000 each occurrence
Automobile Liability (owned, hired, and non-owned)	
4. Bodily Injury	$1,000,000 each person $1,000,000 each occurrence
5. Property Damage	$1,000,000 each occurrence

Deductibles or retention amounts under the policies described above shall not exceed 5 percent of the per occurrence coverage limits, without the express written consent of the Contracting Officer. Contractor's using TVA owned vehicles should see clause titled "Contractor's Use of TVA Vehicles."

A. TVA is not maintaining any insurance on behalf of Contractor covering against loss or damage to the work or to any other property of Contractor unless otherwise specifically stated herein and as may be described by appendix hereto. In the event Contractor maintains insurance against physical loss or damage to Contractor's construction equipment and tools, such insurance shall include an insurer's waiver of rights of subrogation in favor of TVA, the United States, and their employees and agents.

B. The policy of insurance which affords General Liability shall contain a provision or endorsement stating that such insurance:

1. Applies to the indemnity liability assumed by Contractor under this purchase order, subject to all of the terms and conditions of such insurance;

2. Provides coverage for premises/operations, at least 2-year products/completed operations, and other coverages or endorsements required by the Contracting Officer

C. Should any of the work:

1. Be upon or contiguous to navigable bodies of water, Contractor shall also carry insurance covering its employees for benefits available under the U.S. Longshoremen's and Harbor Workers' Compensation Act or Jones Act to the extent required by law;

2. Involve watercraft owned or operated by the Contractor, liability arising out of such watercraft shall be insured by the Comprehensive General Liability insurance or by equivalent insurance such as Protection and Indemnity insurance with a combined single limit not less than $5,000,000 each occurrence. If the hull is insured, such insurance shall provide for an insurer's waiver of subrogation rights in favor of TVA, the United States, and their employees and agents;

3. Involve aircraft (fixed wing or helicopter) owned or operated by the Contractor, liability arising out of such aircraft shall be insured for a combined single limit not less than $10,000,000 each occurrence and such limit shall apply to Bodily Injury (including passengers) and Property Damage Liability. If the aircraft is insured, such insurance shall provide for an insurer's waiver of subrogation rights in favor of TVA, the United States, and their employees and agents.

D. All liability insurance provided under this purchase order (including General Liability, Automobile Liability, and Excess Liability coverages) shall provide that:

1. TVA, the U.S., their officers, agents, employees, and volunteers are added as additional insureds on a primary noncontributory basis to the Contractor's (liability) insurance policies shown above and with respect to any liability of additional insureds arising out of or resulting from contractor's operations performed for the additional insureds, including, but not limited to, liability of the additional insureds for the general supervision of such operations.

2. It includes an insurer's waiver of rights of subrogation in favor of TVA, the United States, and their employees and agents.

3. It states that it is primary, noncontributory insurance and contains a severability of interest clause.

E. The requirements contained herein as to types and limits, as well as TVA's approval of insurance coverage to be maintained by Contractor, are not intended to and shall not in any manner limit or qualify the liabilities and obligations of Contractor under the purchase order.

F. The Contractor shall provide at least thirty (30) days written notice of cancellation, expirations, terminations, and alterations of the insurance policies.

G. Contractor shall require each of its subcontractors to maintain Workers' Compensation insurance at least in accordance with statutory requirements. In the event Contractor requires any of its subcontractors to provide any additional insurance, Contractor shall require that TVA, the United States, their officers, agents, employees and volunteers be named as additional insureds with respect to such insurance, and that such insurance shall provide for the insured's waiver of subrogation rights in favor of TVA, the United States, and their employees and agents.

H. Failure by the Contractor or its subcontractors to provide and maintain current, valid certificates of insurance throughout the purchase order performance period shall be a material breach of purchase order for which TVA may exercise any rights or remedies it may have under the purchase order or at law, including the right to withhold moneys due and owing the Contractor hereunder. In the alternative, TVA may, at its sole option, accept the Contractor's written certification that it or its subcontractors self-insure in accordance with applicable workers' compensation laws for all duties, liabilities, and obligations it has or may have under such laws; provided, however, that Contractor must provide to TVA satisfactory written evidence showing that its or its subcontractors' self-insurance plan(s) have been authorized by the appropriate State regulatory entity.

MEDICAL SERVICES:

TVA is not providing any medical services to Contractor or Contractor's subcontractor employees. Contractor shall be responsible for ensuring appropriate medical coverage for both Contractor's and subcontractor's employees in accordance with applicable rules and regulations. In cases involving medical emergencies that are life threatening, TVA, to the extent medical services are available, shall assist in the provision of evacuation to a medical treatment facility.

In the event TVA provides any of the following services: basic first aid, and assessment and stabilization and, if appropriate, referral to providers outside TVA of more serious medical cases, including emergency medical cases, and other services for employees of Contractor as authorized and approved by TVA, these medical services will be provided only during the hours, if any, that TVA normally provides medical services at that location, to the extent that the resources to provide them is available, but in no event shall TVA be obligated to provide greater services under this contract than it does to its own employees.. In the event TVA provides medical evaluations, TVA's determination will be provided to Contractor.

If medical facilities are made available to Contractor's employees then, in consideration for the use of such facilities and the receipt of such services, Contractor hereby agrees:

(a) To release, defend, indemnify and save harmless TVA and the United States, its authorized representatives, successors or assigns, and all of their officers and employees from and against any and all claims, demands, liabilities, including attorney's fees, arising from the receipt of such services or the use of such facilities by Contractor's employees, including claims and demands arising out of the sole active negligence of TVA, its agents, officers, employees or its representatives.

(b) That upon receipt of any notice from TVA of any such claim, demand or liability being pursued against TVA, to not only undertake the defense of such claim, demand or liability, but also upon entry of judgment, to make any and all payments necessary thereunder.

(c) That in the event any of Contractor's employees require off-site medical services, including transportation thereto, Contractor shall promptly pay for such services directly to the providers thereof.

NUCLEAR ENERGY HAZARDS AND NUCLEAR INCIDENTS:

Prior to, or at the time of shipment of the first nuclear fuel to the TVA nuclear facility, TVA will furnish nuclear liability protection in accordance with Section 170 of the Atomic Energy Act (42 U.S.C. § 2210) and applicable regulations of the Nuclear Regulatory Commission. Should this system of protection be repealed or changed, TVA would undertake to maintain in effect during the period of operation of the plant, to the extent available on reasonable terms, liability protection which would not result in a material impairment of the protection afforded to the Contractor and its suppliers under the existing system

TVA waives any claim it might have against the Contractor or its subcontractors because of damage to, loss of, or loss of use of any property at the site of the TVA nuclear facility resulting from nuclear energy hazards or nuclear incidents. This provision shall not affect the Contractor's obligation under the "Warranty" provision of this contract.

TVA will indemnify the Contractor and its subcontractors and save it harmless from any claims, losses or liability arising as a result of damage to, loss of or loss of use of any property at the site of the TVA nuclear facility resulting from nuclear energy hazards or nuclear incidents. In return for this indemnification the Contractor waives any claim it might have against any third party because of damage to, loss of, or loss of use of its property at the site of the TVA nuclear facility resulting from nuclear energy hazards or nuclear incidents.

The foregoing waiver and indemnification provisions will apply to the full extent permitted by law and regardless of fault. The subcontractors referred to above include any of the Contractor's suppliers of material, equipment, or services for the work, regardless of tier.

For purposes of these provisions the following definitions shall apply: "Nuclear energy hazards" shall mean the hazardous properties of nuclear material. "Hazardous properties" shall include radioactive, toxic, or explosive properties of nuclear material. "Nuclear material" shall include source material, special nuclear material or by-product material as those are defined in the Atomic Energy Act (42 U.S.C. § 2014). "Nuclear incident" shall have the meaning given that term in the Atomic Energy Act (42 U.S.C. § 2014(q)).

If contract covers goods or services for nuclear plants, any goods or services which must be repaired, replaced, or installed will be decontaminated without cost to Contractor to the extent necessary to permit it to perform the work.

Emergency Preparedness Information – See Attachment A.

SAFETY AND HEALTH:

Standards. No person employed by the Contractor or any subcontractor in the performance of work pursuant to this contract at a project or worksite owned or controlled by TVA shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his safety or health. In order to provide the necessary controls for protection of employees and prevention of damage to property and for avoidance of work interruption in the performance of this contract, the Contractor shall comply with the provisions of Section 107 of the Contract Work Hours and Safety Standards Act (CWHSSA) (this contractual reference to CWHSSA does not apply to contracts for commercial items as defined at 41 U.S.C. 403(12), although provisions of CWHSSA itself may still apply), and the Occupational Safety and Health Act of 1970 (OSHA) regulations, and such other requirements for the protection of health or safety as may apply; provided that the Contractor shall comply with such additional specifications including TVA supplemental standards and site specific requirements relating to safety and health. In the event of conflict between any OSHA regulation or another requirement and the TVA specification, the latter shall control to the extent they are more stringent. It shall be the responsibility of the Contractor and any subcontractor to initiate and maintain such programs as may be necessary to comply with the foregoing requirements; to provide for frequent and regular inspection of the job sites, materials, and equipment, to identify and prohibit work in an unsafe or unhealthful work place, including the use of unsafe machinery, tools, materials, or equipment; and to permit only those employees qualified by training or experience to operate equipment and machinery.

Compliance by Subcontractors. The Contractor shall be responsible for securing compliance by its subcontractors and all the safety and health provisions contained herein.

Technical Contract Manager. For the purpose of these safety and health provisions, Technical Contract Manager means (a) the TVA Technical Contract Manager or the Technical Contract Manager's designee, (b) when there is no Technical Contract Manager, the TVA employee supervising the work at the location where the work is to be performed under the contract (Jobsite Representative).

Safety and Health Plan. Work to be performed under this contract will be evaluated for any recognized potential hazards as determined by the Technical Contract Manager; in the event that a potential hazard is recognized, the Contractor, prior to commencement of the work will:

A. When required by the Technical Contract Manager, submit a safety and health plan in writing 30 days prior to start of contract work, or as otherwise stated in this contract, describing how it proposes to promote health and safety in the work environment; such plan must be approved by the Technical Contract Manager prior to the start of work by Contractor.

B. When required by the Technical Contract Manager, meet in conference to discuss development, implementation and coordination of Contractor's safety and health program in conjunction with contract requirements.

Evaluation and approval under the requirements of this provision of the contract shall not affect the Contractor's obligations under the indemnity provision of this contract.

Accident Records. The Contractor and its subcontractor will maintain an accurate record of all accidents and occupational diseases in accordance with the provision of 29 C.F.R. pt. 1904. In addition, the Contractor shall maintain such records as required by the Technical Contract Manager of the costs for repairing or replacing property, materials, supplies, and equipment damaged in accidents occurring while doing work incident to this contract.

Contractor Safety Representative. The Contractor shall retain a representative onsite at all times while work is in progress who shall be responsible for the Contractor's safety and health program and who shall have authority to correct hazardous conditions. The contractor's representative shall respond promptly to the Technical Contract Manager in order to reduce or eliminate conditions which in the opinion of the Technical Contract Manager constitute a threat to or appear to threaten life, health or property at the work location.

Temporary Access and Public Safeguards. The Contractor shall build and maintain such temporary bridges, roads, and other means of passage as are necessary and not otherwise provided by TVA; shall provide for convenient access to the various parts of the work and to adjacent private property which may be affected by the work; and shall provide such temporary fences or guards as may be necessary to keep livestock on adjoining property from entering the lands occupied by the work. The Contractor shall also provide such barricades, warning signs and lights, watchmen, etc., as are necessary to protect the public and the work. Should conditions arise on the work which require that immediate and unusual provisions be made to protect the public from danger or loss of damage due directly or indirectly to the prosecution of the work, the Contractor shall make the necessary provisions. The Contractor shall be responsible for the sufficiency and safety of all such temporary works and provisions and shall be responsible for all damage resulting from their insufficiency. The Contractor shall not disturb, close, or obstruct any existing highways or other communications systems until permission therefor has been obtained from the Technical Contract Manager.

Cleaning Up. The Contractor shall at all times keep the work area, including storage areas used by it, reasonably free from hazardous and unsanitary accumulations of waste materials or rubbish, and prior to completion of the work, shall remove any rubbish from the premises and all tools, scaffolding equipment, and material not the property of TVA. Upon completion of the work, the Contractor shall leave the work and premises in a clean, neat, and workmanlike condition satisfactory to the Technical Contract Manager.

Breach of Safety and Health Provisions. It shall remain the responsibility of the Contractor to ensure that the foregoing provisions are complied with at all times; provided, however, the Technical Contract Manager shall have the right (but not the duty) to inspect the Contractor's operations as he or she deems appropriate to assure that the requirements for health and safety under the contract are being met. In the event that apparent deficiencies in complying with the foregoing provisions are brought to the attention of TVA through such inspections or otherwise, TVA will promptly notify Contractor through its Technical Contract Manager. Upon receipt of such notice Contractor shall immediately take such action as may be required to determine the existence of and to correct deficiencies. If the Contractor fails or refuses to correct an unhealthful or unsafe condition, the Technical Contract Manager shall have the authority to issue an order stopping all or part of the work being performed under the provisions of this contract until satisfactory corrective action has been taken. No part of the time lost as the result of any stop order shall be the subject of a claim for extension of time or for excess costs or damages by the Contractor. Any stop order issued by the Technical Contract Manager shall apply to work performed by any subcontractor as well as by the prime contractor under this contract. The Technical Contract Manager shall have the authority to require removal of any person from a TVA work location (regardless of the status of such person as an employee of Contractor or any subcontractor) if, in the opinion of the Technical Contract Manager, the presence of such person endangers the safety or health of others.

Investigation of Accidents. TVA shall have the option to examine the site of any accident immediately following its occurrence to determine (1) the cause or causes of such accident, (2) the degree of personal injuries, (3) the damage to TVA-owned property, (4) the effect of such accident upon completion of the work provided for under the contract, and (5) other pertinent information. In order to accomplish this TVA shall have the authority to question any persons having knowledge relative to or present when such accident occurred, including employees and agents of the contractor and all subcontractor(s).

Respiratory Protective Equipment. Any person employed by the contractor or by any subcontractor in the performance of work pursuant to this contract at a plant or job-site owned or controlled by TVA shall wear respiratory protective equipment when required by the TVA project or plant procedures for safety or health considerations and, therefore, shall be required to be clean shaven in the area between the sealing surface of the device and the face. Any person requiring the use of corrective eyewear shall also be required to have special respirator glasses when reporting to work in order to be mask-fitted promptly. Any person employed by the contractor or by any subcontractor refusing to comply with this requirement shall be denied access to plant facilities. No part of the time lost as the result of any denied access to plant facilities shall be the subject of a claim for extension of time or for excess costs or damages by the contractor or any subcontractor.

WORK AUTHORIZATION/MANAGEMENT CONTROL:

It shall be the responsibility of Contractor to ensure that all work performed onsite by Contractor or its subcontractor personnel be in accordance with applicable site work control procedures and shall commence as authorized by the TCM, Robert Kirkpatrick 423-365-8252

ENTIRE AGREEMENT:

This Contract embodies the entire agreement between the TVA and Contractor and supersedes all other communications, either oral or written. The parties shall not be bound by, or be liable for any statement, representation, promise, inducement or understanding not set forth herein. No amendments or modifications shall be valid unless incorporated into the contract in writing.

OFFICIALS NOT TO BENEFIT:

No member of or delegate to Congress or Resident Commissioner, or any officer, employee, special Government employee, or agent of TVA shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom, but this provision shall not be construed to extend to a corporation or unit of Government contracting for its or for the public's general benefit. Breach of this provision shall constitute a material breach of this agreement.

ATTACHMENT A
EMERGENCY PREPAREDNESS INFORMATION

TO BE FURNISHED TO ALL CONTRACTOR EMPLOYEES WORKING ON OR NEAR A TVA NUCLEAR PLANT SITE

The following information is related to TVA Emergency Preparedness within the area owned and operated by the Tennessee Valley Authority (TVA) for nuclear sites. In the unlikely event of an accident, all onsite personnel will be notified by one of the following means:

- Sirens would be sounded for three minutes. (See site specific information below for routine siren test schedule)
- TVA personnel may enter the area and provide instructions.

If Contractor personnel are alerted by either of the above, Contractor personnel should:

- If TVA personnel are present, follow their instructions.
- If no TVA personnel are present, and the sirens are not sounding during the test schedule below, Contractor personnel should immediately exit TVA property.
- As soon as possible, listen to one of the radio stations noted below for any additional information which may be provided by State Authorities.

If there is a potential that Contractor personnel may have been exposed to radioactive material, he or she would be instructed to go to a designated location for monitoring or decontamination.

For further information on these emergency plans please contact TVA Emergency Preparedness at the numbers listed below.

Site Specific Information:
Browns Ferry Nuclear Plant

- Sirens are normally tested at 9:15 AM on the 2nd Monday of each month.
- WVNN (AM 770) WZYP (FM 104) WKAC (AM 1080)
- Emergency Preparedness - (256) 729-2038

Sequoyah Nuclear Plant

- Sirens are normally tested at noon on the 1st Wednesday of each month.
- WSKZ (FM 106.5)
- Emergency Preparedness - (423) 843-7088

Watts Bar Nuclear Plant

- Sirens are normally tested at noon on the 1st Wednesday of each month.
- WSKZ (FM 106.5) WIVK (FM 107.7) WIVK (AM 990)
- Emergency Preparedness - (423) 365-8004

SEP-25-2003 15:27 P.02/02

CONTRACT NO.: 00029353
SUPPLEMENT 1
CONTRACT AMOUNT: $80,000
AWARD DATE: September 25, 2003
CONTRACT TERM: 09/25/03
Through 9/30/04

TENNESSEE VALLEY AUTHORITY

[illegible]

[illegible]

This CONTRACT SUPPLEMENT, effective September 25, 2003 by and between ENERCON SERVICES, INCORPORATED, (hereinafter called "Contractor"), and the TENNESSEE VALLEY AUTHORITY (hereinafter called "TVA");

IN CONSIDERATION of the mutual covenants hereinafter contained, the parties agree to the provisions specified herein.

IN WITNESS WHEREOF, the parties hereto have caused this contract to be executed by their duly authorized officials.

TENNESSEE VALLEY AUTHORITY Watts Bar Nuclear Plant P.O. Box 2000 Spring City TN 37381 ATTN: David A. Smith, WBN Contract Manager	ENERCON SERVCIES, INCORPORATED 500 TOWNPARK LANE SUITE 275 KENNESAW, GA 30144-5509 ATTN: J. AARON SMITH
By [signature]	By Robert H. Bryan
Title WBN Contracts Mgr.	Title Director, Atlanta Operations
Date 9/25/03	Date 9/25/03

TOTAL P.02

TERMS & CONDITIONS

WORKSCOPE
Contractor will perform the following:

TASK No. 1 – Debris Source Walkdowns

ENERCON will document the walkdowns with digital photographs and videos. ENERCON will walkdown areas in Containment in accordance with the developed procedure and document the following, as a minimum. It is Enercon's understanding that items 1 and 2 below will be confirmatory in nature, as plant documentation is in very good shape. It is anticipated that most of the walkdown effort for items 1 and 2 will be in the lower elevations inside the crane wall, as this is the location of most of the insulation material. For item 3, the full containment will be walked down and foreign material will be documented.

1. *Insulation Subject to Destruction*
   Location inside containment
   Type of insulation
   Type of fastening, jacketing or wrapping
   Amount of insulation (length , width/thickness)

2. Cable and Cable Tray Fire proofing materials
   Flammastic and Thermolag, etc

3. Foreign Materials
   Other Materials are to be identified and are to be quantified in accordance with NEI 02-01 guidance (i.e. dirt, tape, tags, etc.)

This effort will be documented with walkdown packages consisting of drawing markups and photographs of each walkdown area. The walkdown effort will be supported by a team of four engineers. The duration is anticipated to be 5 days or less.

Based upon previous discussions with TVA, it is anticipated that the insulation drawings are in very good shape and the walkdown effort will be more of confirmatory in nature with minimal exceptions being identified on with respect to the drawings.

The deliverable for this task will be a small summary report describing and summarizing the containment walkdown process and noting the foreign material identified as well as any fire proofing material. Attached to the report will be walkdown packages consisting of marked up drawings with photographs as needed. This small report will not itemize the piping insulation material.

TASK No. 2 – Coatings Walkdown

The coatings walkdown will consist of the following:

1. Review of existing documentation of the coatings systems used with in containment.

2. Perform a walkdown, including digital photographs, of the containment to generically identify and evaluate the condition of coatings on structures, systems and components, using NEI 02.01 as a guide.

3. Prepare a qualitative estimate of indeterminate and unqualified containment coatings.

Though most PWR utilities have good coatings programs, based upon our recent work with several utilities, this coatings walkdown and review has in most cases identified additional items that had been overlooked for years. This task provides a fresh set of eyes with respect to this industry issue.

A letter report will document the assessment and walkdown findings.

Our coating engineer will require approximately three days onsite.

TASK No. 3 – Sump Area Walkdown

ENERCON will videotape and photograph areas in and around the containment emergency sump to support as-building the sump areas for any potential modifications. In addition, we will verify the as-built condition of the strainer for future modification or structural qualification of debris loads. We will also review and record layouts of high energy piping in the vicinity of the sump area. Enercon will support this walkdown effort of the sump area with a structural engineer who has experience in sump strainer design.

In addition, the containment floor and flow paths to the sumps will be recorded with videotape and photographs to assist future debris transport analyses. ENERCON will be supported by an ITS engineer with experience in containment modeling for debris transport and will conduct this flow path walkdown. The transport engineer will walkdown and document the physical/structural features that will affect the flow of debris and water from a potential break location to the sump. The following items will be documented at a minimum:

- Verify robust barriers located inside containment.
- Verify structures and equipment impervious to jet impingement and prevent jet expansion.
- Verify major paths for containment spray flow and assess the areas covered by containment sprays
- Determine spray and drainage flowpaths to the sump
- Confirm input necessary for debris transport analysis (CFD).

These walkdowns will be documented in letter reports.

The structural engineer and transport engineer will require approximately three days onsite.

TASK No. 4 – Walkdown Report

As an overall summary to this GSI-191 containment walkdown, ENERCON will develop a detailed walkdown report with findings documented in spreadsheet format with a narrative report of the scope, basis, summary of results, etc. The detailed report will provide all of the insulation material information in a spreadsheet format that can be directly used as input for any future debris generation model. The report will also contain the letter reports of the above selected task as well as the walkdown packages for insulation as attachments, thus resulting in one overall walkdown report. ENERCON will provide to TVA the electronic files for the document and spreadsheets.

This Walkdown Report will support two topics in the overall resolution of GSI-191 issues. First, this report will be part of the design input for the debris generation and transport analyses for determining debris head loss at the emergency sump strainer. Second, this report will be part of the input in establishing a program to document and control potential debris source material (thermal insulation, fire barrier material, unqualified or degraded coatings, etc.) within containment.

Deliverables

The following deliverables will be developed in accordance with Westinghouse /ENERCON's QA program:

- ENERCON Walkdown Procedure
- ENERCON Walkdown Reports

All electronic files and photographs/videos will be provided.

Schedule

ENERCON proposes to complete the scope of work in accordance with the milestone schedule below:

Begin Walkdowns	September 29, 2003
Walkdowns complete	October 5, 2003, 7 days after start
Walkdown Report Submitted for Comment	8 weeks after walkdowns
Final Walkdown Report	2 weeks after comments received

COMPENSATION FOR SERVICES

For the satisfactory completion and acceptance by TVA of the deliverables described in the Work scope, TVA agrees to pay Contractor the firm fixed price of Eighty thousand dollars ($80,000), with the following breakdown by task:

Task 1 Debris Source Walkdowns - $25,000

Task 2, Coatings Walkdown - $14,000

Task 3, Sump Area Walkdown - $12,000

Task 4, Walkdown Report - $29,000

This price shall be fixed and is not subject to change except pursuant to a fully executed written supplement to this contract. Payments under this contract supplement shall not exceed $80,000. The fixed price of $80,000 may only be adjusted based on the actual rates of performance as agreed upon by TVA pursuant to a fully executed written supplement to this contract.

TECHNICAL AND QUALITY NOTES

S1051 Services shall be supplied under the quality assurance program evaluated and accepted by TVA and which is in accordance with the applicable provisions of ANSI N45.2.

S1052 The services being supplied shall be subject to the requirements and civil penalty provisions of 10 CFR 21, the regulations of the NRC concerning reporting of defects and noncompliance. In addition, the contractor shall inform TVA immediately in writing of each defect or noncompliance reportable under Part 21. The notice to TVA is to be sent to the following address with a copy to the contracting officer: TVA Nuclear Power, Nuclear Licensing and Technical Affairs, Attention: Manager, Licensing and Technical Affairs, BR 4X, 1101 Market Street, Chattanooga, Tennessee 37402-2801.

S1054 TVA shall have right of access to the contractor's work, whether onsite or offsite, to perform, if necessary, quality assurance audits, inspections, and surveillances.

S1056 TVA shall be informed promptly by Contractor of any potentially reportable deficiencies under the provisions of 10 CFR Part 50.71 and 10 CFR Part 50.72, and TVA's corresponding reporting procedures. These regulatory requirements shall also apply to any subcontractors or suppliers used by Contractor.

S1057 Contractor shall identify all nonconformance to the requirements of this contract. Nonconformance shall be documented, including suggested corrective action, and referred to TVA for resolution before continuing any work which may cause further nonconformance.

S1066 FITNESS FOR DUTY. For all personnel performing work on TVA Nuclear Power Property, defined as any TVA nuclear plant site/project and any Nuclear Power work location or facility under this contract, or under subcontracts entered into under this contract, and all personnel required to report in person to any TVA emergency response center under TVA's emergency plans and procedures (collectively Covered Personnel), Contractor will adhere to TVA Nuclear Power's fitness for duty requirements, as applicable, set forth by the latest revision of SPP 1.2, Fitness For Duty Program Administration, and any subsequent revision(s) thereto. Covered Personnel who have been denied access to or removed from work at any nuclear plant as a result of violations of any fitness for duty program will not be assigned to work as Covered Personnel during the course of this contract without Contractor so informing the TVA Human Resource Manager (HRM) at the work location. Before Contractor permits such personnel to perform work as Covered Personnel under the contract, the TVA Nuclear Power Fitness For Duty Program Manager must grant approval in writing to the Contractor.

Before any Covered Personnel are assigned duties on any Nuclear Power property or any TVA emergency response center, they shall report to the HRM at the work location and shall receive appropriate training from TVA as a part of TVA Nuclear Power's Fitness For Duty Program. Refresher training for Covered Personnel must be completed at least once every 12 months. During the course of the contract, Contractor will notify the HRM at the work location in writing before Covered Personnel become managers or supervisors, or are assigned to escort duties, so that required training will be provided. Contractor agrees to allow an authorized representative of the Nuclear Regulatory Commission to inspect, copy, or take away copies of any contractor's records, documents, or reports related to implementation of TVA's Fitness For Duty Program. Contractor agrees to include the requirements of this provision in any subcontract(s) related to the performance of this contract, regardless of tier.

S1066 CHEMICAL/RADIOLOGICAL EQUIPMENT CONTROL

Contractor shall furnish a list of chemicals to be used in performance of this contract to the Technical Contract Manager prior to the use of the chemicals on site. These include but are not limited to solid, liquid, or aerosol cleaners, solvents, lubricants, adhesives, sealants, paints, coatings, paint thinners, process and bulk chemicals, photographic supplies, and liquid photocopy supplies, valve packing materials, teflon tape, halogenated compounds, and refrigerants. Contractor shall ensure that all approved chemicals have been labeled by TVA prior to use. All shipments of materials, chemicals, chemical products, and other consumables must be made in a manner that will allow receipt inspection in a materials and procurement complex, which will be a nonradiologically controlled area. If the shipment is radioactively contaminated, the shipment must be readily identified as such so that proper precautions and receipt inspection can be undertaken in a proper radiologically controlled area.

S1071 Contractor shall not perform welding, brazing, or soldering operations (including permanent, temporary, and tacks), and shall not bring welding, brazing, or soldering materials onsite, at TVA nuclear facilities unless specifically allowed to do so by the contract. When allowed by the contract, appropriate requirements in accordance with the TVA nuclear welding program will be included or referenced in the contract.

Additional External Quality Notes:

Enercon's Project Planning Document (PPD) must be submitted to and approved by the Technical Contract Manager (TCM) prior to the start of the workscope contained in this supplement.
The TVAN TCM is Robert R. Kirkpatrick, EQB 2N-WBN. (Phone: 423-365-1707)

Except as hereby amended, all terms, conditions and provisions of Contract 00029353, heretofore amended, are hereby affirmed and shall remain in full force and effect during the remainder of the term of the contract supplement.

ATTACHMENT C:

TVAW001-PROC-01, REV. 0, "CONTAINMENT WALKDOWN PROCEDURE FOR POTENTIAL SUMP SCREEN DEBRIS SOURCES AT WATTS BAR NUCLEAR PLANT"

TVAW001-PROC-01 REV. 0

CONTAINMENT WALKDOWN PROCEDURE
FOR
POTENTIAL SUMP SCREEN DEBRIS SOURCES
AT
WATTS BAR NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY

PREPARED BY

ENERCON SERVICES, INC.

Issued by: [signature] Date: 9/26/03

Reviewed by: William E Walding III Date: 9/26/03

Approved by: J. Alan Smith Date: 9/26/03

NUMBER: TVAW001-PROC-01 REV. 0
Page 2 of 10

TITLE: CONTAINMENT WALKDOWN FOR POTENTIAL SUMP SCREEN DEBRIS SOURCES

TABLE OF CONTENTS

1.0 SCOPE

This procedure governs the containment walkdowns being performed for the Watts Bar Nuclear Plant response to GSI-191. The following walkdowns are to be performed during the 2003 Fall Refueling Outage:

- Insulation walkdowns to verify the type and quantity of insulation and fibrous materials that may present a challenge to the containment sumps during and following a LOCA or MSLB;
- Containment Coatings walkdowns to identify Qualified and Non-Qualified coatings that exist within the Primary Containment; and
- Sump Area walkdowns to document the areas in and around the containment emergency sump to support as-building the sump area for any potential modifications. Identify flowpaths/drainage paths to the Containment Sump from potential break follows and containment spray flows, verification that drainage paths are unblocked, and confirm inputs necessary for the Debris Transport Analysis.

The insulation walkdowns will include a methodical inventory of the specified potential sump screen debris sources, that could be dislodged due to the dynamic effects of a High Energy Line Break (HELB) and post-LOCA environmental effects. There are no plant modifications associated with this effort.

2.0 POTENTIAL DEBRIS SOURCES

2.1 The potential debris sources inside containment can be classified within the following types:

Fixed Debris: Fixed debris includes materials that are part of the plant by design, which when subjected to direct effects of high energy line break could be damaged or destroyed and become potential source of transportable debris.

Transient Debris: Transient debris is non-permanent debris that is brought into the containment, typically during outages. This type of debris includes rags, tools, sheeting, plastic bags, pens/pencils, temporary filters, tapes, dust, dirt, etc. Transient debris is primarily controlled by FME and housekeeping programs.

Latent Debris: Latent debris consists of materials inside containment that may become a potential debris source as a result of degradation due to the effects of exposure to post-LOCA (or MSLB) environmental conditions inside the containment. These sources include unqualified coatings, tapes, labels, and other materials that are not qualified for exposure to post-LOCA (or MSLB) environment.

Coatings Debris: Coatings applied on walls, floors, structural steel, equipment, electrical panels, etc., may degrade over time or when exposed to post-LOCA environment. These degraded coatings could potentially dislodge and become transportable debris.

2.2 Containment walkdown to include the following potential debris sources.

Piping and Equipment Thermal Insulation (commonly used)

- Calcium Silicate insulation (Asbestos and non-asbestos)

- Reflective Metal Insulation (RMI)
- NUKON®
- Armaflex
- TempMat™
- Min-K
- Kaowool
- Koolphen-K®
- Fiberfrax
- FiberMat
- Unibestos Block
- Mineral Wool Blocks
- Corning Uni-Jac (Foamglas)
- Fibrous blanket insulation

Other Fibrous Debris

- 3M type Fire Wrap
- Miscellaneous items that are of relative weak structure which may be easily damaged by a high energy fluid jet (e.g. equipment filters)
- Conduit thermal protection insulation
- Cable tray fire barrier stops (on cable trays)
- Fibrous insulation inside electrical junction boxes and electrical penetrations.
- Fibrous material contained in mechanical penetrations.
- HVAC Filters

Transient and Latent Debris

- Miscellaneous loose debris (e.g., gloves, plastic wrap, cloth, nuts and bolts, wire, rags, plastic tubes from tube lights, tape, labels and paper)
- Dirt, loose paint chips etc.
- Rust on piping, equipment and structural steel
- Plastic sheathing on flexible conduits and cabling
- Tape used for markings on conduits and cables
- Tie-wraps in cable trays
- Labels on valves, equipment, cable trays, etc. that may be susceptible to destruction or de-lamination due to exposure to LOCA fluid jets or long term LOCA environment in the containment.

(Total quantity of such debris in the containment will be estimated based on the data for the walkdown areas indicated in Section 3.0).

Coatings Debris

- Degraded coatings
- Unqualified coatings

3.0 WALKDOWN OBJECTIVE

The objective of the field walkdowns is to verify, and where needed identify, the type, location and extent of various types of potential debris sources inside the containment vessel.

For thermal insulation on piping and equipment, and other fibrous insulation such as fire wrap, the objective is to record the debris targets and to document its location to within ±12". This will be achieved by verification of the existing insulation and piping drawings and the documentation of additional debris sources with regards to insulation not accounted for in the TVA documents.

Miscellaneous transient debris shall be identified along with its type, and location to enable notification of plant personnel for cleanup and disposal.

With regards to dirt, the objective is to obtain an overall perception of the existing state of cleanliness of the containment. Subjective notes as to the thickness and location of the dust/debris should be made. If a specific area appears to be significantly dirty, the plant personnel should be contacted for possible clean up.

Using available plant documentation, identify qualified and unqualified coatings. Determine the current condition of these coatings based on visual observations.

Additionally, this walkdown will identify and examine the flowpaths/drainage paths to the containment sump. It will identify any potential "choke points" and verify that the drainage paths are currently unblocked. The as-built configuration of the ECCS Strainers will be verified and information required to perform the Debris Transport Analysis will be confirmed or obtained.

4.0 WALKDOWN AREAS

The walkdown shall include all accessible areas of the containment. Areas of specific concern are:

- Areas containing insulated piping and equipment
- Areas containing high energy lines (includes most of the areas within the bioshield wall)
- Areas near the emergency sump and flow paths leading to the sump
- Areas that may experience direct impingement from the containment spray

5.0 RECOMMENDED WALKDOWN TOOLS

The following are recommended items to aid in the performance of the walkdowns:

- Layout drawings (piping or cable tray location drawings)
- Flashlights and/or flood lights *
- Ladders *

- Personal fall protection *
- Cameras (digital, Polaroid, 35mm, video camera)
- Tape measure (folding stick and/or retracting tape) *
- Sample bags (for transporting drawings and pens, and for collecting samples of insulation/debris)
- Pens and/or markers *

* Obtained from tool crib(s) inside containment.

6.0 TEAM MEMBERS

The debris source walkdown team will consist of at least four members. The team will have a designated team leader who will be responsible for ensuring that the walkdowns are consistent with this procedure. The walkdown teams may consist of engineers, insulators, and Radiation Protection (RP) support personnel, as required. A structural engineer and an engineer specializing in transport analysis will conduct the sump area walkdowns. A coatings engineer will conduct the coatings walkdown.

7.0 PREPARATION

7.1 ALARA

Walkdown teams shall coordinate and meet with RP to incorporate ALARA principles. Review with RP the scope of the walkdown, various locations, number of personnel, applicable Radiation Work Permit (RWP's) and other pertinent issues. Temporary lead blanket shielding will not be removed or altered in any way without prior approval of RP.

7.2 Review Reference Materials

Review TVA insulation documents showing lines and equipment that are expected to be insulated

7.3 Review Insulation Types

Review with plant maintenance, and be able to differentiate, the various types of insulation that are expected to be observed inside containment. Below is a list of potential types of insulation material. Other types are also possible:

- Reflective Metal Insulation (RMI)
- Calcium Silicate (Asbestos and Non-Asbestos)
- Fiberglass
- Min-K
- Foam
- Tempmat
- Cellular Glass
- Mineral Wool
- Armaflex/Rubatex (Closed Cell Neoprene)

Review the different types and details of construction of jacketing material for insulation inside containment:

- Stainless steel jacket (recognize the standard installation configuration of the SS jacket, e.g., the seam is located at either at 2 o'clock or 10 o'clock with a 2" overlap and the seam is generally located toward the wall, away from view)
- Stainless steel mesh
- Aluminum jacket
- PVC
- Fiberglass lagging fabric
- Silicon coated liner cloth

Review the different methods of insulation attachment and spacing of fasteners/attachments:

- Bands
- Tie wires
- Buckles
- Insulating tapes (both fabric and metallic)
- Fastening hardware (screws, rivets)

8.0 WALKDOWN

8.1 Piping & Equipment Insulation

Verify information contained in the TVA insulation drawings for type of insulation and other details, including information such as the identification of transitions from one insulation type to another (i.e., temp-mat vs. NUKON or Transco fibrous insulation, or cal-sil vs. unibestos block insulation). Insulation not contained in the TVA insulation drawings shall be documented separately. Documentation/verification should include the following to the extent possible:

- Piping line numbers,
- Piping layout as indicated on the drawings are in general agreement with the piping 'as-built' configuration,
- Insulation type and location (piping, valves, penetrations, cable trays, HVAC ducts, etc.),
- Location of the piping in the plant (within ±12 inches, to the extent possible)
- Insulation thickness/pipe size,
- Length (and width, if appropriate) of insulation,

- The type of jacketing or wrapping, if used, longitudinal seam location,
- The method used to band the insulation, if appropriate,
- The spacing of bands used, If appropriate,
- General condition of insulation (report any significant discrepancies), and,
- Other relevant information regarding the type and installation of insulation.

Documentation of new insulation should include, as a minimum, a marked-up set of drawings showing different insulation types and/or a spreadsheet including the above information. In addition, the use of a video camera, still pictures and/or digital photographs of the insulation, jacketing, wrapping and how the jacketing and wrapping are secured/fastened to piping is also helpful for future reference.

Equipment such as Steam Generators, Regenerative Heat Exchanger & Excess Letdown Heat Exchanger with insulation should be included & its insulation type & amount recorded.

8.2 Other Fibrous Debris

Document the type of debris in detail, including information such as the identification of transitions from one insulation type to another (i.e., temp-mat vs. NUKON or Transco fibrous insulation, or cal-sil vs. unibestos block insulation). Documentation should include the following to the extent possible:

- Type of debris source,
- Sketch or drawing markup to show location of the debris source
- Characteristics of the debris source (e. g. thickness, texture, visible degradation, etc.)
- Length (and width, if appropriate) of debris source
- General condition of debris source
- Other relevant information regarding the type and installation of debris source.

Documentation should include, as a minimum, a marked-up set of drawings or sketches showing location and extent of the fibrous debris source. In addition, the use of a video camera, still pictures and/or digital photographs of the insulation, jacketing, wrapping and how the jacketing and wrapping are secured/fastened to piping is also helpful for future reference.

8.3 Transient and Latent Debris

Identify and document the debris type including the plant location. Sufficient walkdown information should be collected to facilitate quantification of the total debris by weight, volume or surface area (in case of dust, rust or fire protection coatings). For items such as labels or tape markings, an estimate of the distributed quantities in a specified area should be made. Such data can then be used to calculate the total quantities in various containment areas using statistical means.

Inspect the general area for any relatively weak, permanently installed components, which have the potential of becoming dislodged by pipe break jet impingement, and which would easily transported to the containment sump. Inspection and documentation will also include items such as 3M Fire Wrap, insulation type material inside electrical junction boxes, etc. Document on the Walkdown Package Form any such items.

NOTE: Access to the electrical junction boxes if needed should be coordinated with plant electricians.

8.4 General Cleanliness

Inspect the area to obtain an overall perception of the state of cleanliness and note any areas that are significantly dirty, or appear to have concentrated dirt, as compared to the general area. Areas to be inspected for concentrated dirt could be the top of cable trays, top of structural members, panels or equipment. Record observations of any dirty areas and photograph such areas. Inform the plant Housekeeping about these areas for possible clean up.

8.5 Coatings

Inspect the condition of the coatings on walls, floors, building steel, equipment, electrical panels, conduits, cabletrays, etc. to determine the condition on the coating. Document any visual evidence of degradation such as cracking, flaking, peeling, de-lamination, etc. Utilizing available plant documentation, identify qualified and unqualified coatings; and also determine to the extent possible the type of coatings, thickness, number of coats applied, etc.

8.6 Containment Flow Path

8.6.1 Identify and examine the major flowpaths to the containment sump from postulated break locations and containment spray nozzles. Specifically consider the following two issues that may occur.

- Restrictions or "choke points" in return flow paths that may provide for debris accumulation, possibly either diverting or restricting water from flowing to the sump. The possible restriction of flow to the sump by collecting debris at these "choke points" may reduce the expected water level in the containment sump. Examples of "choke points" may include, but are not limited to the following:
    - Access entrances (door ways) secured with a screened gate during normal operation,
    - Curbs and ledges placed about containment
    - Pipe chases and fuel transfer canal drains.
- Floor grates at upper elevations that may catch and restrict the transport of large debris from upper elevations to lower elevations.

Documentation of major flowpaths, choke points and floor gratings will be accomplished through containment drawing markups and photographs.

8.6.2 Examine the sub-compartment doors within containment to confirm that none interfere with containment drainage. If a potential obstruction is identified, the benefit of removing or modifying individual subcompartment doors to eliminate potential drainage path obstructions will be evaluated.

8.6.3 Verify that all drainage paths to the containment sump are unblocked. Conditions that are considered potentially adverse to quality will be brought to the attention of the TVA Project Manager.

8.7 Sump Area

Verify and document the as-built conditions of the strainer as well as the surrounding area for any potential modification. Review and record high energy piping in the vicinity of the sump area.

9.0 QUALITY ASSURANCE REQUIREMENTS

9.1 All work, including walkdowns, analysis, and documentation, will be performed in accordance with Enercon's approved Quality Assurance Program.

10.0 REFERENCES

10.1 NEI-02-01, "Condition Assessment Guidelines: Debris Sources Inside PWR Containments," Revision 1, September 2002.

10.2 JAS03-049 (TVA-A03-3002), Rev. 2, "Proposal for Watts Bar Containment Debris Source Walkdowns, dated September 16, 2003. TVA Contract 00029353 including Supplement 1.

ATTACHMENTS

A. "Containment Debris Walkdown Package" form

CONTAINMENT DEBRIS WALKDOWN PACKAGE

DATE:		AREA:		RWP NO.:	
		ELEV:			

INSPECTORS:	Print Name

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
Tools:		
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify installation of insulation as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any undocumented insulation.
3	Inspect and determine longitudinal seam location and band spacing if necessary.
4	Document any irregularities of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any undocumented fibrous insulation (e.g., within rupture restraints).
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal)
7	Inspect the area for any weak components that could be dislodged by jet and that could be transported to sump.
8	Inspect any equipment insulation in the area.
9	Inspect and document the general cleanliness of the area
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS

Prepared By: ______________________ Date: ____________

Checked By: ______________________ Date: ____________

ATTACHMENT D:

WALKDOWN TEAM MEMBERS

Walkdown Team Members

- Michael Caldwell - ENERCON
- Glenn Walls - ENERCON
- Frank Yao - ENERCON
- Mike Sollie - TRANSCO
- David Volodarsky - ENERCON
- Gilbert Zigler - JTSC
- Jon Cavallo - CCCL

ATTACHMENT E:

SUMP CONFIGURATION WALKDOWN

Originator CGWalls 8-19-2004
C. G Walls Date

Checker David Volodarsky 8-19-04
Dave Volodarsky Date

RHR Sump Strainer

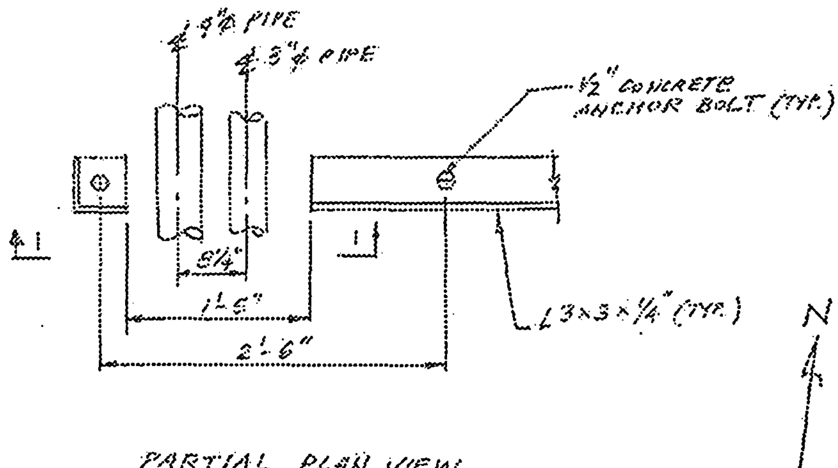
The RHR Sump is located in Containment Building at Elevation 702'-9 3/8". There is wall on each side of sump made of structural angles and grating with wire mesh over the grating. These walls are an integral part of the sump as they form a liner that prevent debris from entering the sump. The sump and liner structure is shown on plant drawing 48N919. The liner structure and sump area were inspected during walkdown performed on October 2nd and 3rd, 2003. As a result of walkdown no significant deviations between design drawing and "as-built" condition of liner structure were found.

However, the findings listed below may require further study and evaluation.

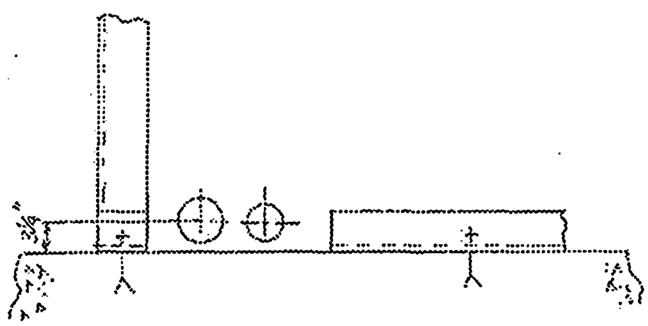
1. Gaps exist at locations of doors, between door and frame structure on both south and north sides of strainer. The gap is estimated as 1/4" to 1/8".
2. Gaps exist at location of pipe penetrations, especially at (2) 18" dia. piping. The gap is estimated as 3/16" to 1/16".
3. The piece of structural angle 3x3x1/4" approximately 17" long was cut to allow the installation of 4" dia. and 3" dia. piping (waste disposal, system 77). The location of cut is on south side of strainer adjacent to the door on a floor level. As a result of that, the vertical grating is not supported at the bottom edge.

   TVA resolution: As shown on 48N919, Section U-U, the grating and mesh are attached to the L 3 x 3 x ¼ by means of ½" diameter bolts, 1'-0" o.c. This would indicate that the vertical edge of the grating and the remaining portion of angle along the floor are attached to the L 3 x 3. For the cut out section of the grating, the 1" x 3/16" banding bar will help transmit any load on the grating to the 1 ½" x 3/16" load carrying bars that is spanning between the ceiling and the floor. Therefore, the cutout of the L 3 x 3 x ¼ at the floor is considered to be acceptable by TVA
4. There is a floor drain approximately 1.5'x1.5' on a floor on north side of the strainer inside the sump area that seams to be not secured to the floor and with no cover made of steel wire. The floor drain cover should be of the same wire mesh (hole opening size) material as the strainer to protect against back flow of debris from the floor drain system.
5. The door latch is a gravity type mechanism and has very simple configuration. There is no mechanism to prevent strainer door from being accidentally open during plant operation.
6. In case of reverse flow through the strainer screen, the steel wire mesh is not adequately supported to prevent it from being damaged.
7. The sump room area is used as a storage/ working area during plant outage. There is a potential for foreign material to enter the sump suction piping as there is constant traffic of people in the room.
8. The high energy piping in vicinity of the Sump Strainer is the Crossover Leg (Cooling Loop) from Reactor Coolant Pump to Steam Generator.

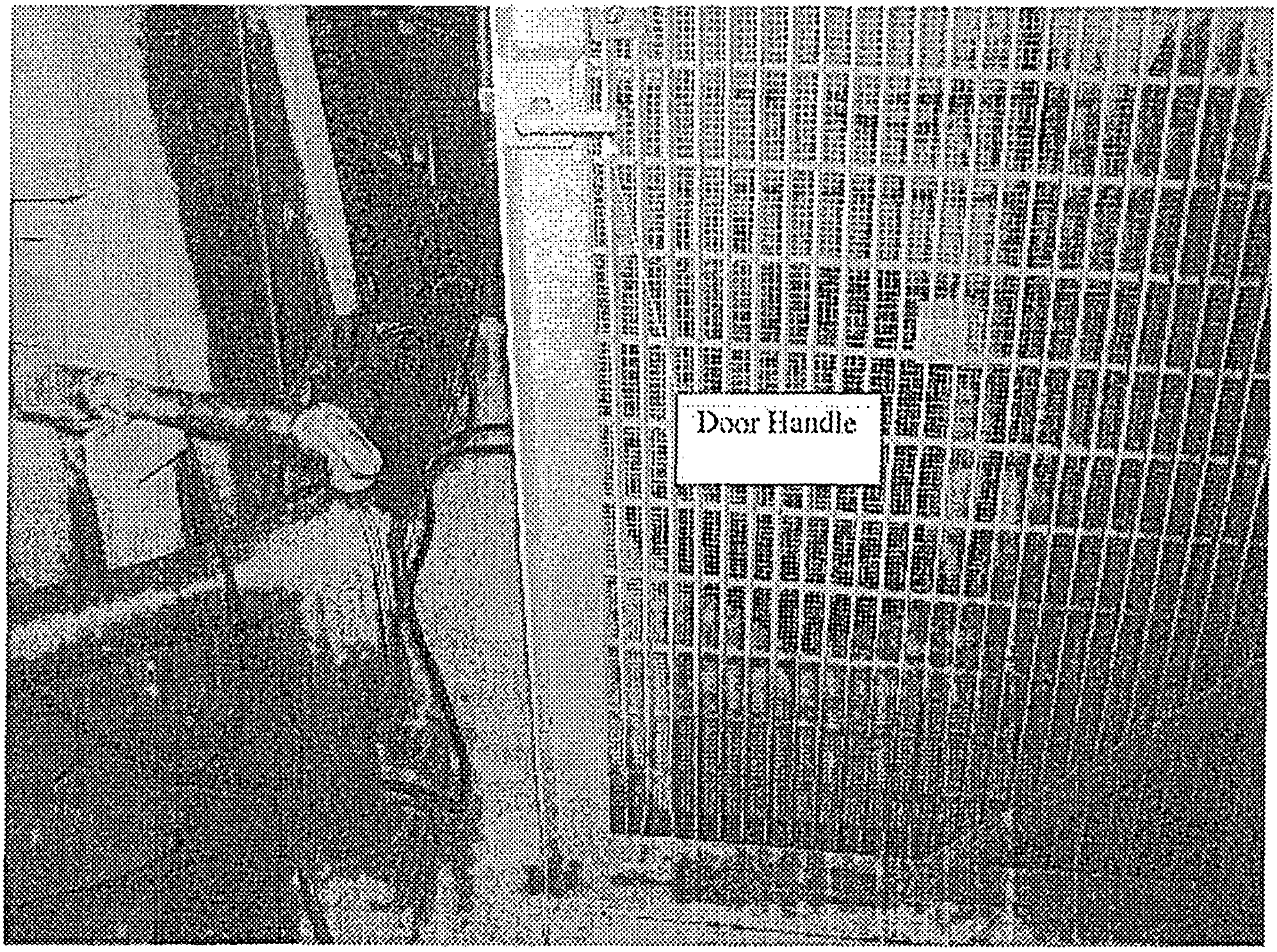
See next page for sketch that show cutout in structural angle 3x3x1/4" described in note 3 above. Also, see pictures of sump area on following pages that supports notes 1 through 7 described above.

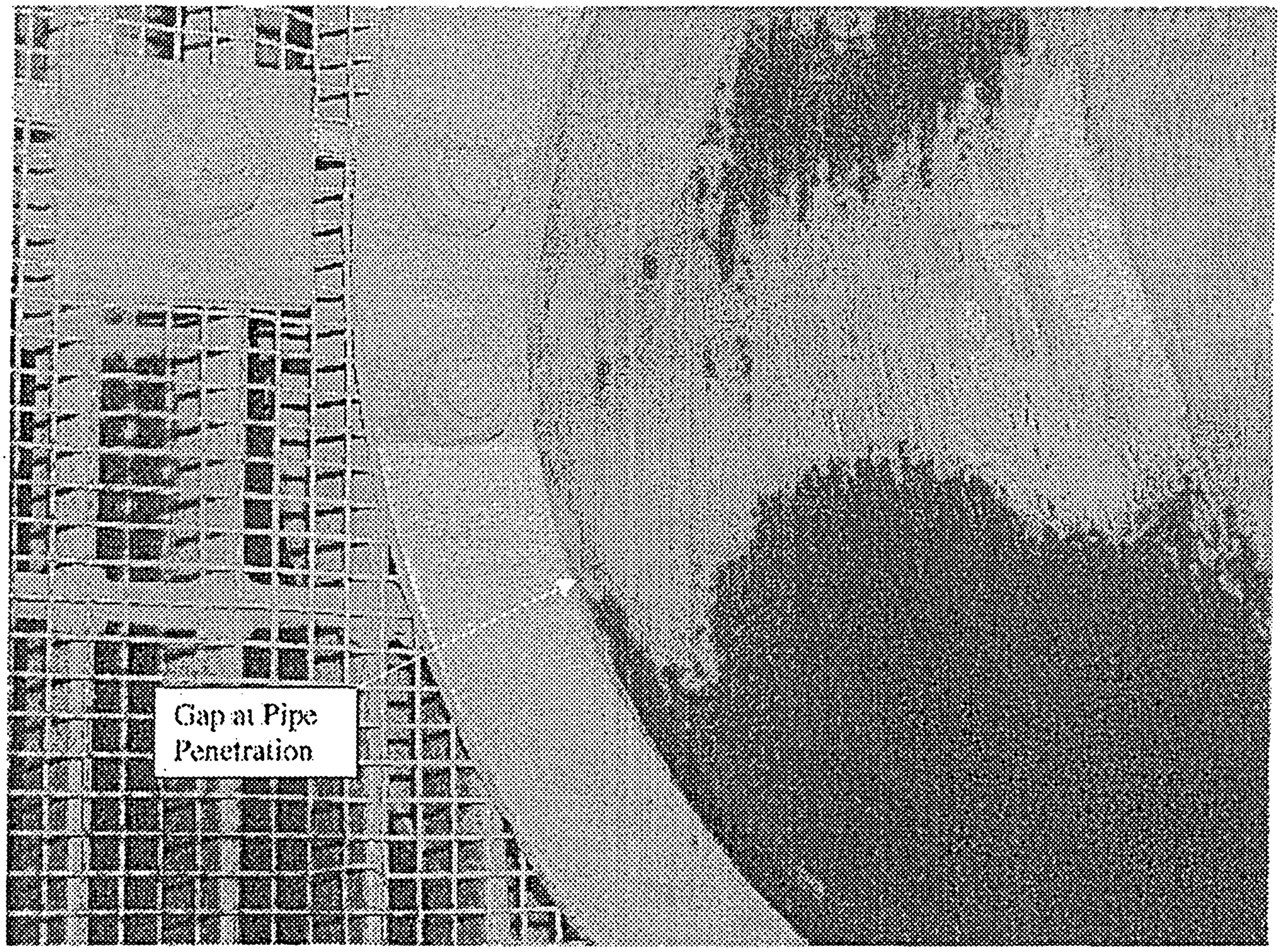


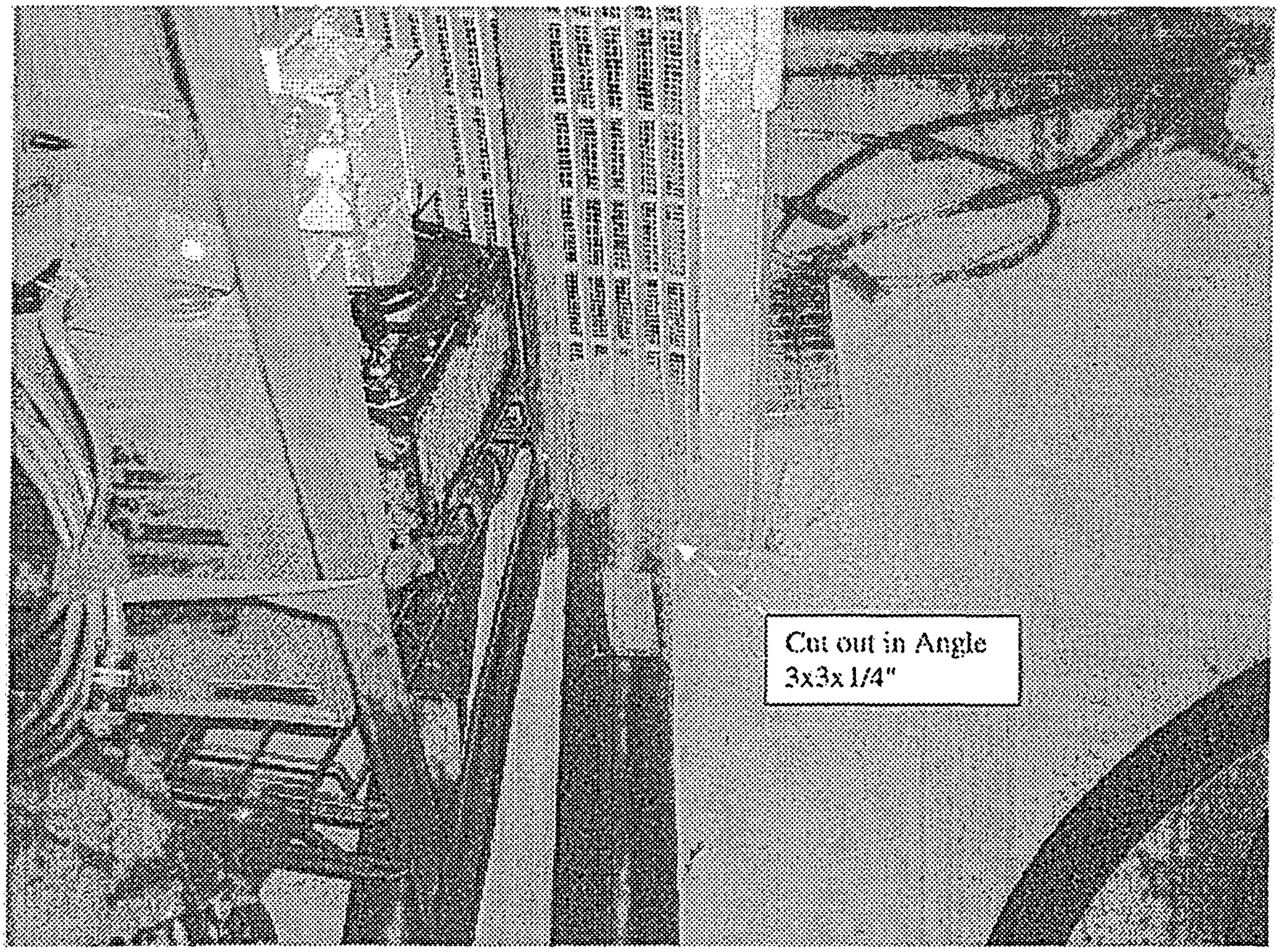
PARTIAL PLAN VIEW
@ EL. 702'-9 3/8"

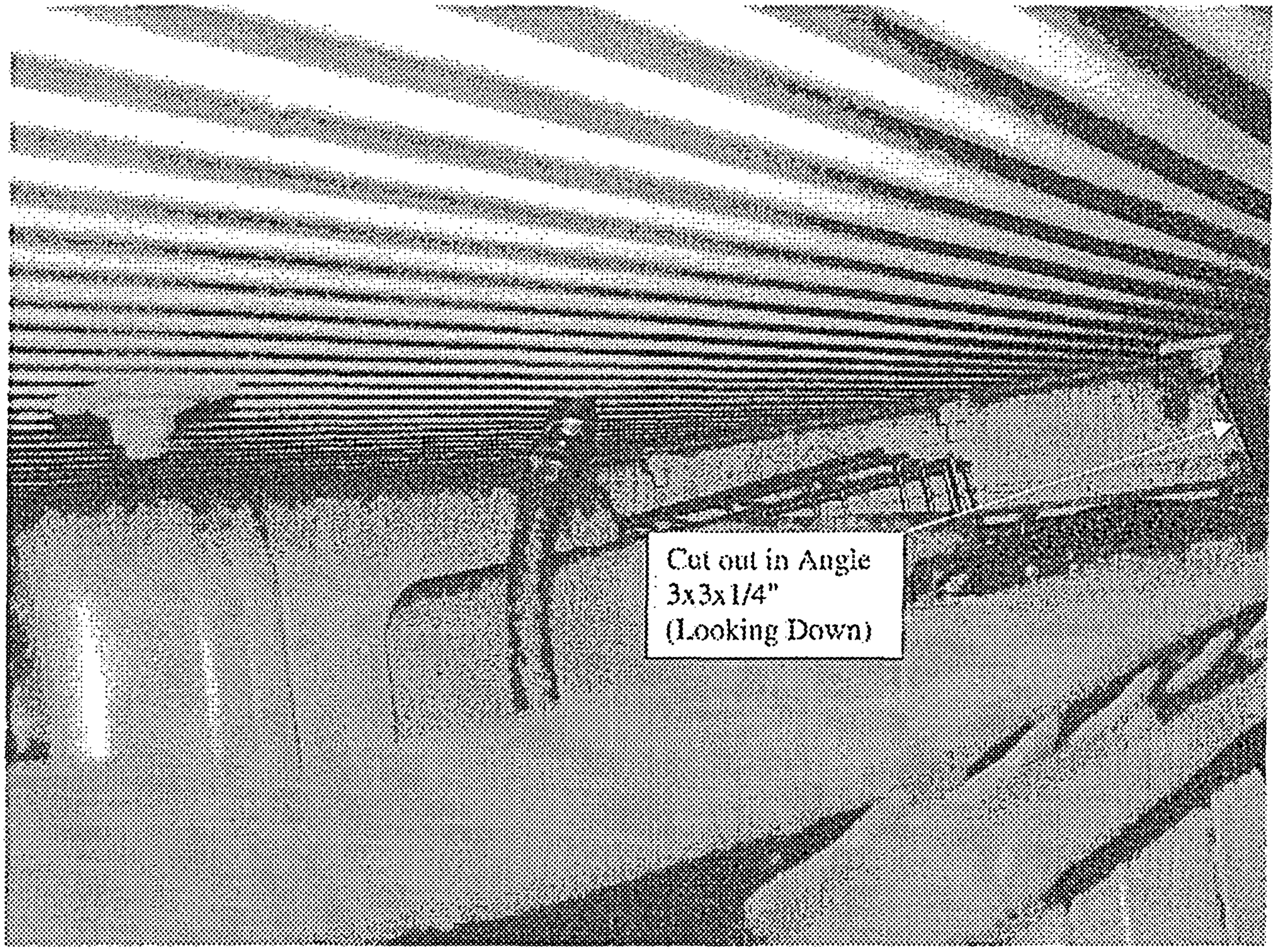


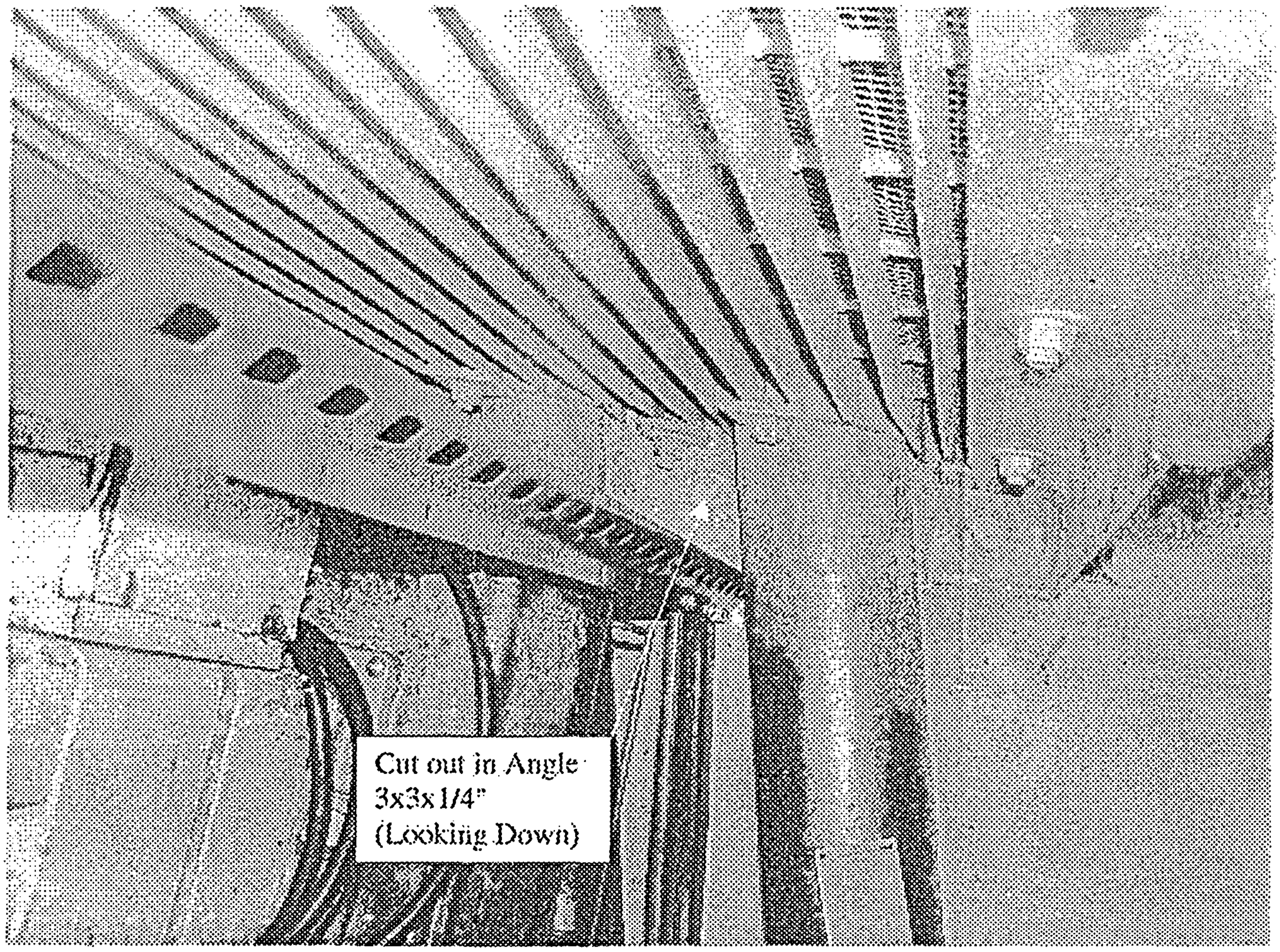
SECTION 1-1

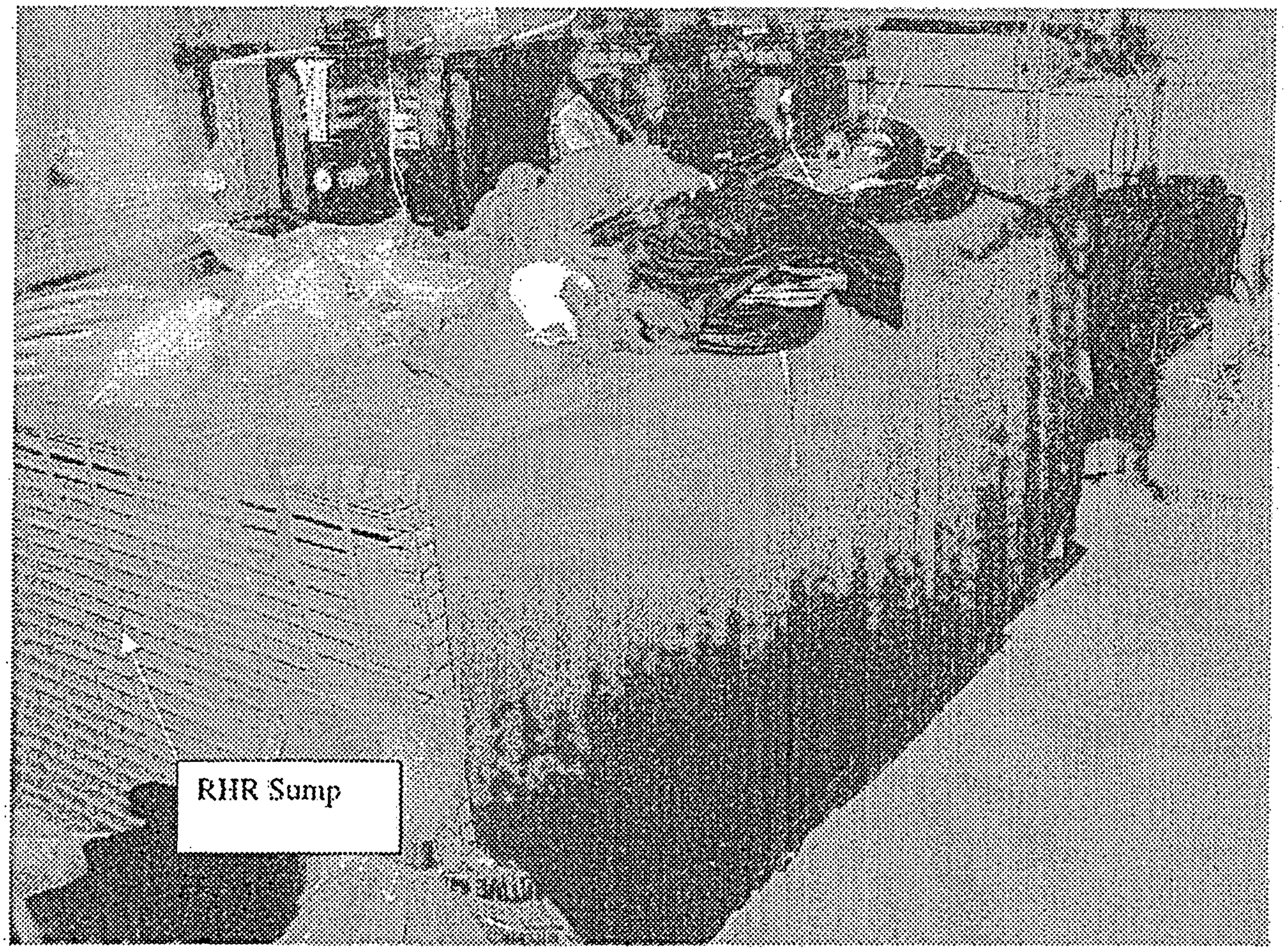

Door Handle

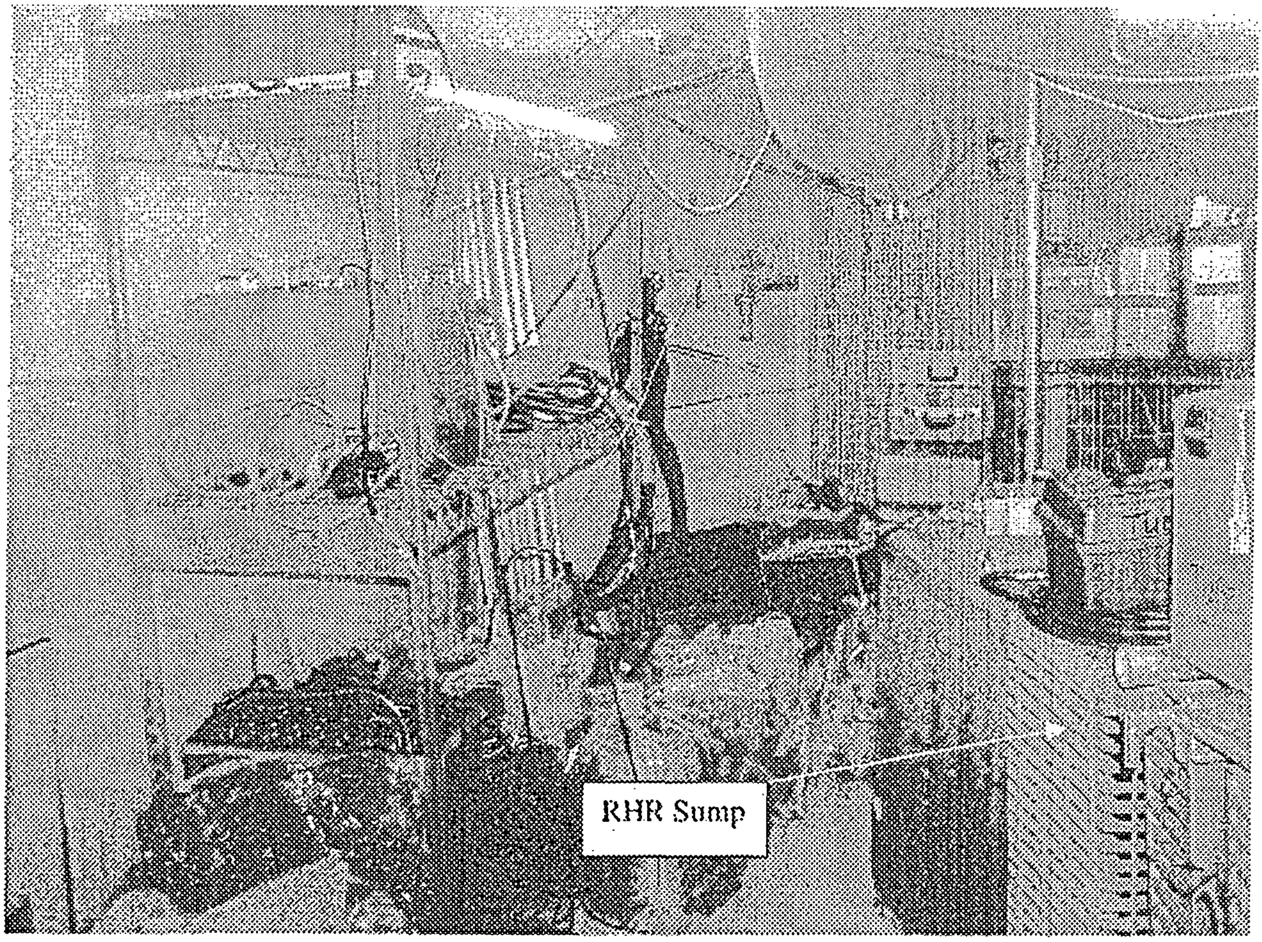

Gap at Pipe
Penetration

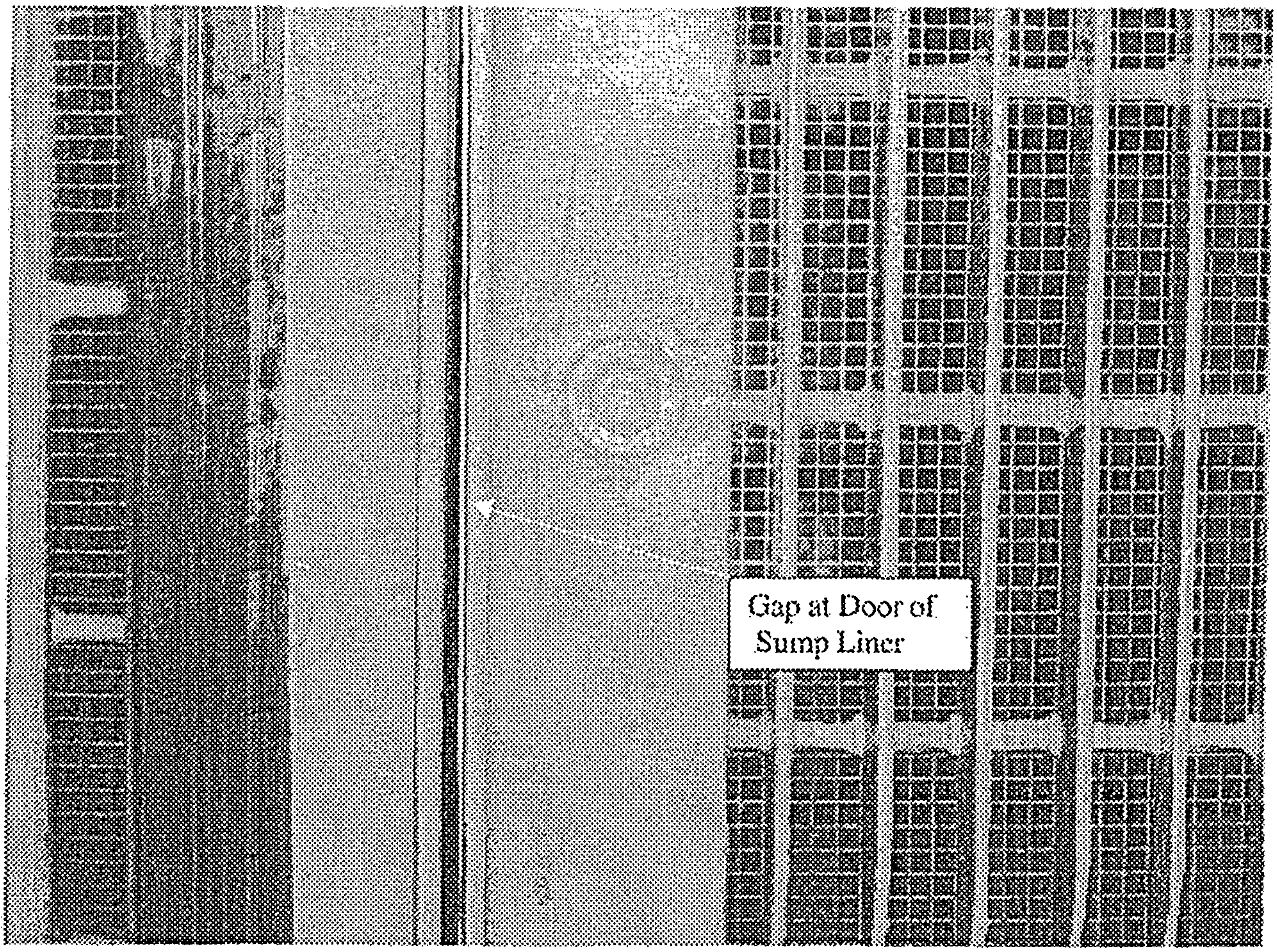

Cut out in Angle
3x3x 1/4"

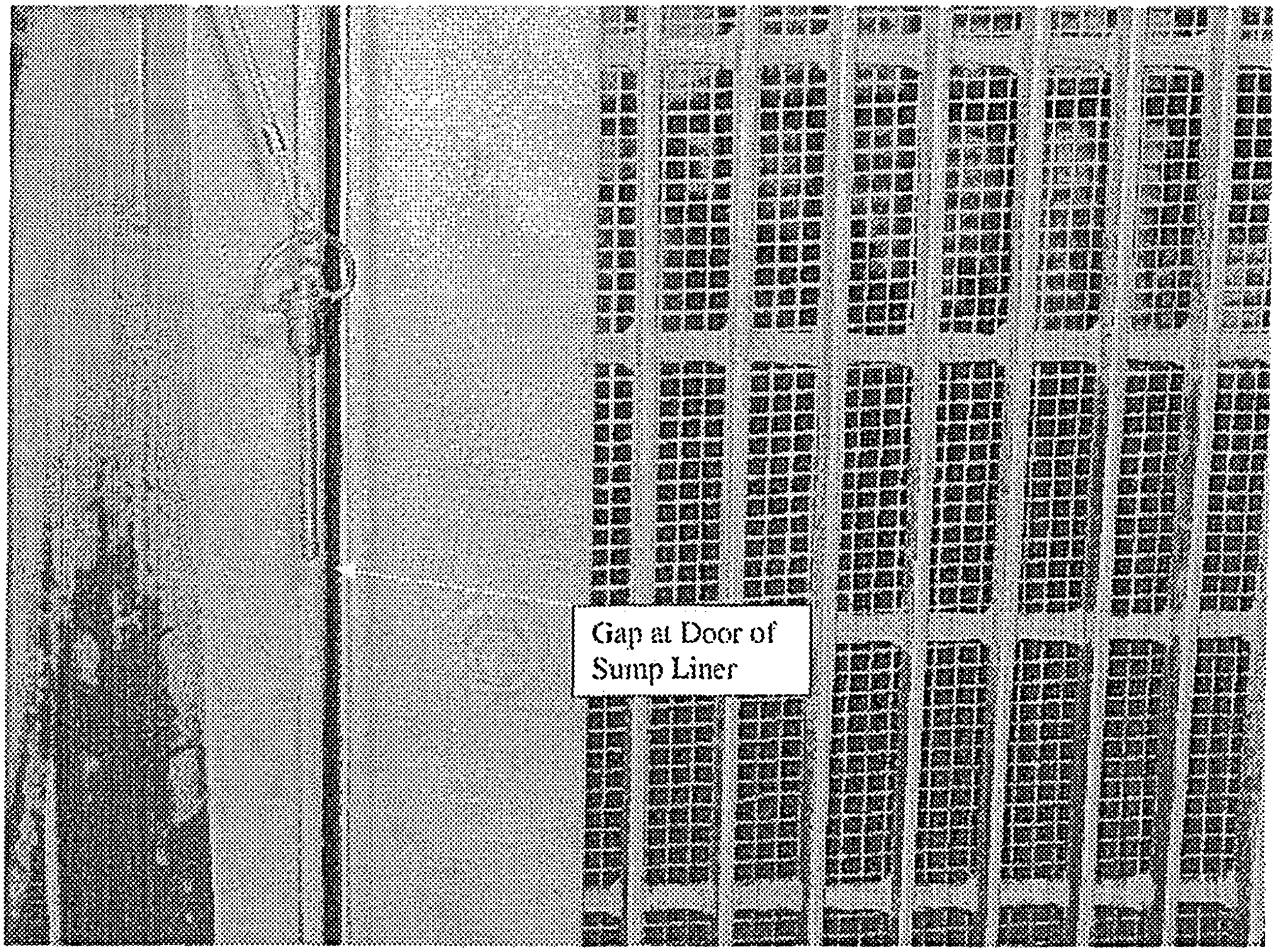

Cut out in Angle
3x3x1/4"
(Looking Down)

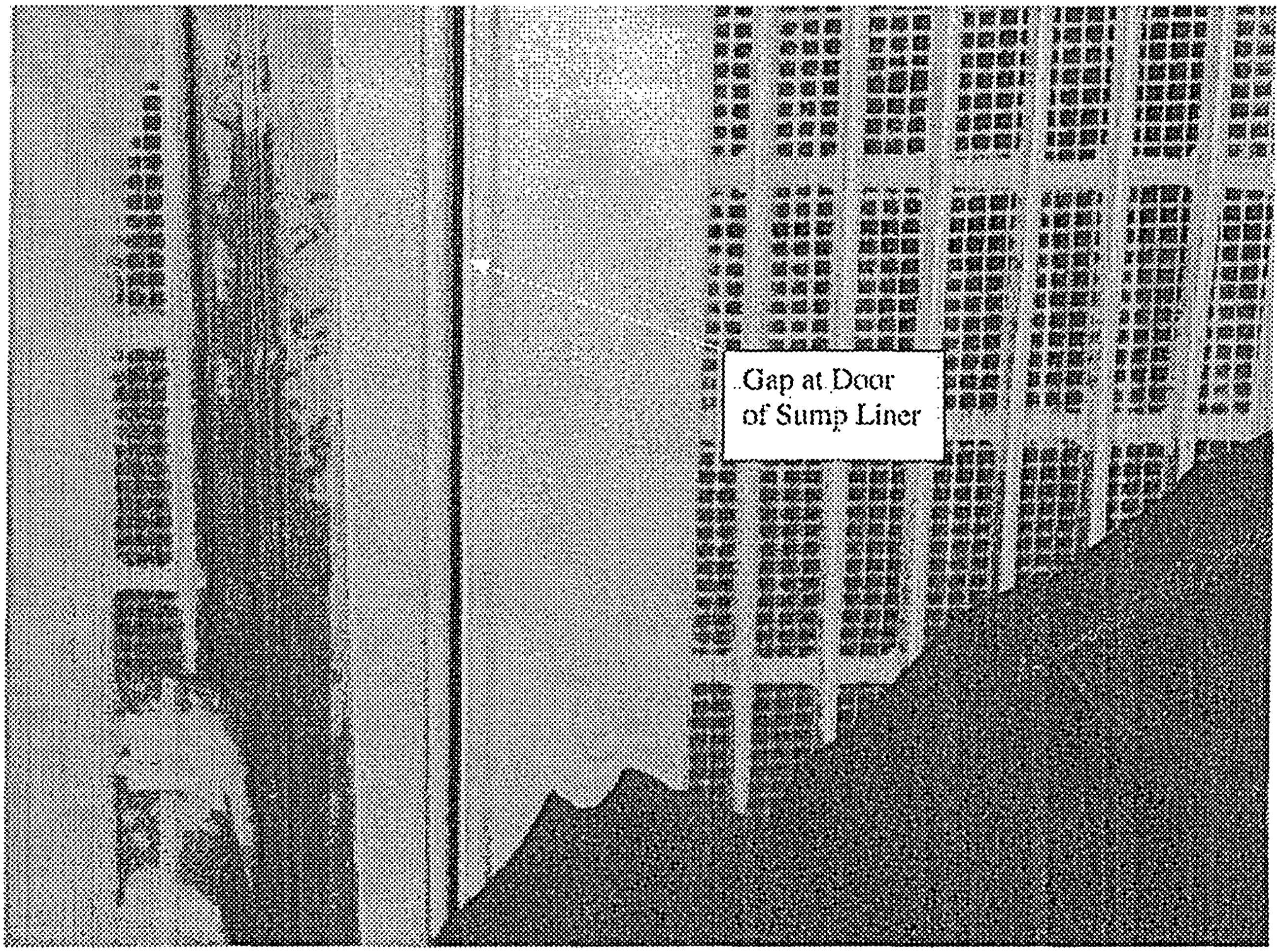

Cut out in Angle
3x3x1/4"
(Lookiñg Down)

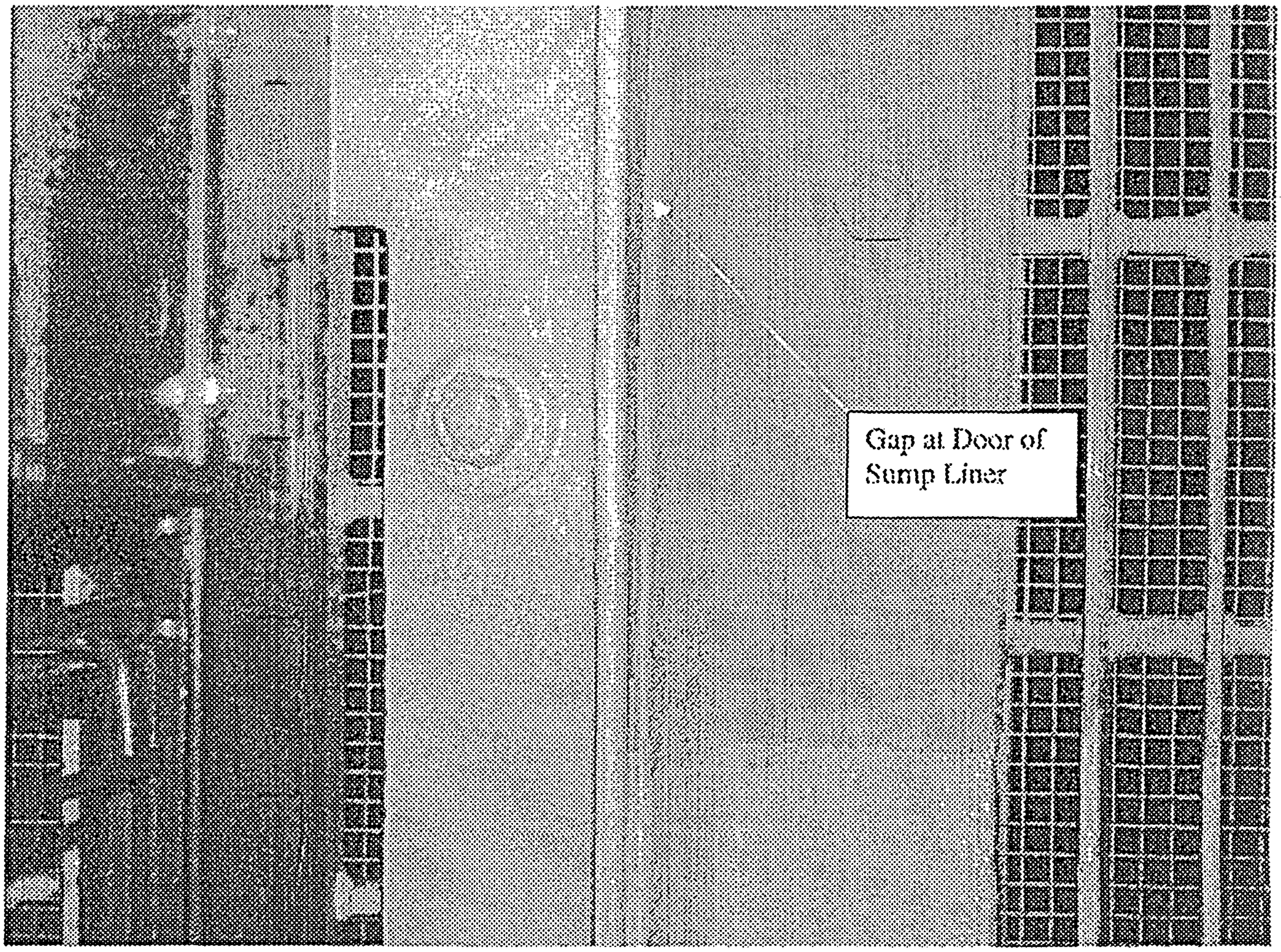

RHR Sump

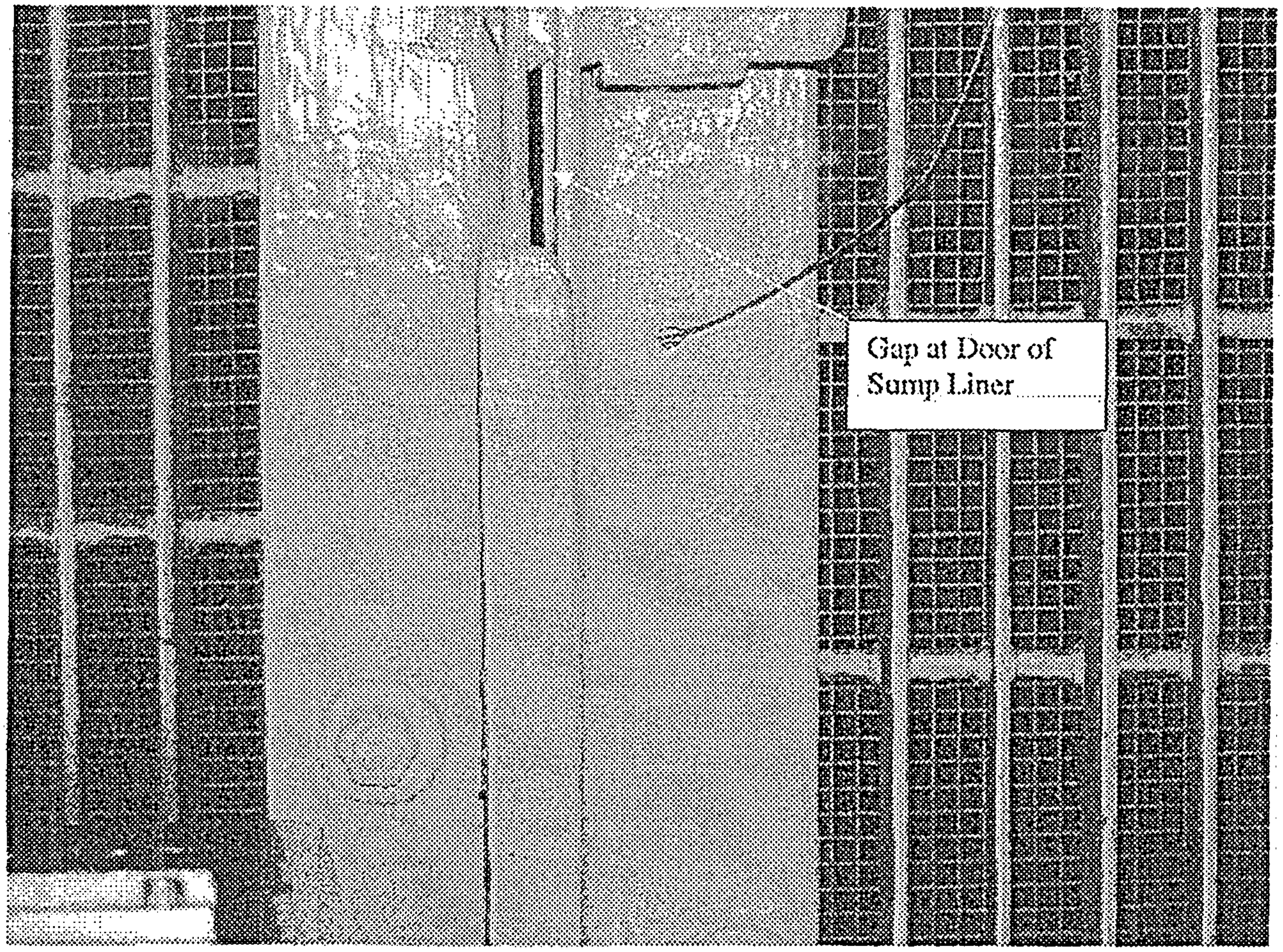

RHR Sump

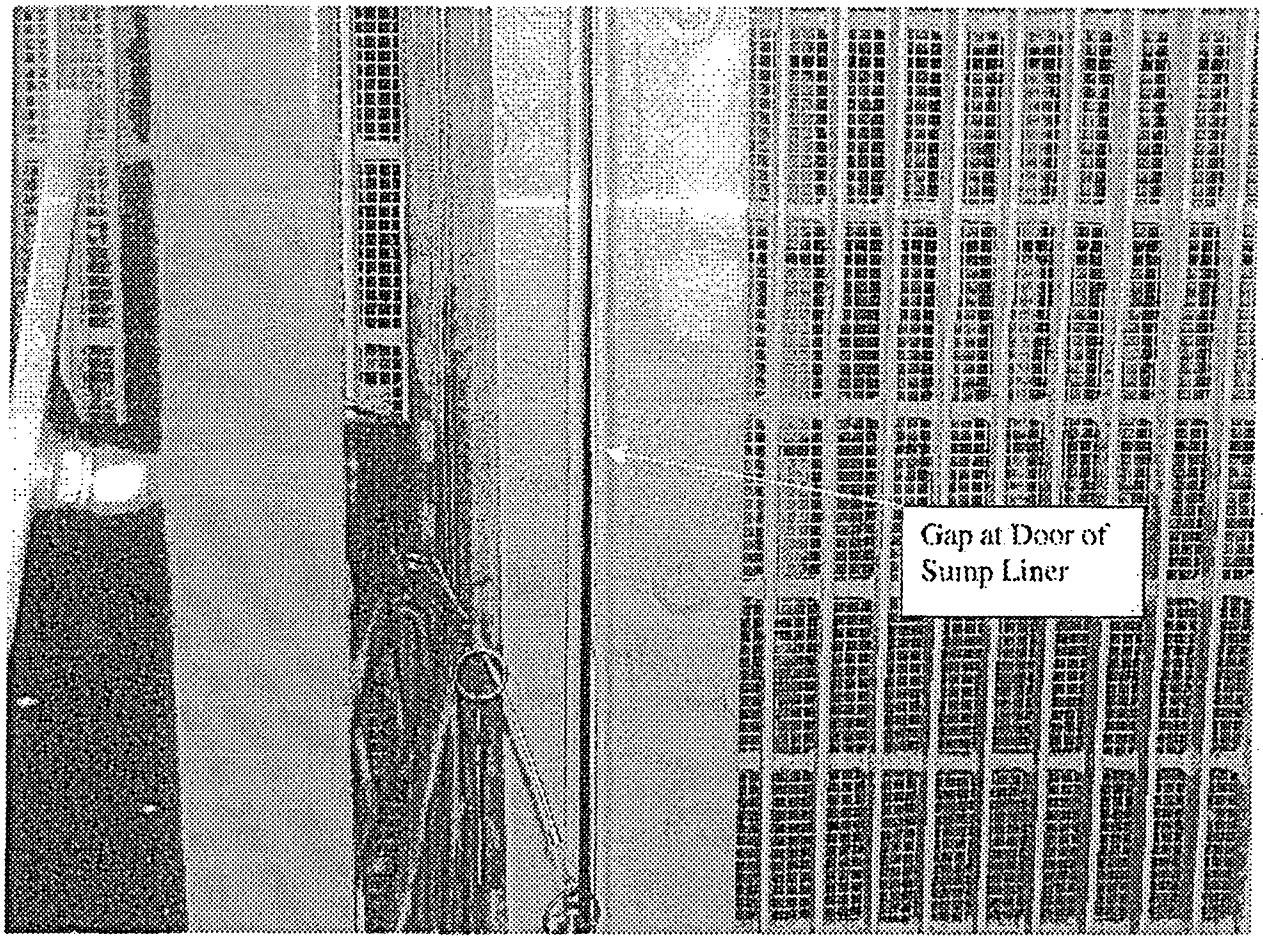

Gap at Door of
Sump Liner

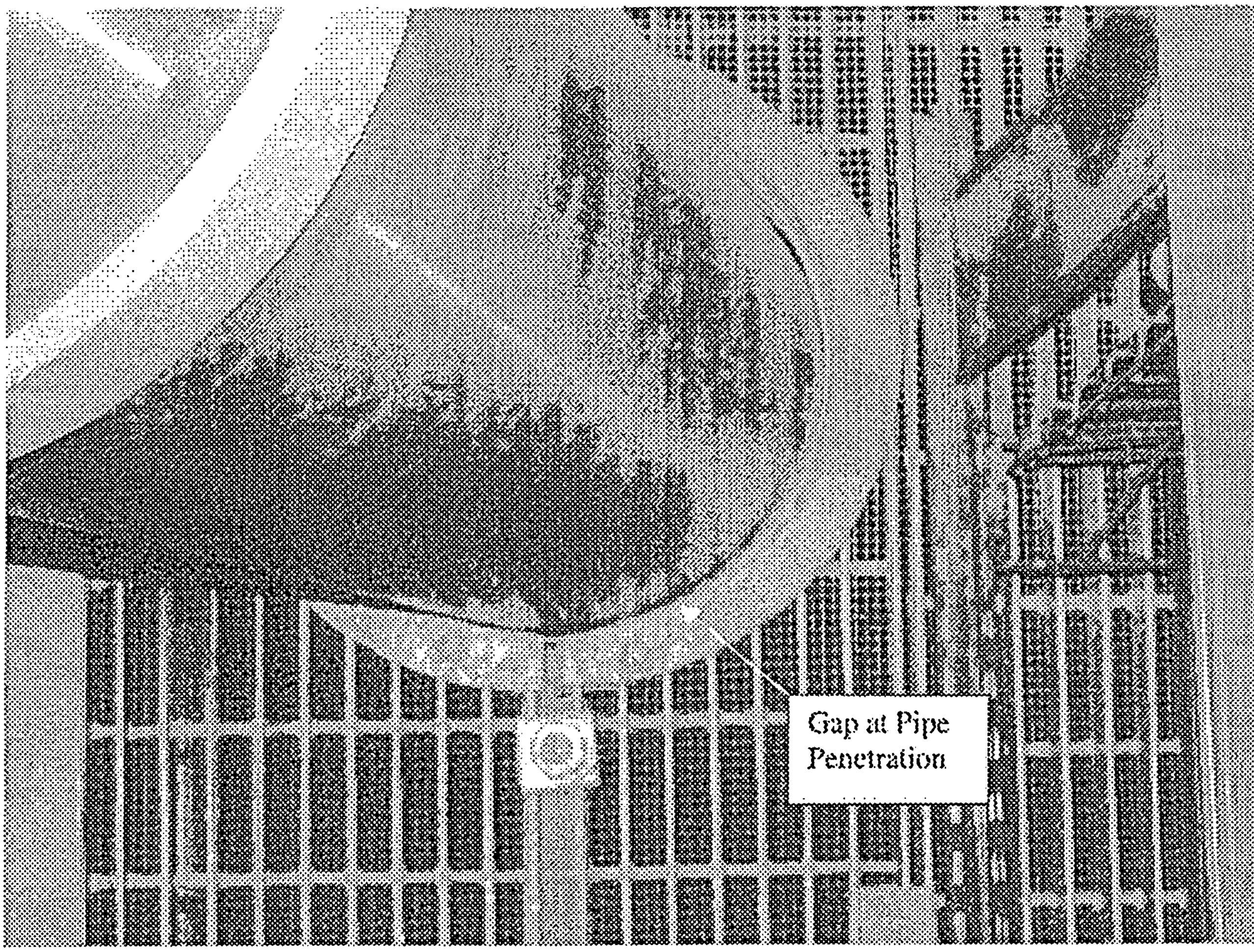

Gap at Door of
Sump Liner

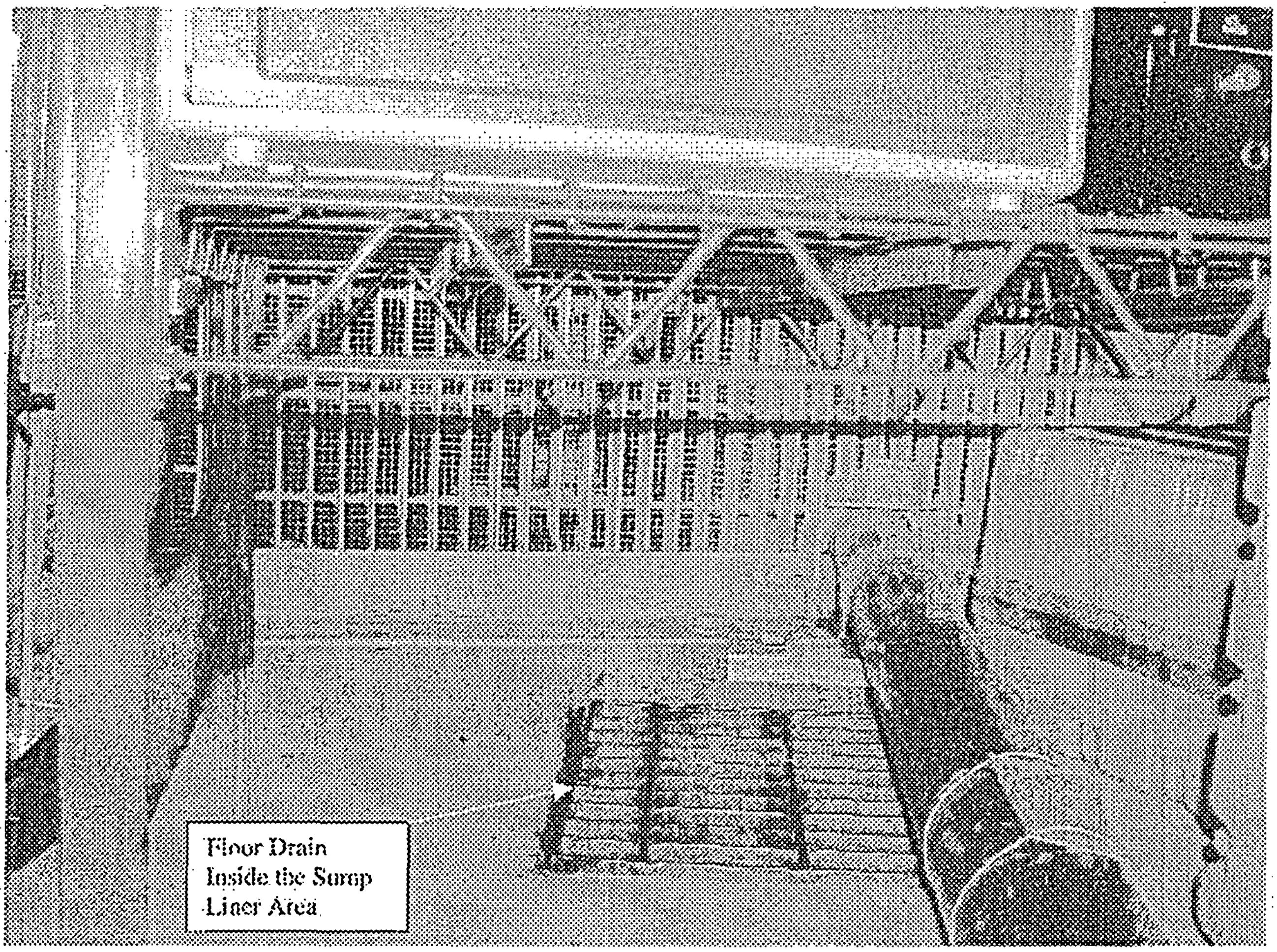

Gap at Door
of Sump Liner

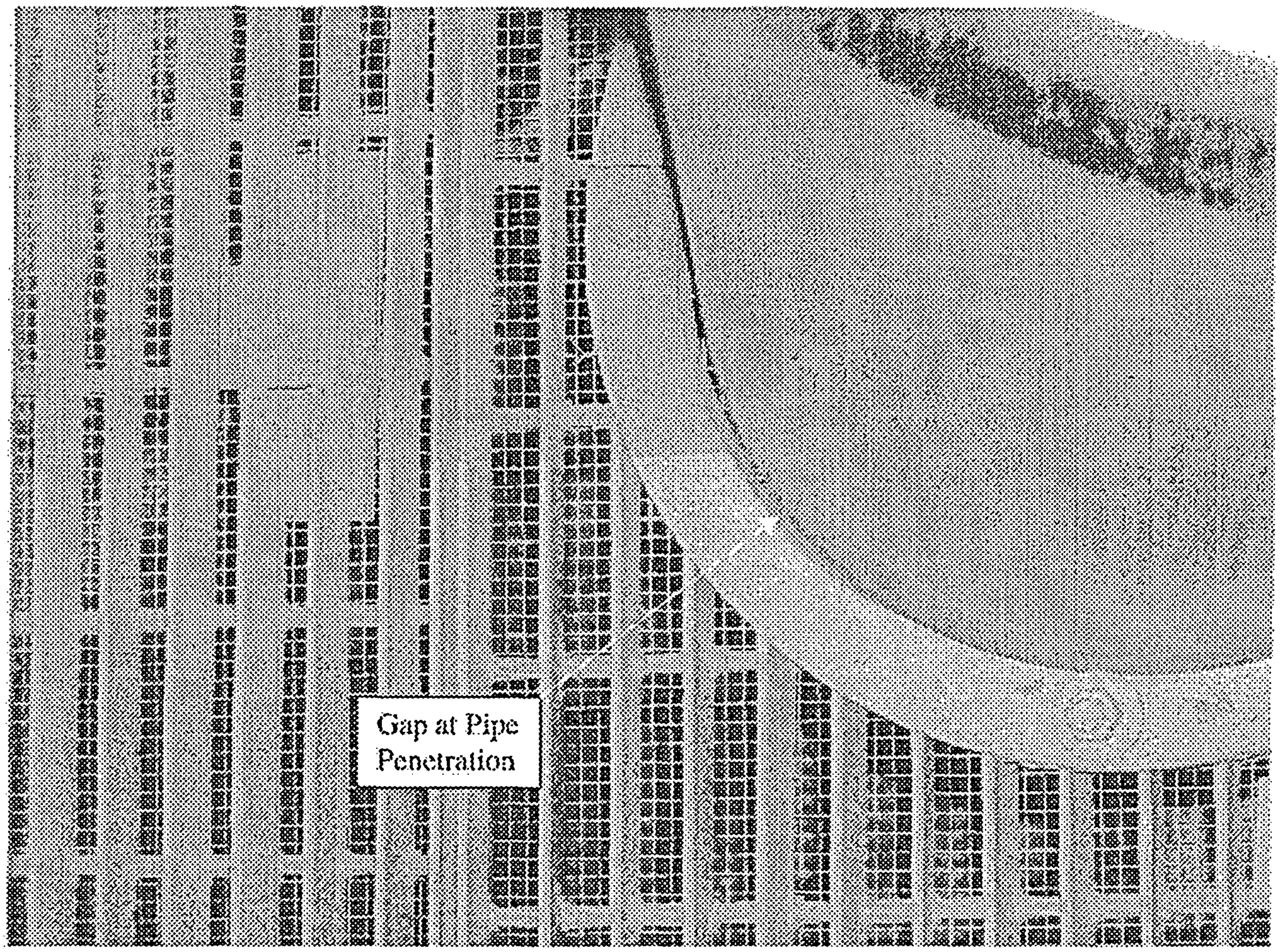

Gap at Door of
Sump Liner

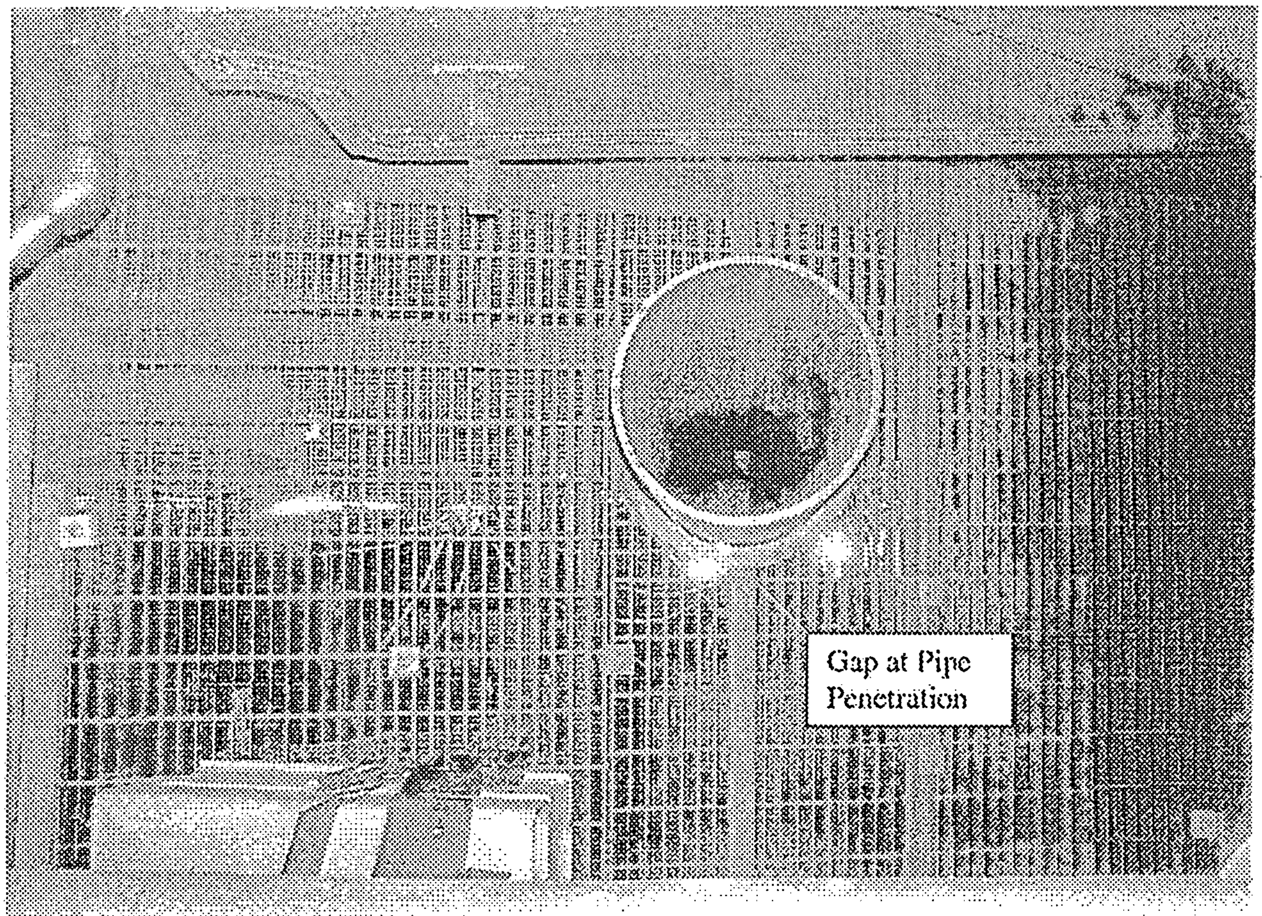

Gap at Door of
Sump Liner

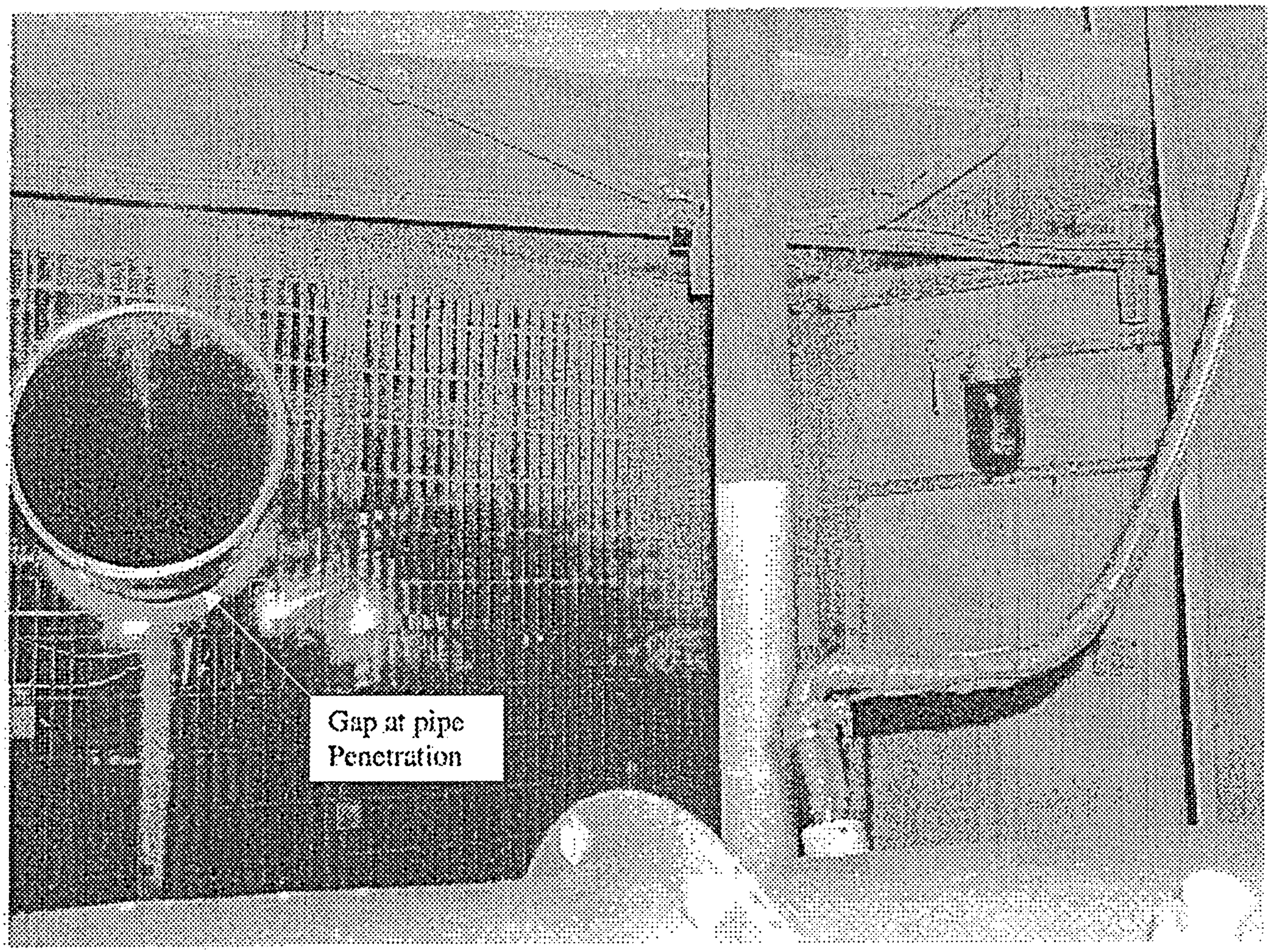

Gap at Door of
Sump Liner

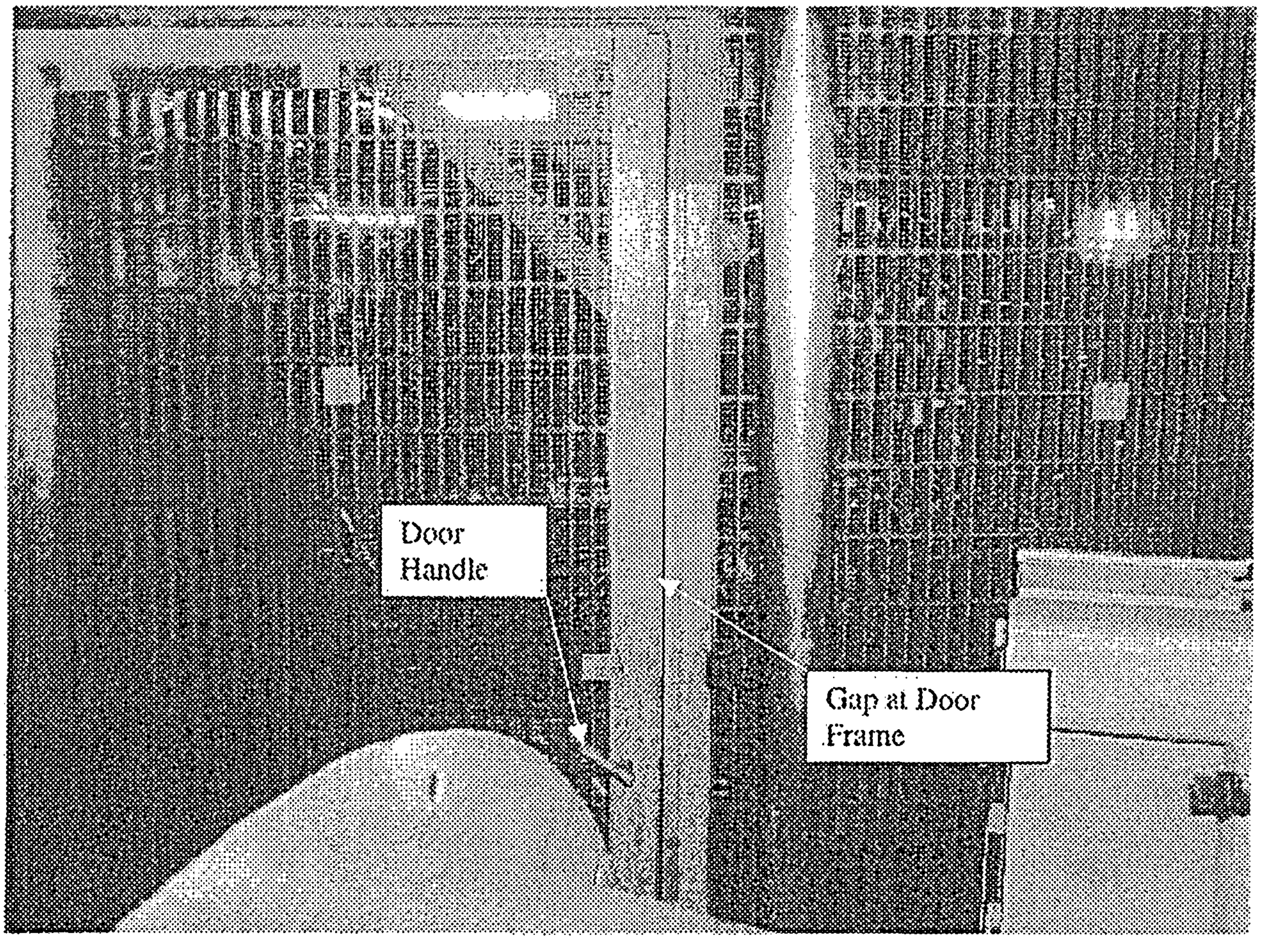

Gap at Pipe
Penetration

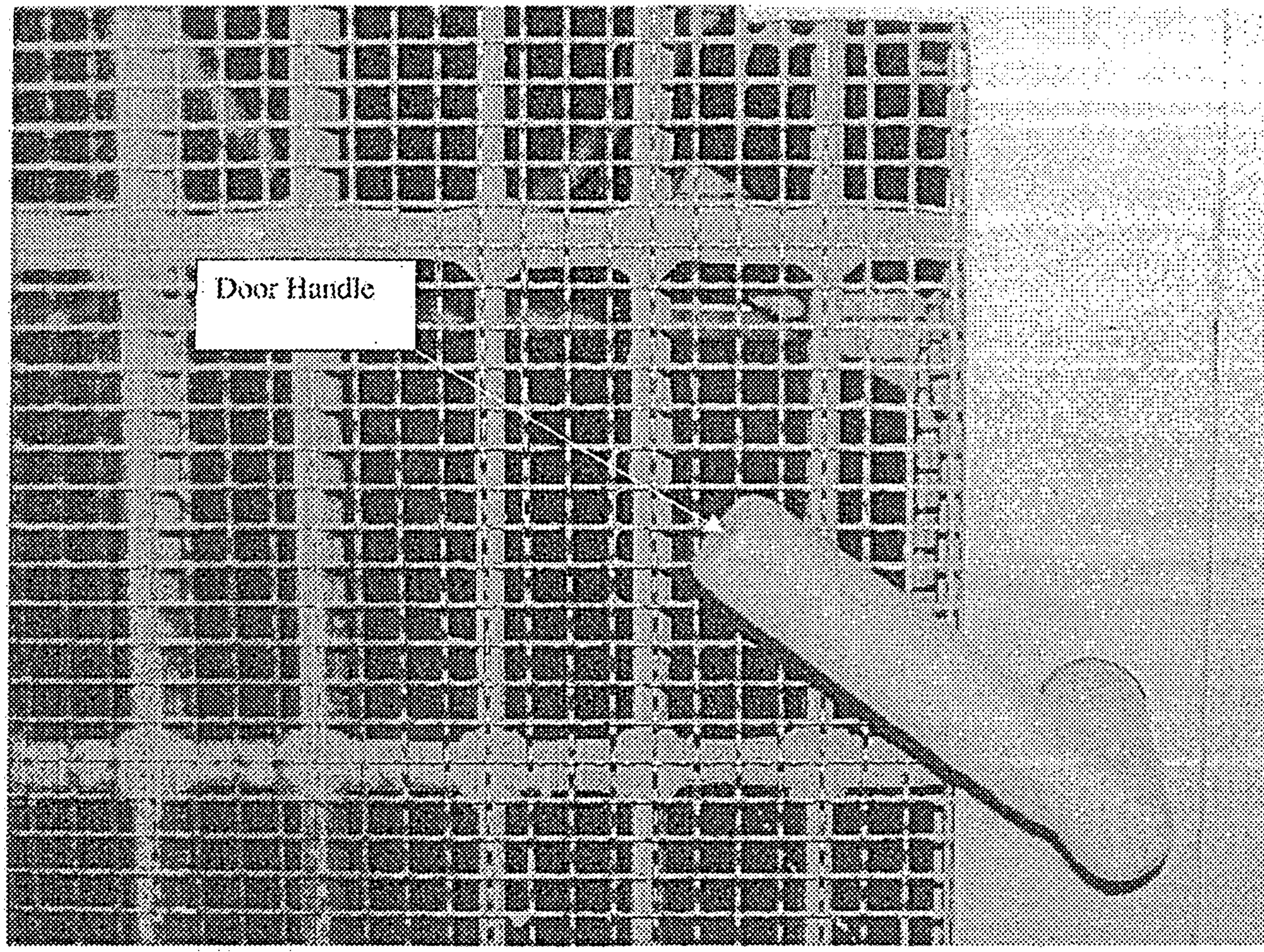

Floor Drain
Inside the Sump
Liner Area


Gap at Pipe
Penetration


Gap at Pipe
Penetration


Gap at pipe
Penetration


Door
Handle
Gap at Door
Frame


Door Handle

Enercon Services, Inc.

ATTACHMENT F:

TVA Watts Bar
CONTAINMENT TRANSPORT PATHS WALKDOWN

Originator ______________________ 8/17/04
Gilbert Zigler Date

Checker ______________________ 8/20/04
Michael Caldwell Date

TABLE OF CONTENTS **PAGE**

1. Purpose

The purpose of this report is to document the results of a containment geometry assessment walkdown performed in October 2003 to support the resolution of the GSI-191 issue at the Tennessee Valley Authority (TVA) Watts Bar Nuclear (WBN) Power Plant. The containment geometry assessment documents the physical/structural features that will affect the flow of debris and water from a potential break location to the sump. This report addresses the following specific items:

- Verify robust barriers located inside containment.
- Verify structures and equipment impervious to jet impingement and prevent jet expansion.
- Verify major paths for containment spray flow and assess the areas covered by containment sprays
- Determine spray and drainage flow paths to the sump
- Identify any potential "choke points" and verify that the drainage paths are currently unblocked
- Confirm inputs necessary for debris transport analysis (CFD)

This report will also provide a listing of input data necessary for the development of a computer model (computational fluid dynamics – CFD) of the lower containment. It will also provide data and commentary on the physical features that will affect the blowdown flow path and disbursement of debris.

2. General Description

The WBN Unit 1 containment is an ice condenser containment housing a 4 loop Westinghouse pressurized water reactor. The WBN containment can be vertically divided into two general compartments:

- Upper Containment – the upper part of the containment with the floor at the 756.63" elevation,
- Lower Containment – the lower part of the containment with the floor at the 702.78" elevation.

The following are the pertinent characteristics of the WBN Unit 1 associated with potential debris transport paths following a postulated high energy pipe break:

- The containment sprays are of a multiple concentric ring design and are located on the inside of the dome with no intervening structures to the upper containment floor at elevation 756.63".
- In the event of a postulated LOCA the steam/water from the blowdown will pass from the lower containment to the upper containment through the ice condensers.

- The containment spray and blowdown condensate are designed to drain from the elevation 756.63" floor into the refueling canal.
- The containment spray water and condensate will flow from the refueling canal to the lower containment through two refueling canal drain lines.
- The lower containment is compact and has no significant robust barriers between major RCS components. There are no significant vertical obstructions between potential pipe break location and the floor that could retain break flow water.
- The 702.78" elevation floor has numerous obstructions to horizontal water flow in the floor in the form of the RCS piping and reactor coolant pump motor supports and other miscellaneous support structures.
- The ECCS sump is located in the 702.78" elevation floor under the refueling canal.
- The two refueling canal drain lines are piped in the lower containment to outside the refueling canal constraint.
- The ECCS sump is protected from debris by gratings covering the entire entry into the refueling canal constraint.
- The water from the ice condenser baskets drains into the lower containment through lines located at approximately elevation 736".
- The volumes below the divider deck but outside the crane wall do not communicate with the sump as the crane wall is sealed up to 13 feet off the floor which is at elevation 702.8'. When the Lower Compartment water level exceeds 13 feet above the floor (715.8'), water goes outside the crane wall through unsealed penetrations. The maximum transient elevation inside the crane wall is 720' and the maximum equilibrium elevation is 717.2'. Therefore, the only communication paths between lower containment and the areas outside the crane wall are the limited number of unsealed penetrations between elevation 715.8' and 717.2'. The level outside the crane wall never gets close to 13 feet to allow transfer of water or debris.. There are two minor exceptions. Accumulator rooms 3 and 4 have the air return fans in them. Containment spray water that directly impacts the fans goes into these accumulator rooms. Curbs on the refueling floor prevent spray water hitting the floor from running into the air return fans. Water going through the fans is drained directly from these rooms into the lower compartment. Latent debris in these rooms could go to the sump. None of the other areas outside the crane wall would be a source of debris.

3. Walkdown Observations

A familiarization walkdown was performed at WBN Unit 2 on October 3 by Gil Zigler of ITS. On October 4 Gil Zigler of ITS performed the containment geometry walkdown of WBN Unit 1. The walkdowns entailed observing containment spray and postulated break flow paths to the ECCS containment sump, looking for unique debris sources, and looking for interferences and obstacles that could impede the flow of water and debris. An inspection of the sump was also conducted during this walkdown. Specific areas were captured on digital still images and are included in this report (see section 4 below).

a. Upper Containment

There is a direct line of sight between the containment spray headers and the floor of the upper containment at elevation 756.63". No significant obstructions were noted that would be conducive to the formation of entrapped pools of water in the upper containment floor at elevation 756.63" that would interfere with water draining into the refueling canal. The general conclusion for the upper containment is that it is not credible that a pool of any significance would be formed at elevation 756.63" or higher and that there is a free flow of water from the floor at elevation 756.63" to the floor of the refueling canal.

b. Lower Containment

The lower containment floor at elevation 702.78" is very crowded when compared to other containment types. The break flow from possible break locations reaching the 702.78" elevation floor would flow over and arround the obstructions on the 702.78" elevation – no significant volumes would be held up in the 702.78" elevation floor. There are numerous obstructions in the form of gratings and piping between most of the ice condenser basket drain line output and the 702.78" elevation floor – as such the ice condenser drain water reaching the post-LOCA pool would be diffused in the form of a spray rather than a direct water jet. The general conclusion is that there are no credible interferences at elevation 702.78" floor that would preclude the break flow water or ice condenser water from reaching the ECCS sumps.

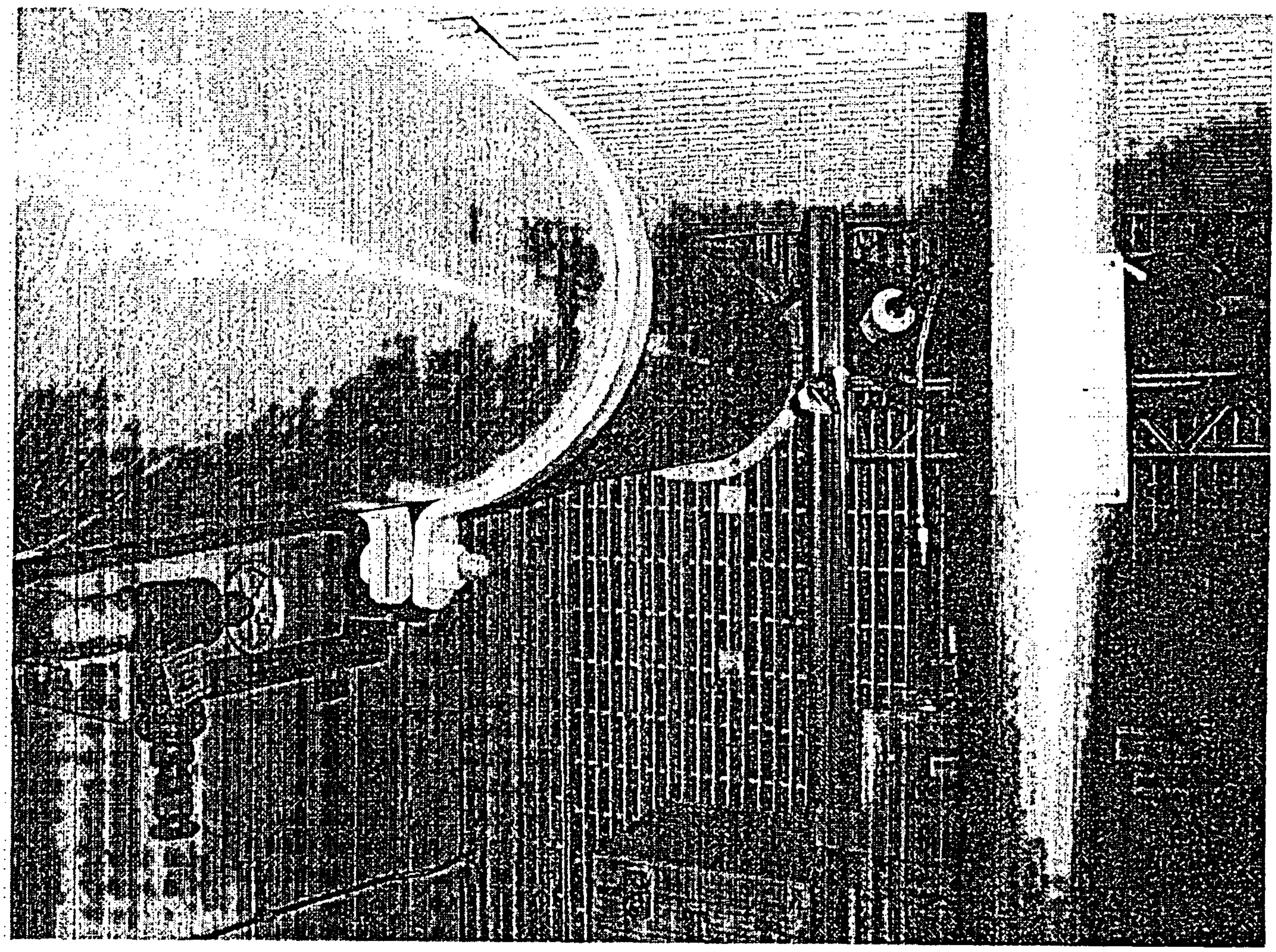
4. Digital Images from Walkdown Team

Pictures of taken during the containment geometry assessment walkdown are attached.

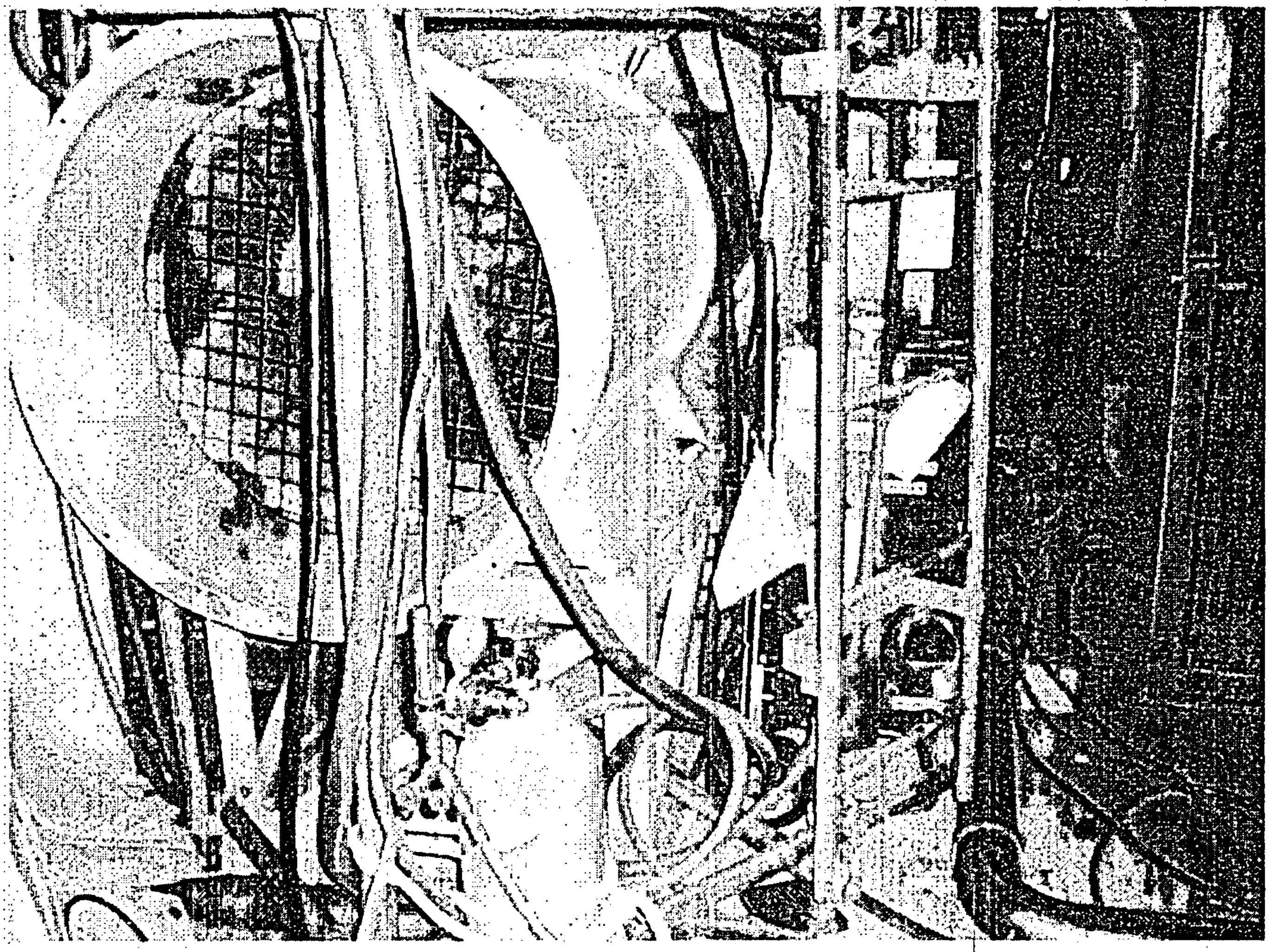
5. Drawings and Other References

The following drawings and other references obtained at WBN applicable to the containment geometry assessment walkdown are as follows:

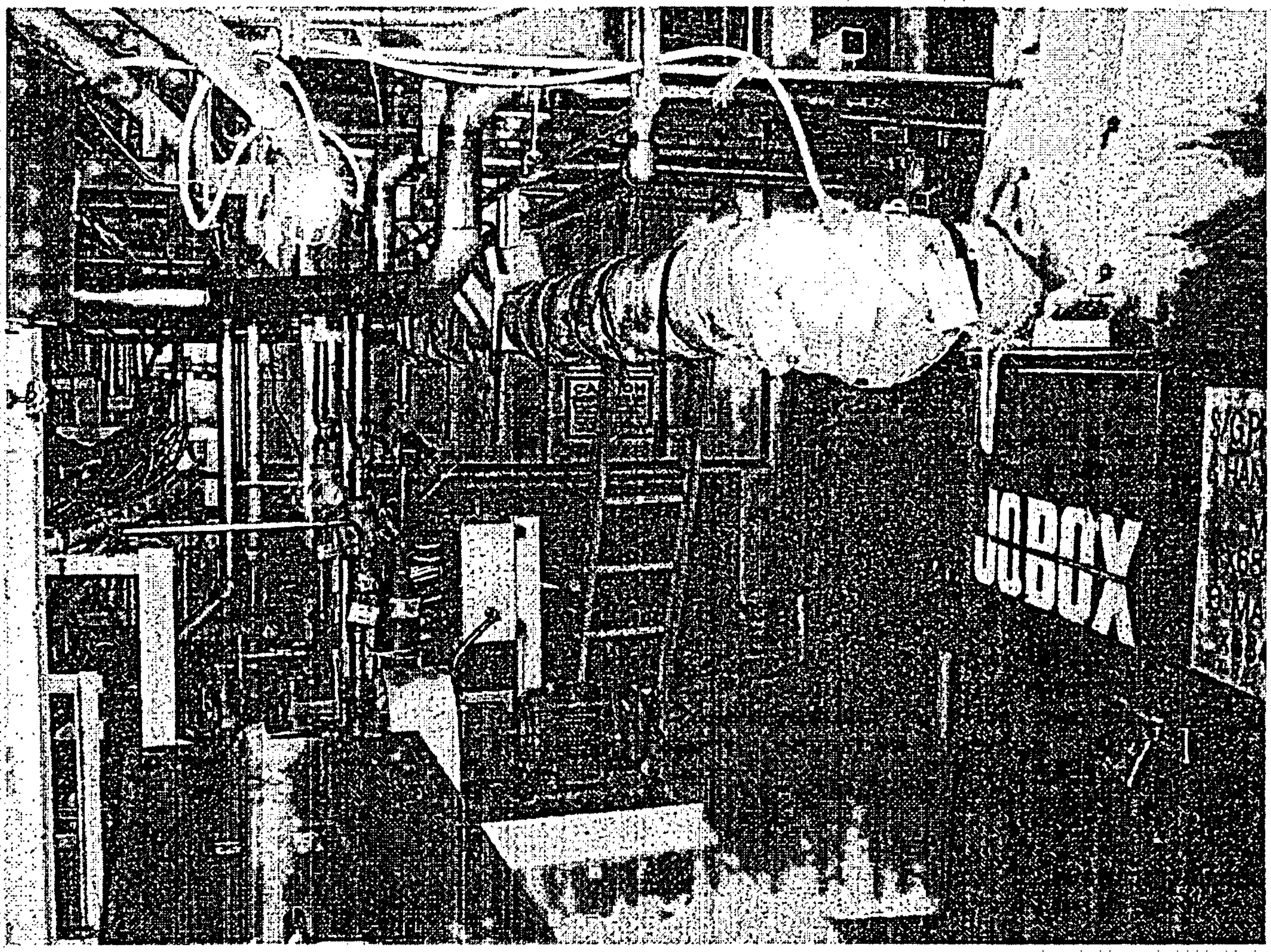
1. Equipment Plan EL 772.0 & Above, drawing #: 47W200-2
2. Equipment Reactor Building, drawing #: 47W200-11
3. Equipment Reactor Building, drawing #: 47W200-12
4. Equipment Reactor Building, drawing #: 47W200-13
5. Equipment Reactor Building, drawing #: 47W200-14
6. Concrete Floor Slab- EL 702.78 Outline, drawing # 41N710-1
7. Mechanical HVAC, drawing #: 47W915-2
8. Mechanical HVAC, drawing #: 47W915-3
9. Mechanical HVAC, drawing #: 47W915-4
10. Miscellaneous Steel Sump Liner, Sheet 3, drawing #: 48N919
11. RWST and Containment RHR Sump Safety Limits, Analytical Limits and Setpoints, Calc # WB-NOSG-4071, dated 8/11/03
12. Evaluating the Effects of Flooding Due to Moderate Energy Pipe Failures Inside and Outside Containment, Calc # WB-DC-40-31.51, 1/12/01



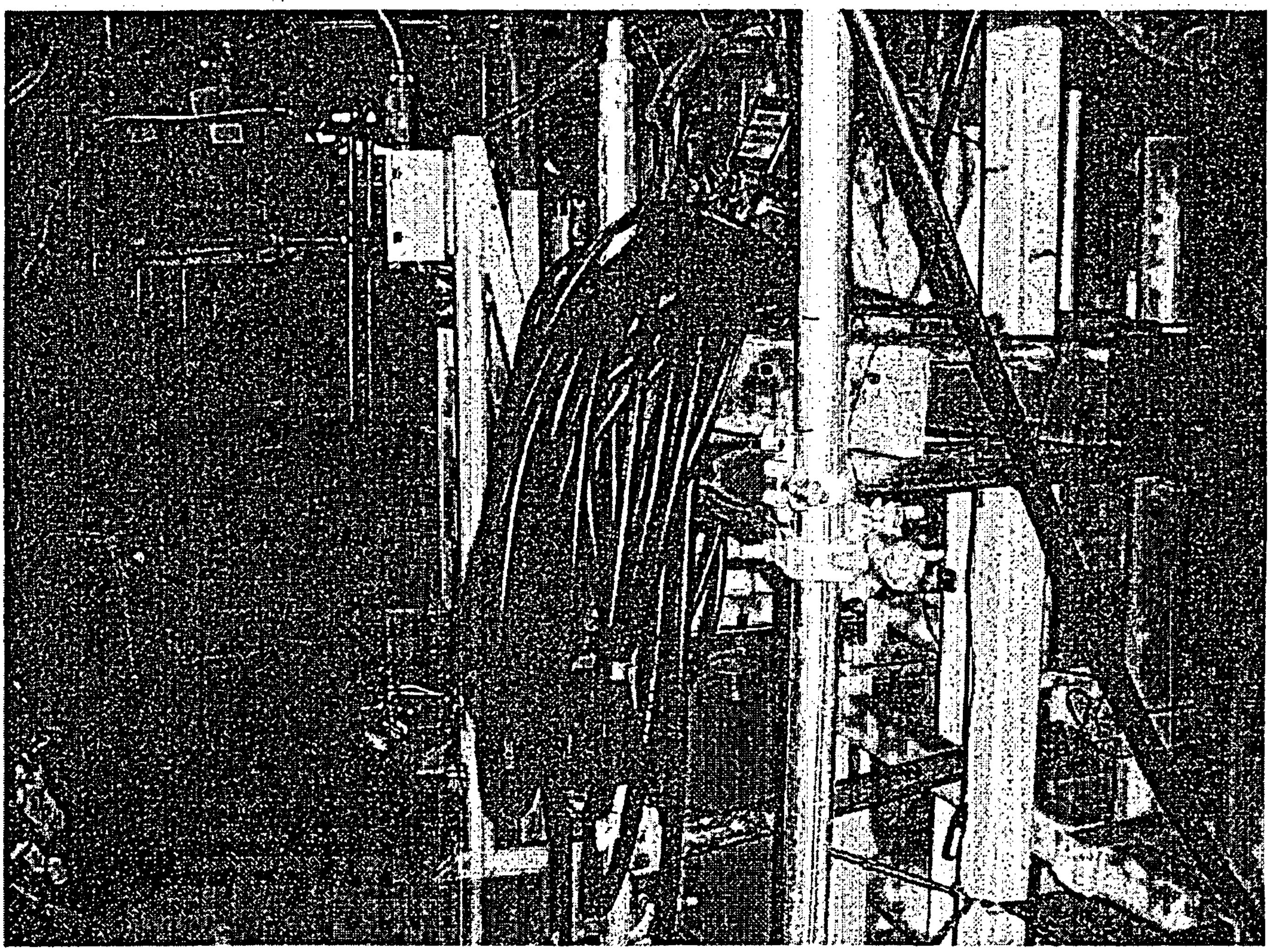
WBN 1 14 inch line in Sump Room



WBN 1 Air Handler next to Sump Room

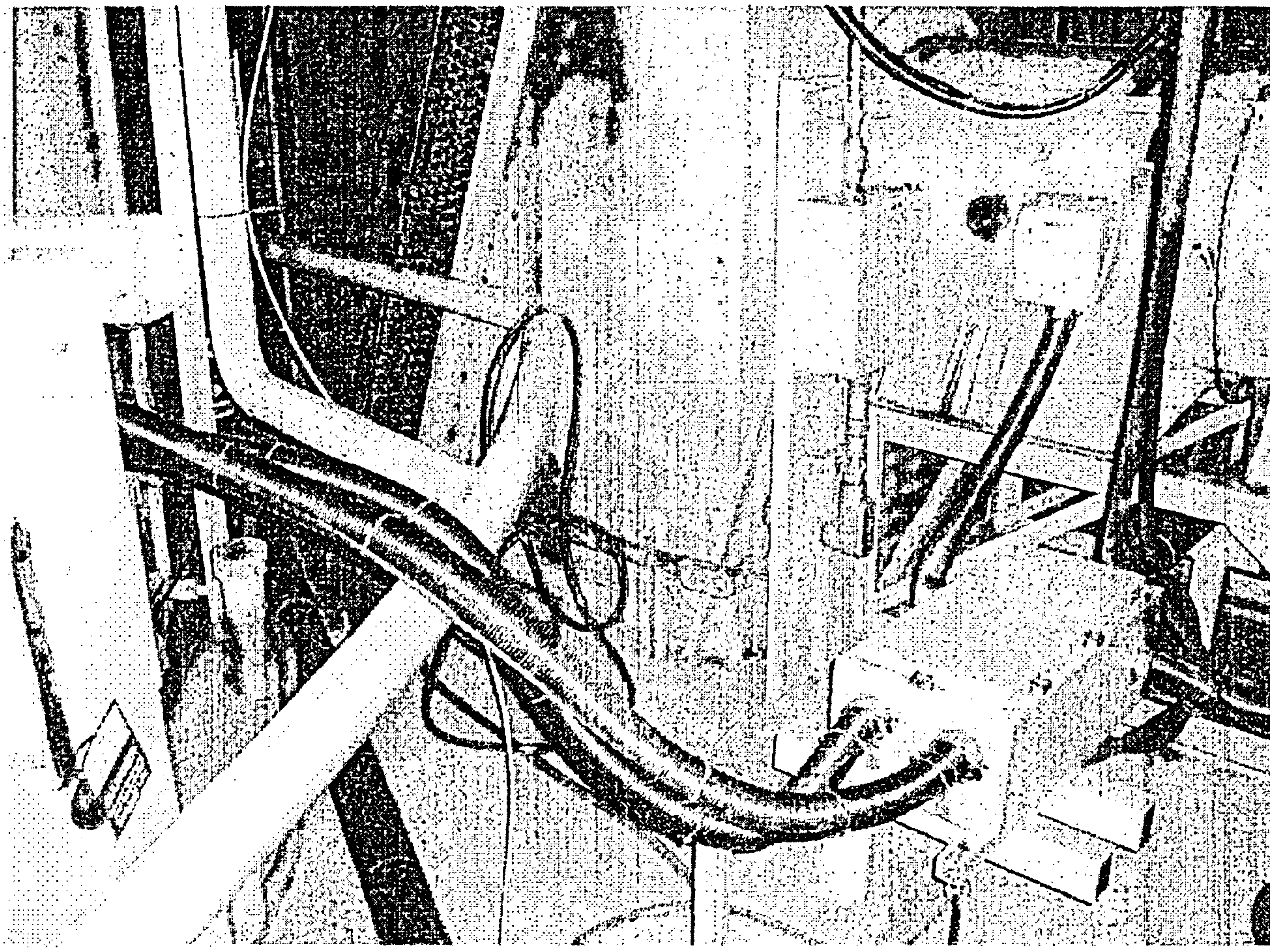


WBN 1 Annulus

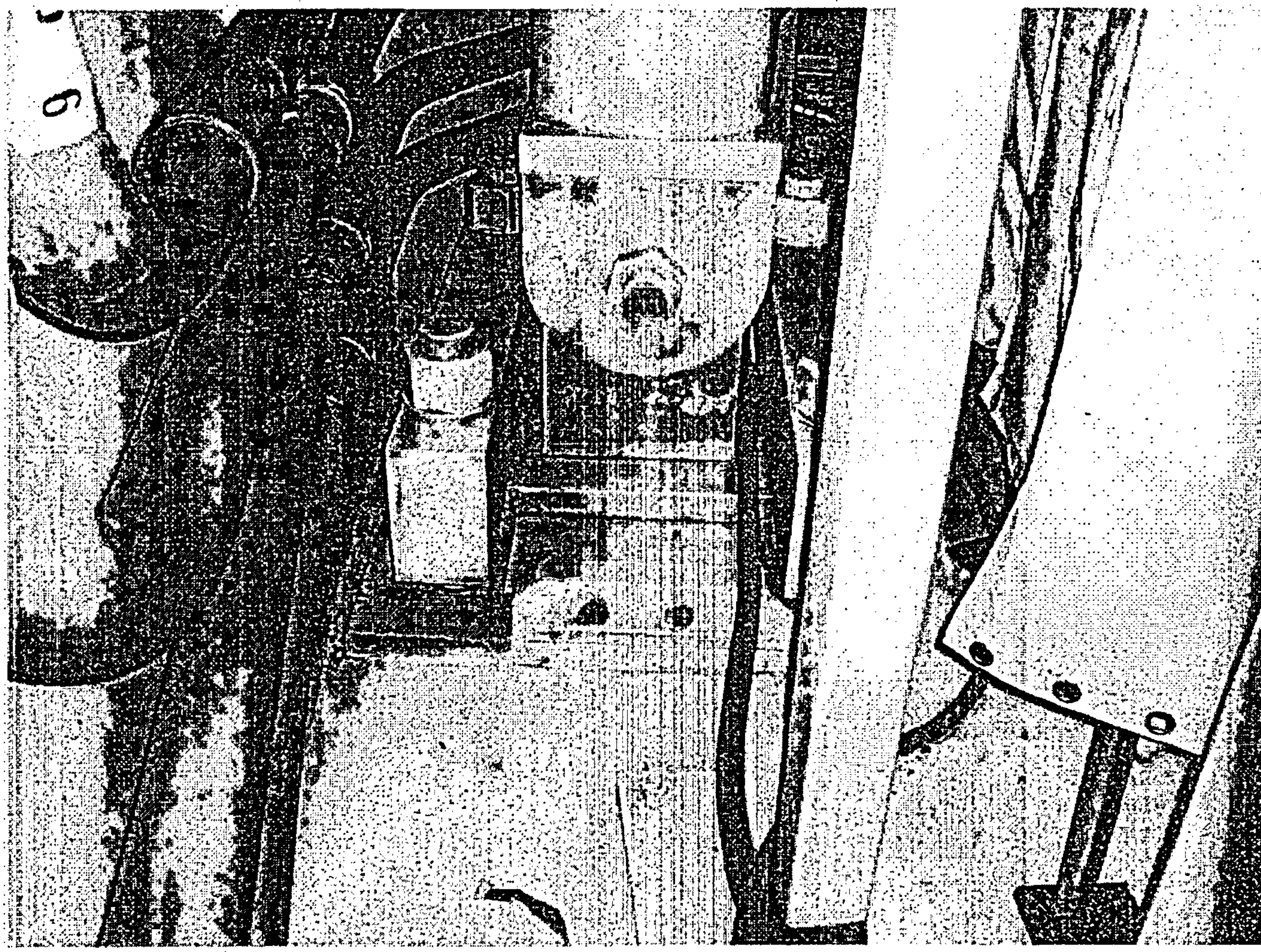


WBN 1 Annulus

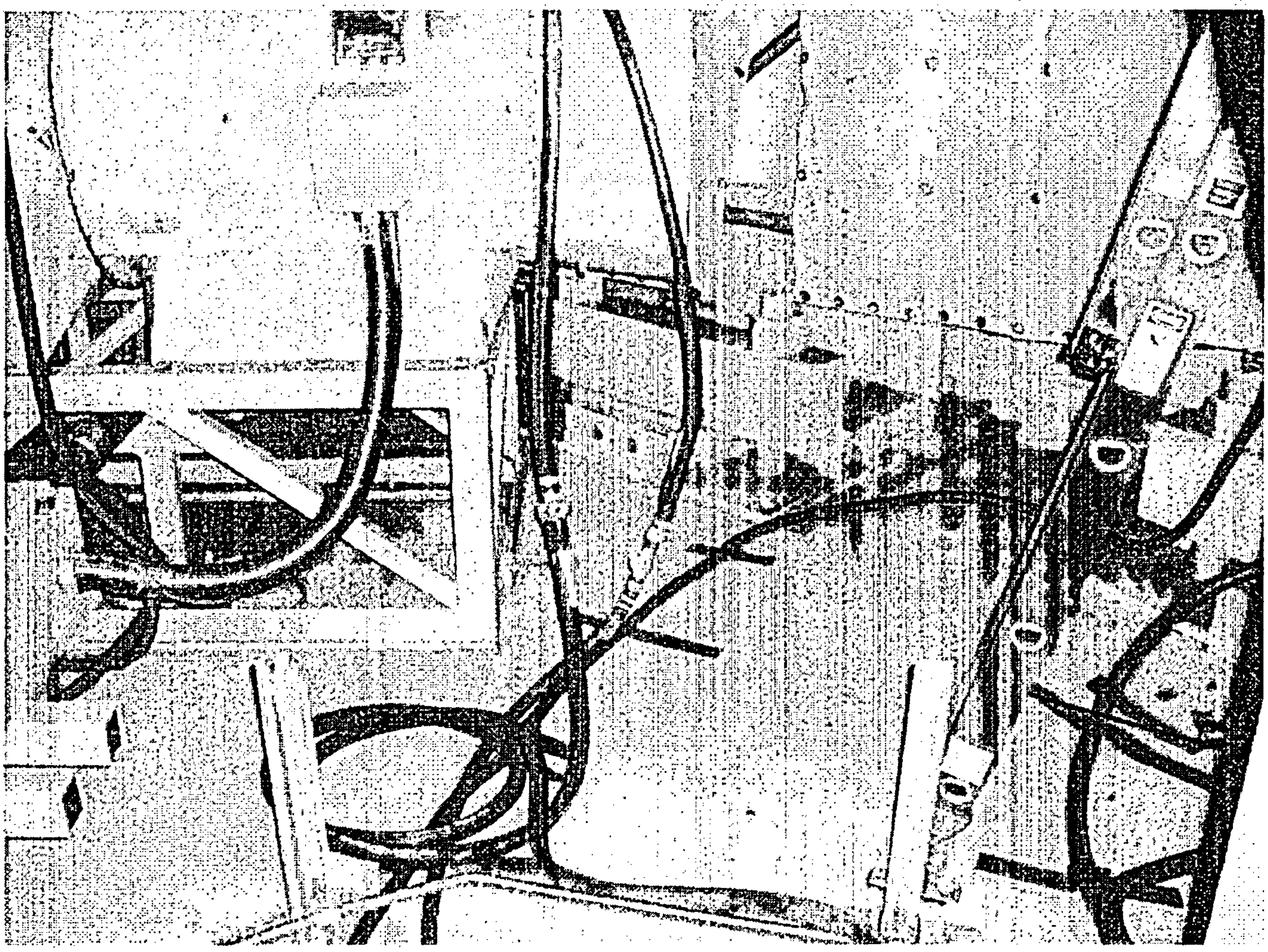
Enercon Services, Inc.



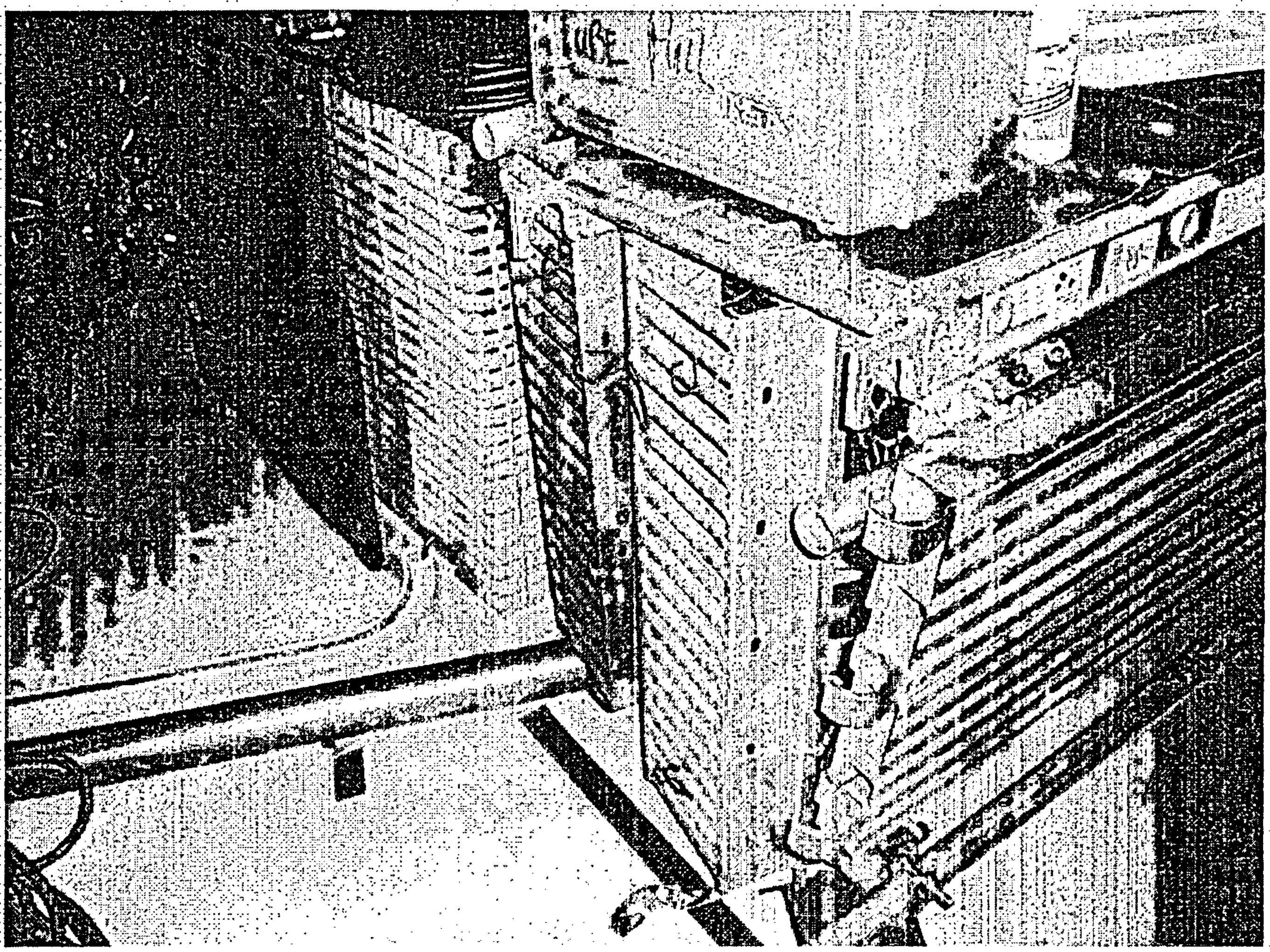
WBN 1 Floor



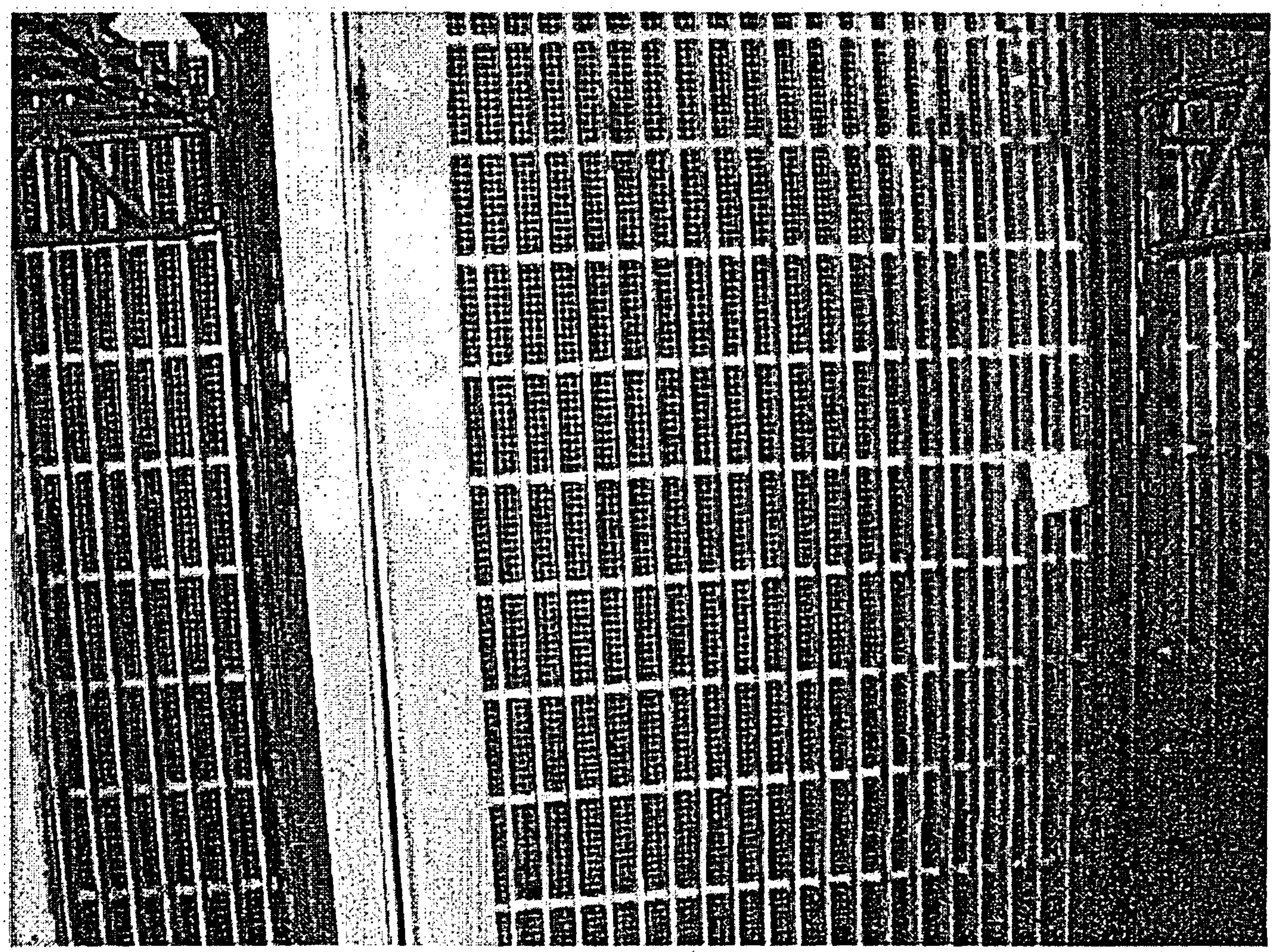
WBN 1 Floor Congestion



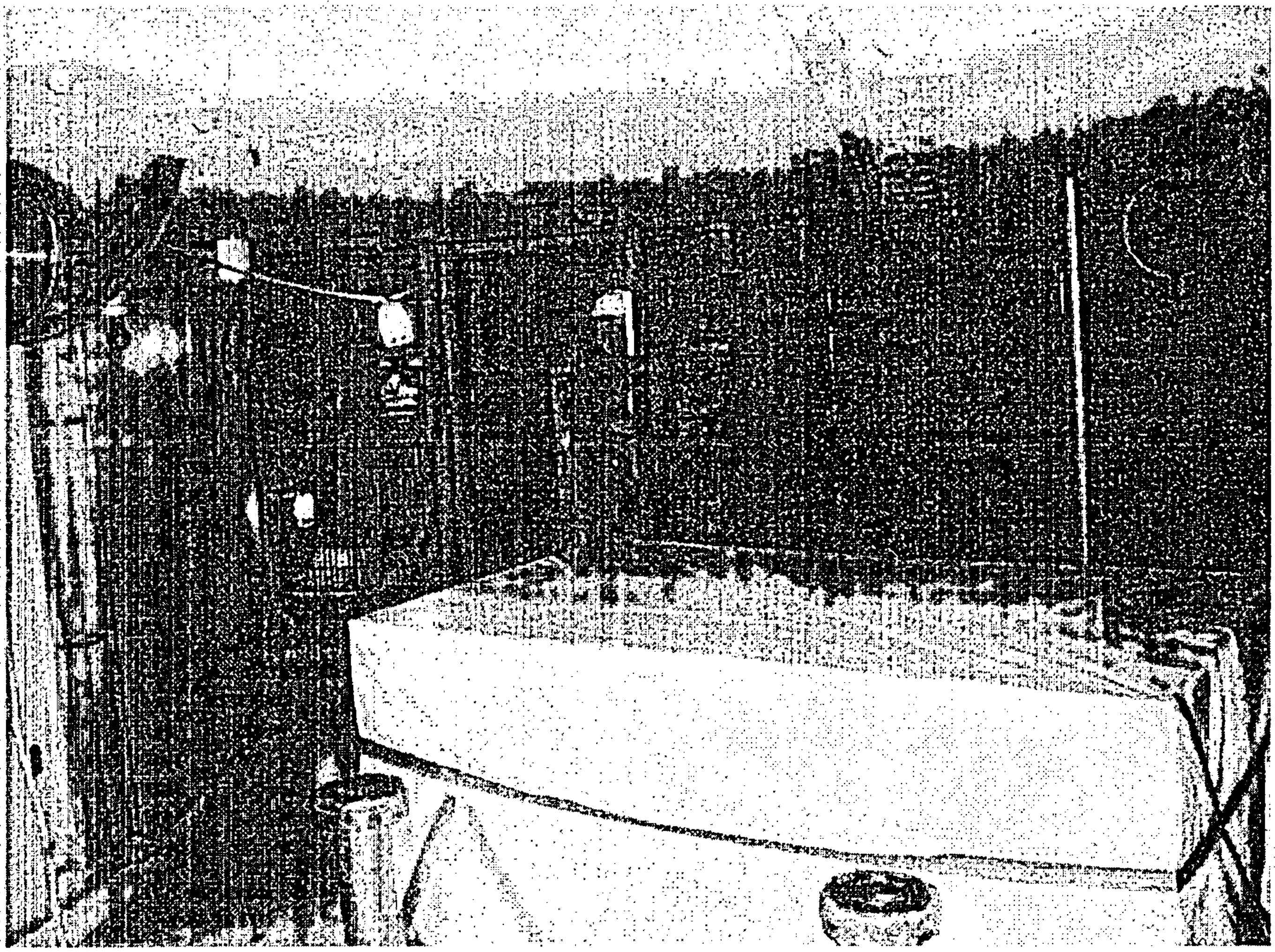
WBN 1 Floor Obstructions



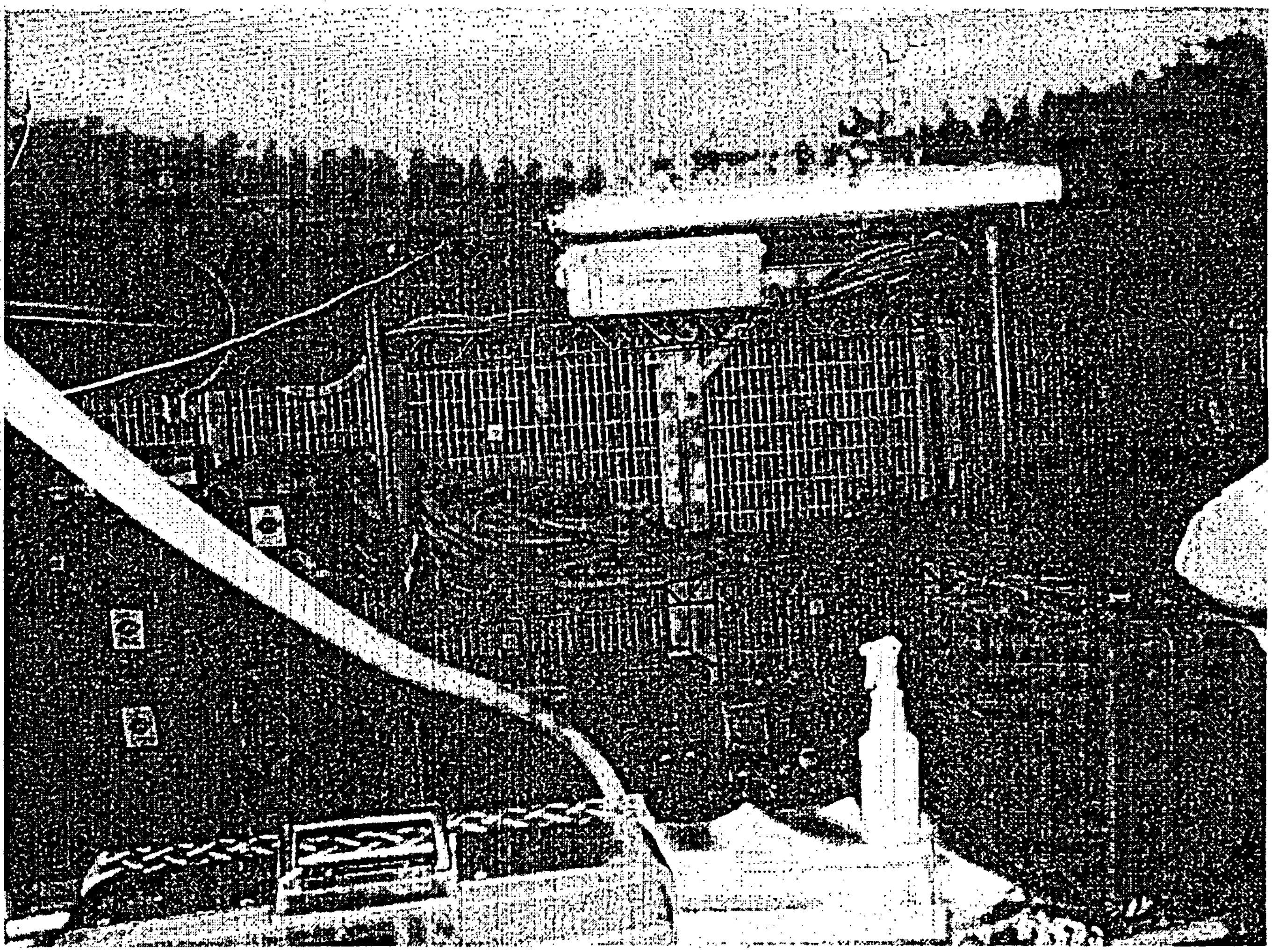
WBN 1 Sump



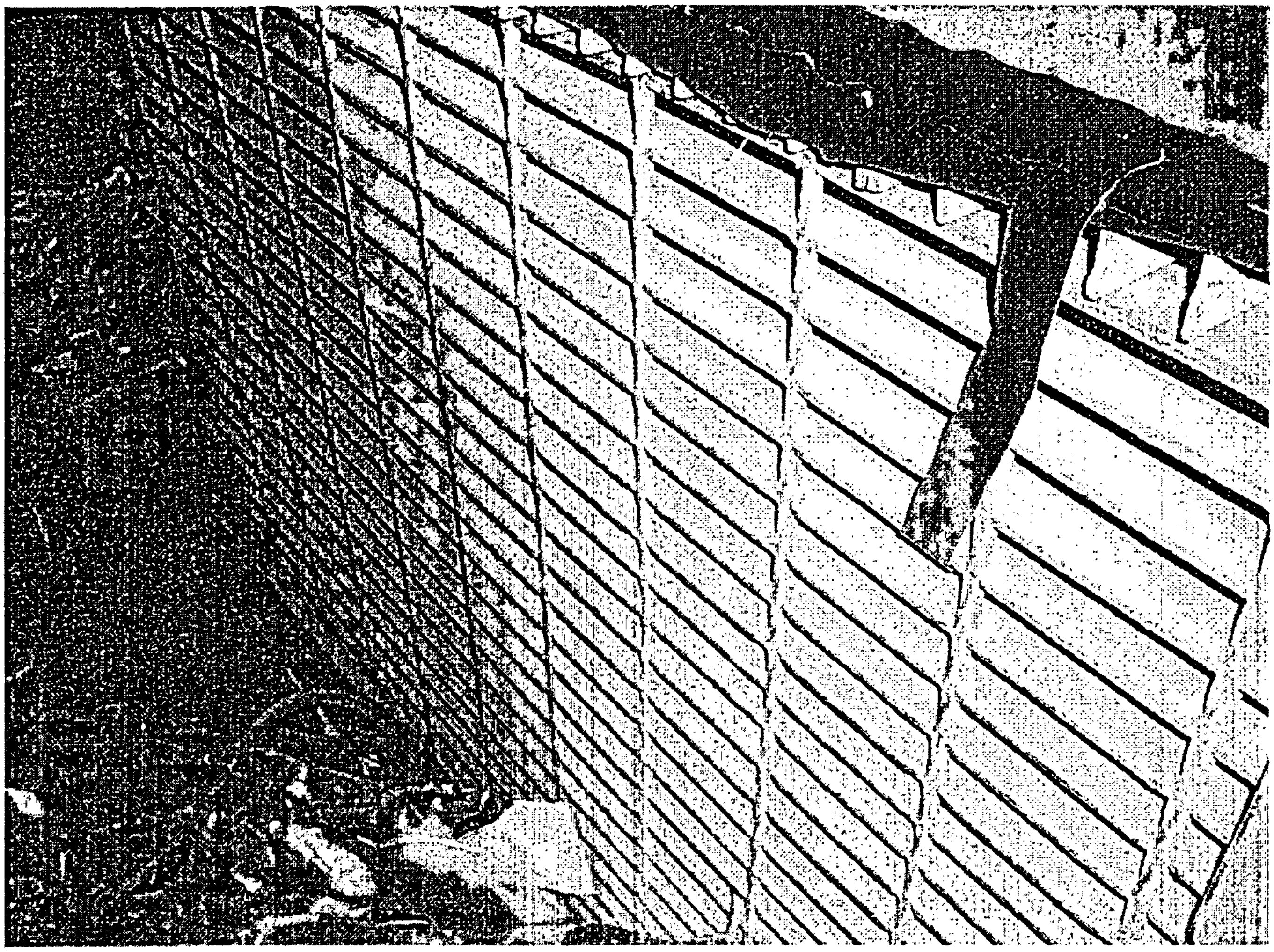
WBN 1 Sump Screen



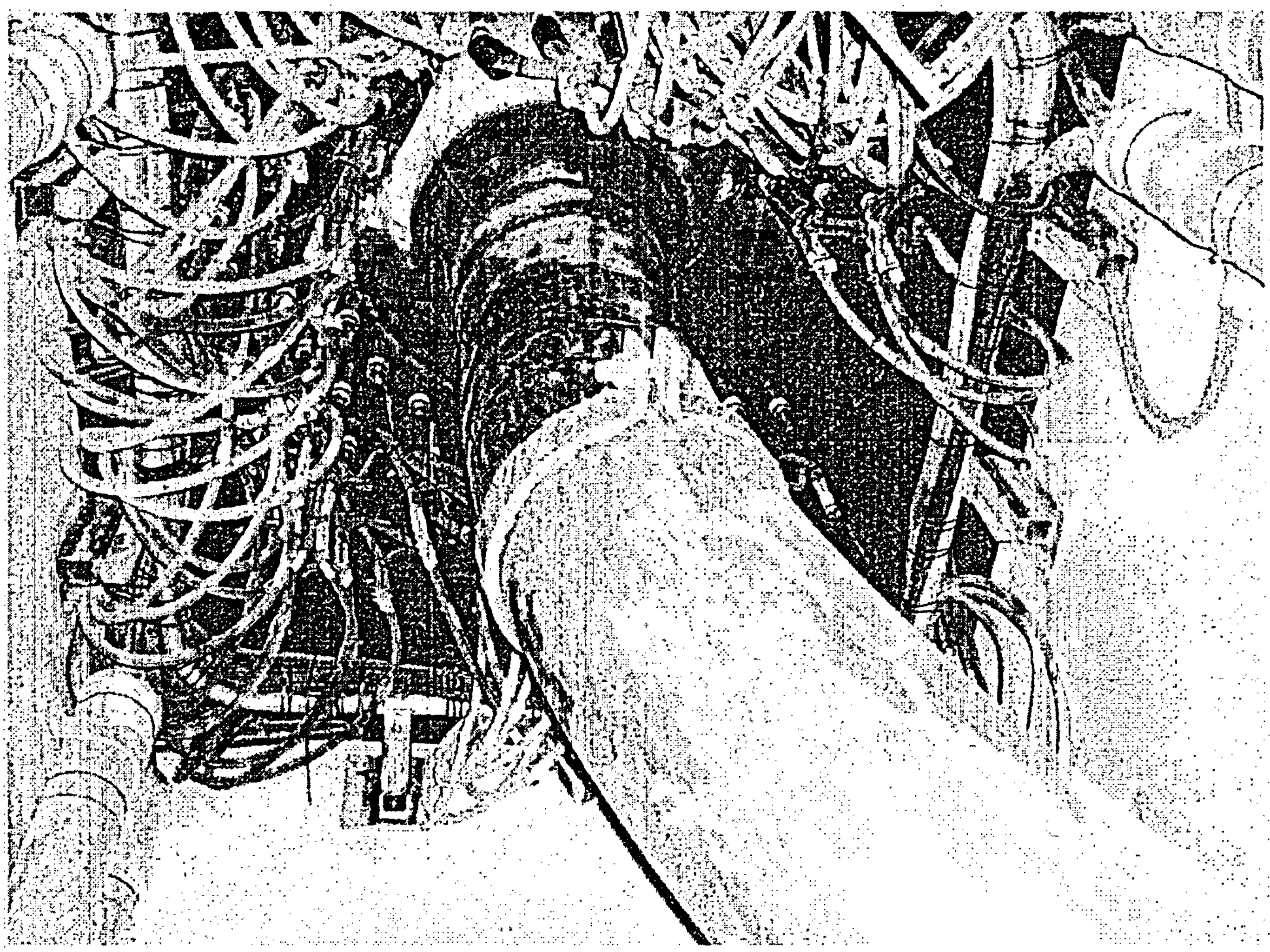
WBN 2 Sump Room



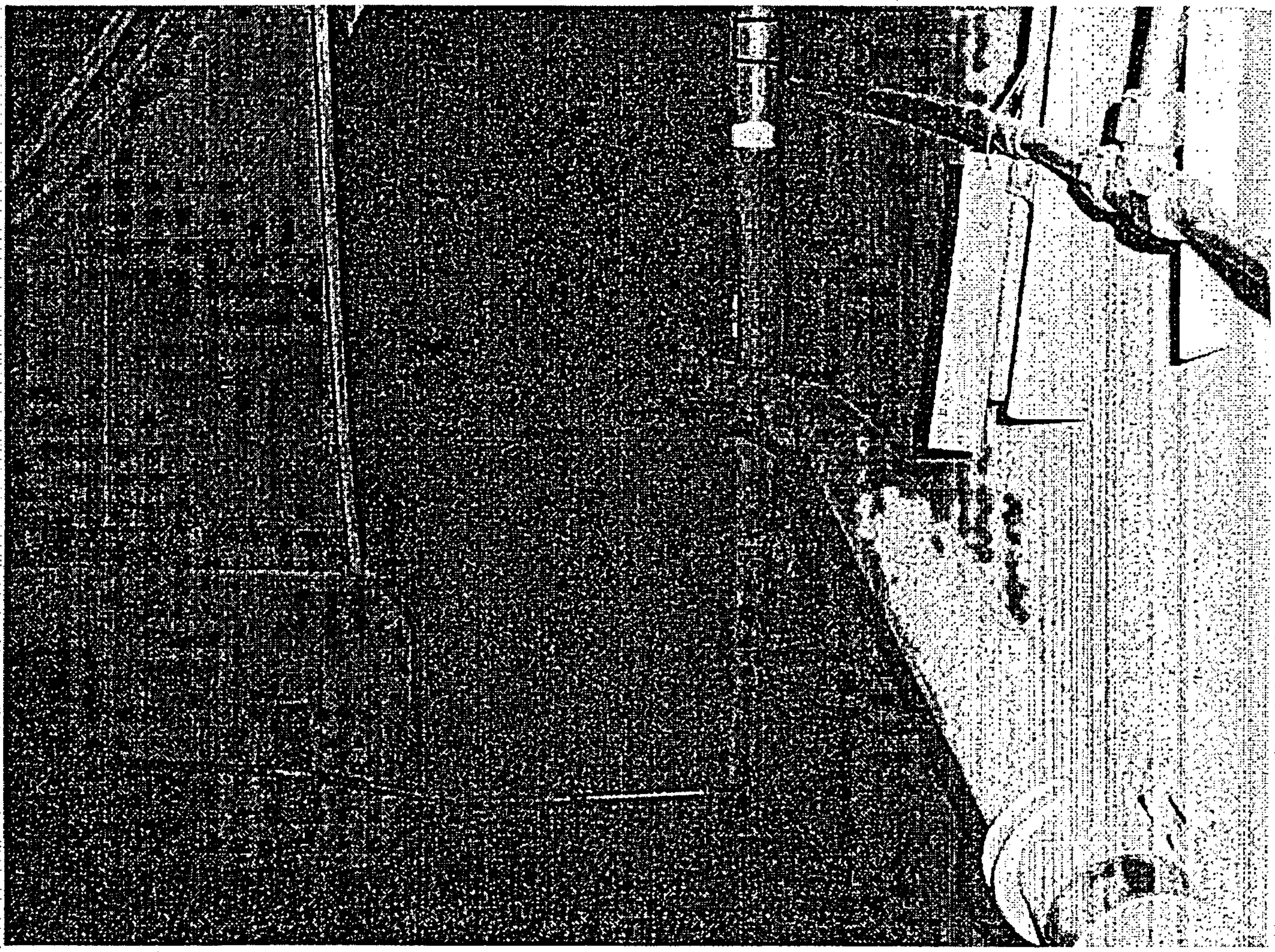
WBN 1 Sump Room



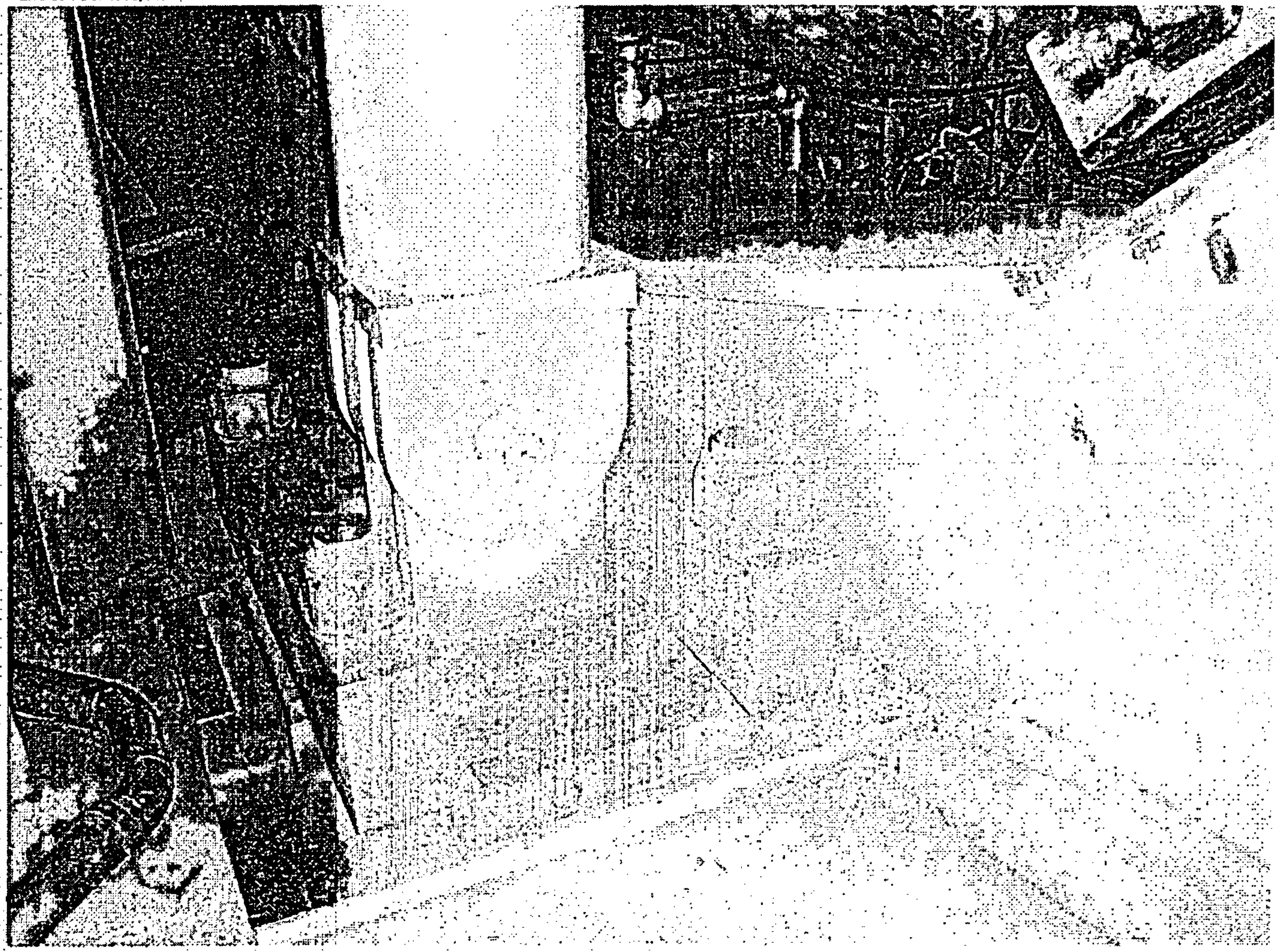
WBN 1 Sump



WBN 2 Bottom of PZR



WBN 2 Constrictions



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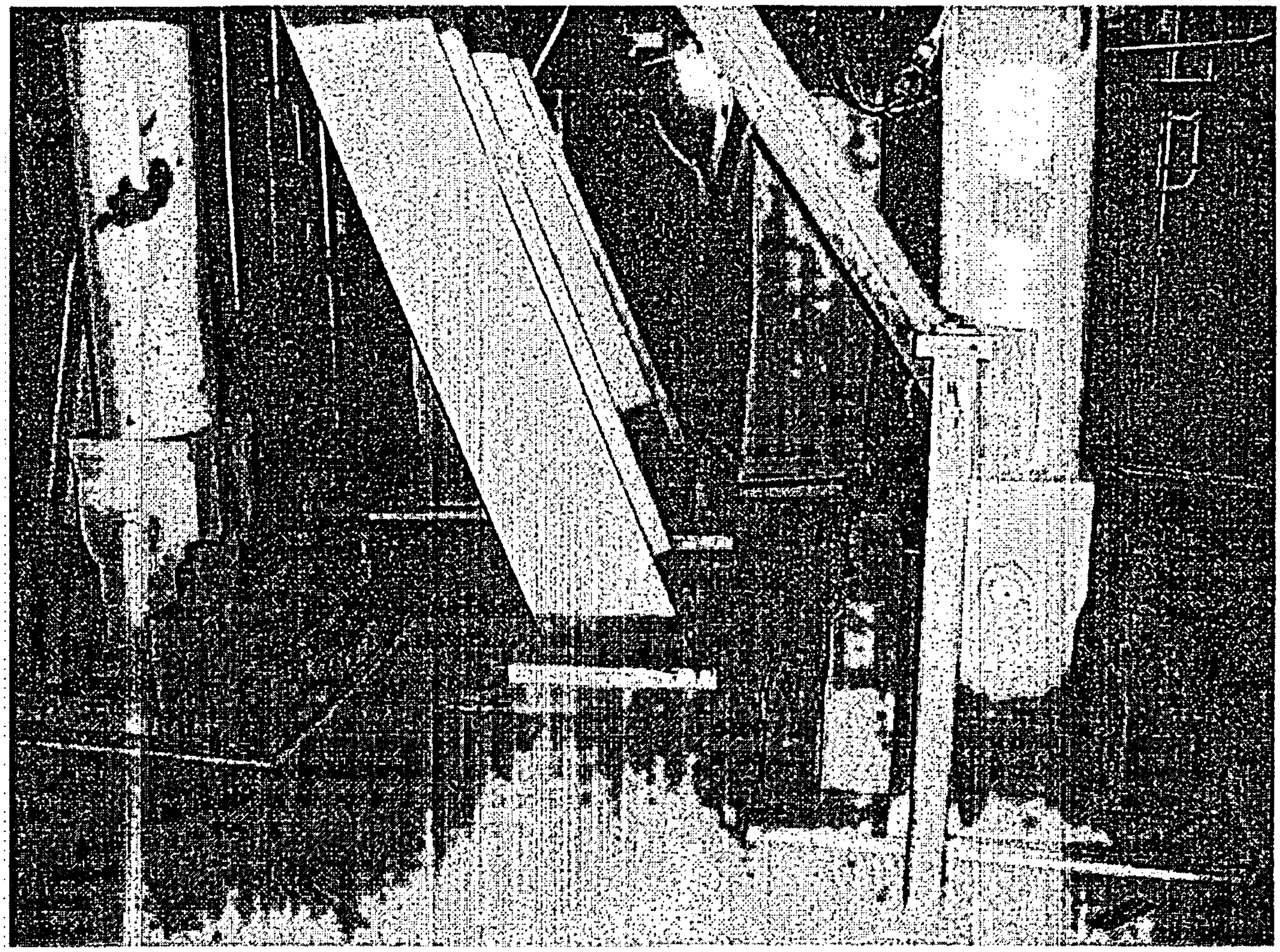
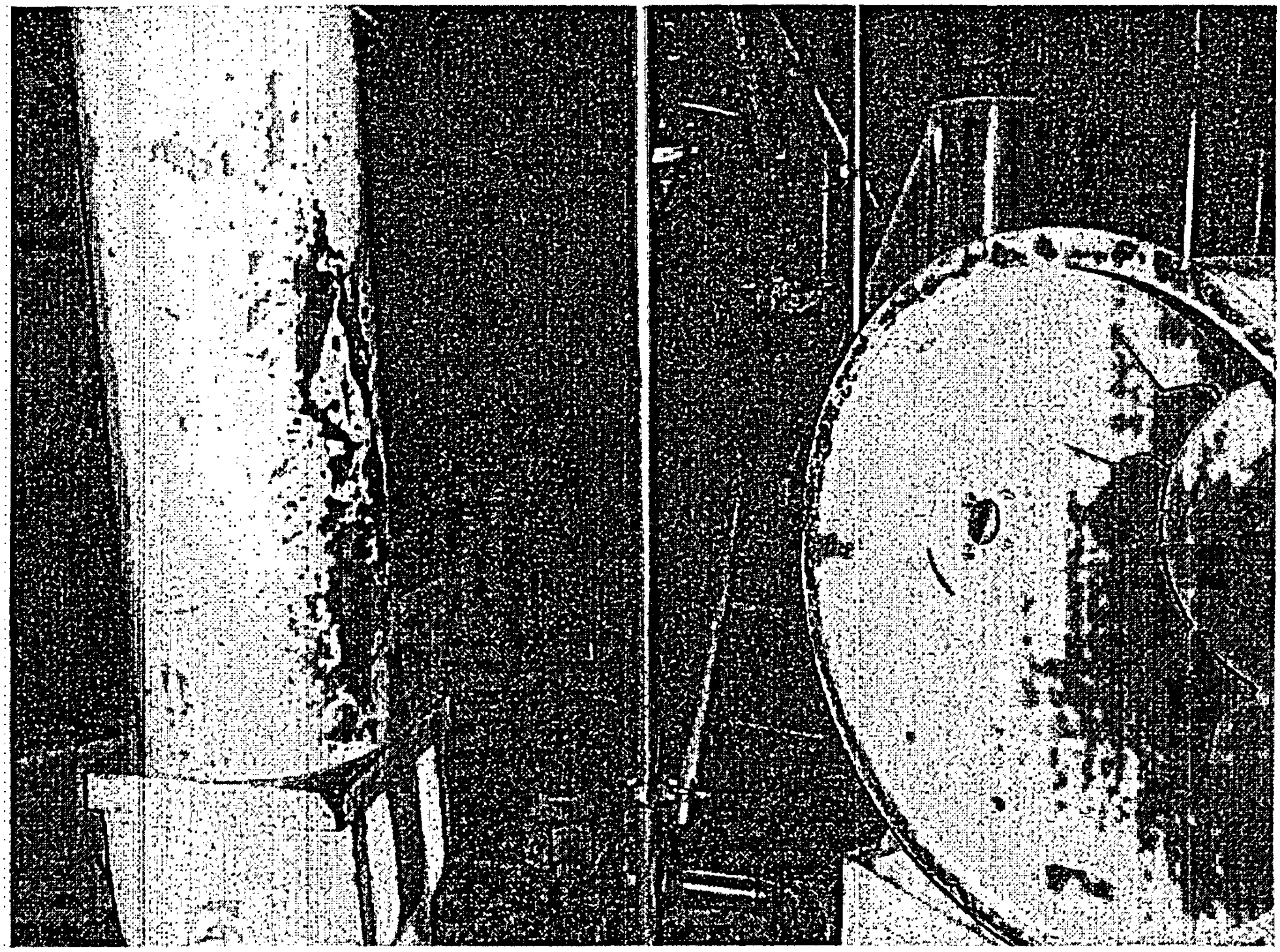
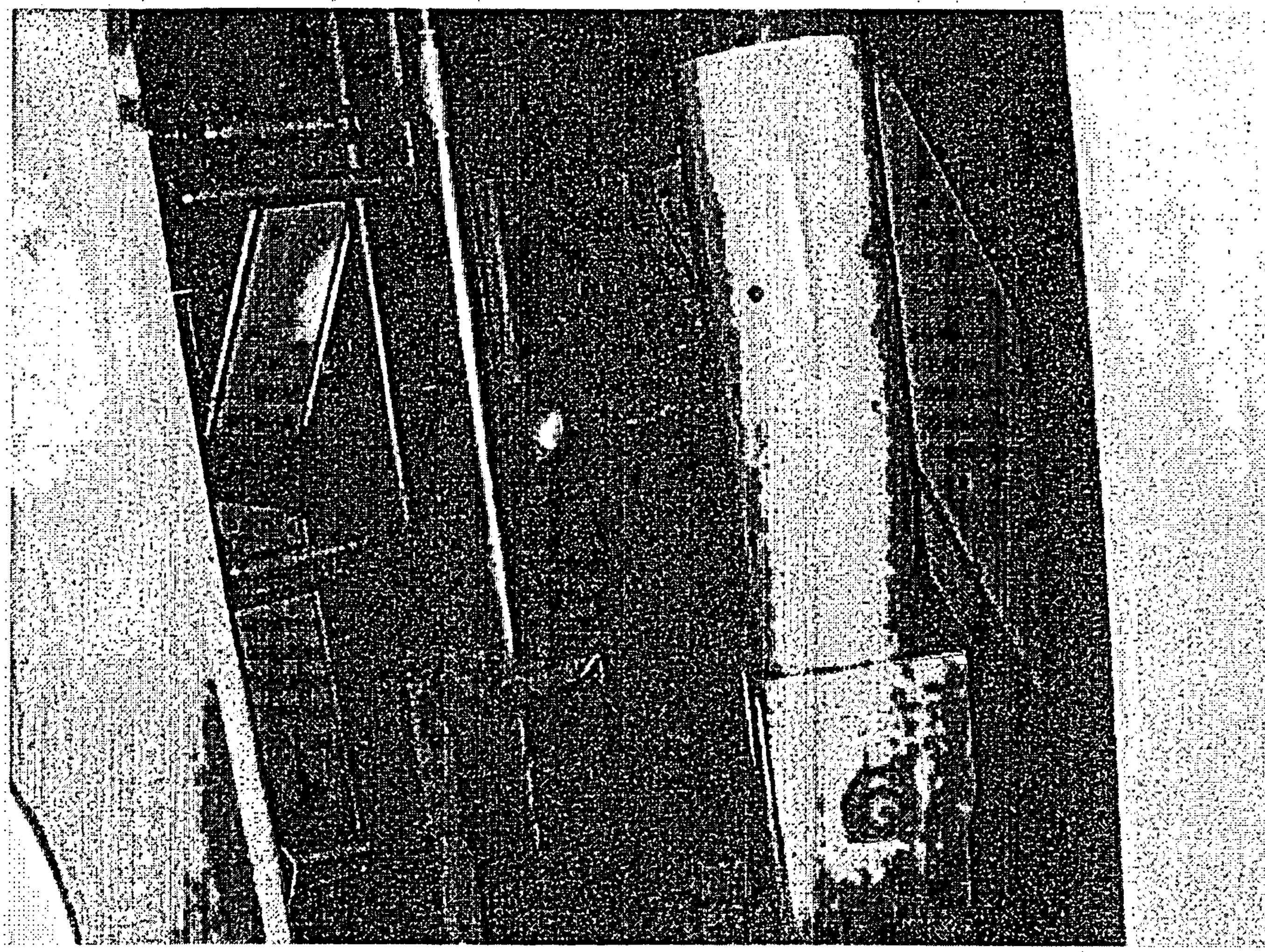


WBN 2 Floor

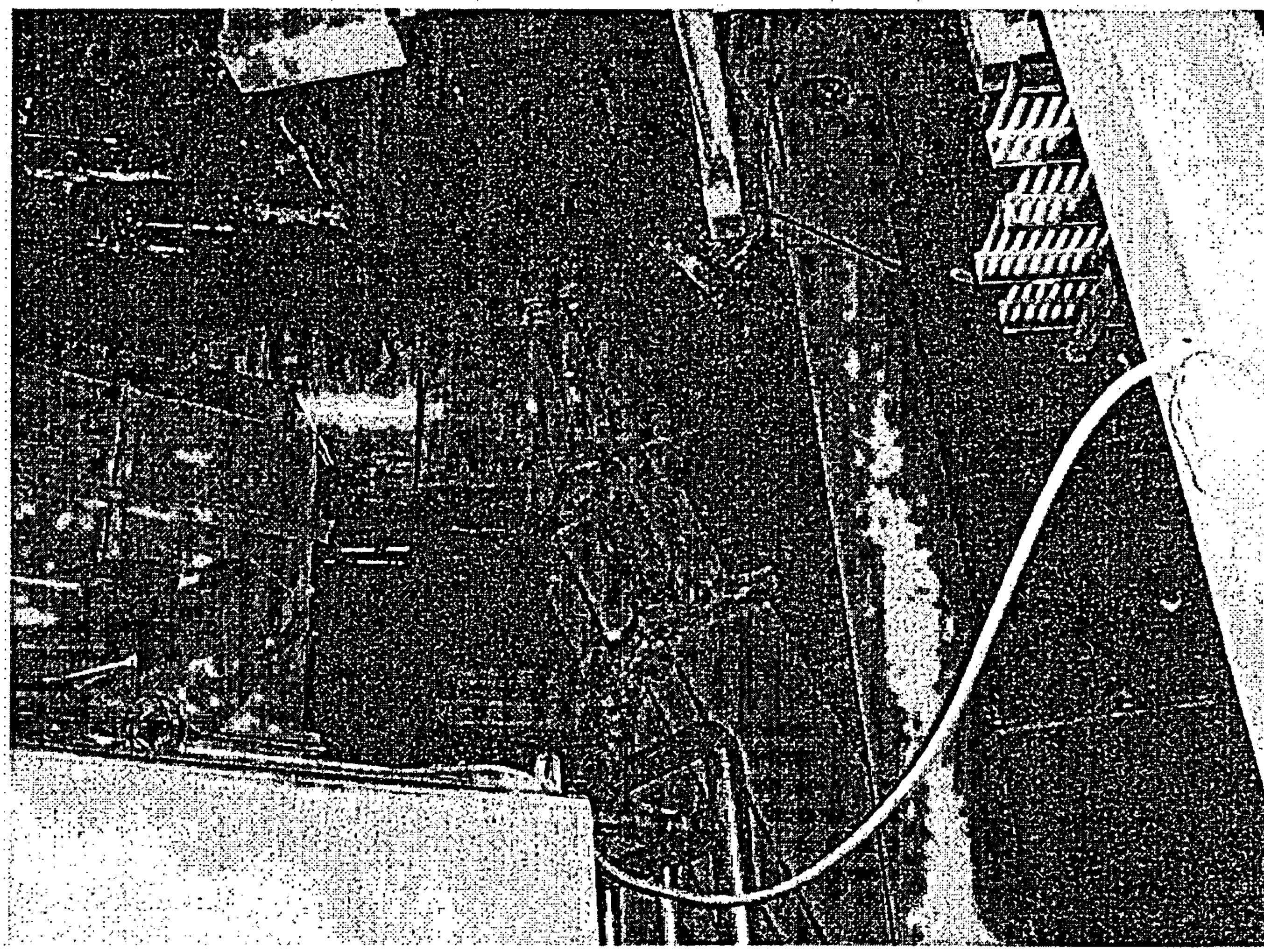


WBN 2 Floor Obstructions

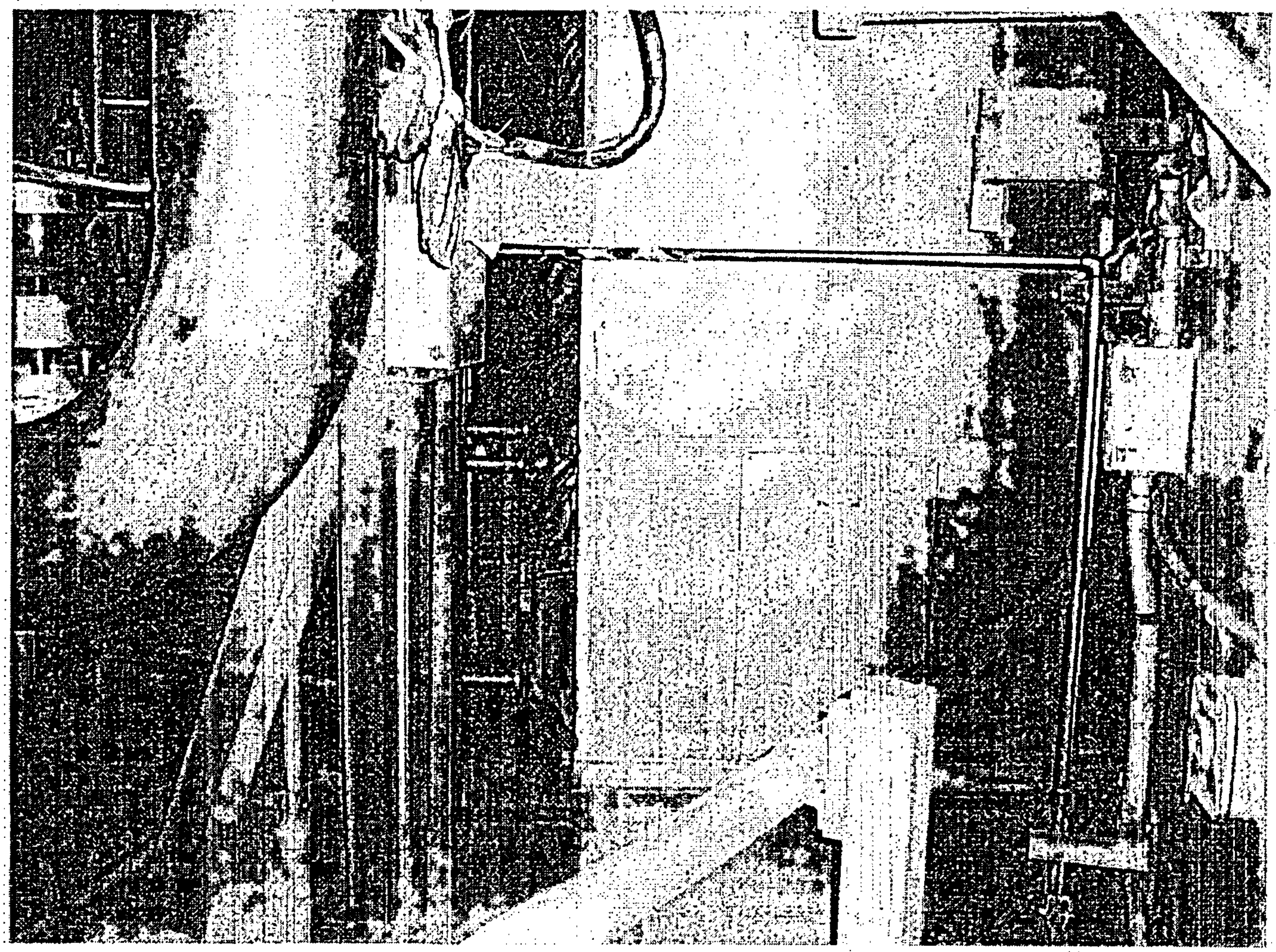


WBN 2 General Congestion

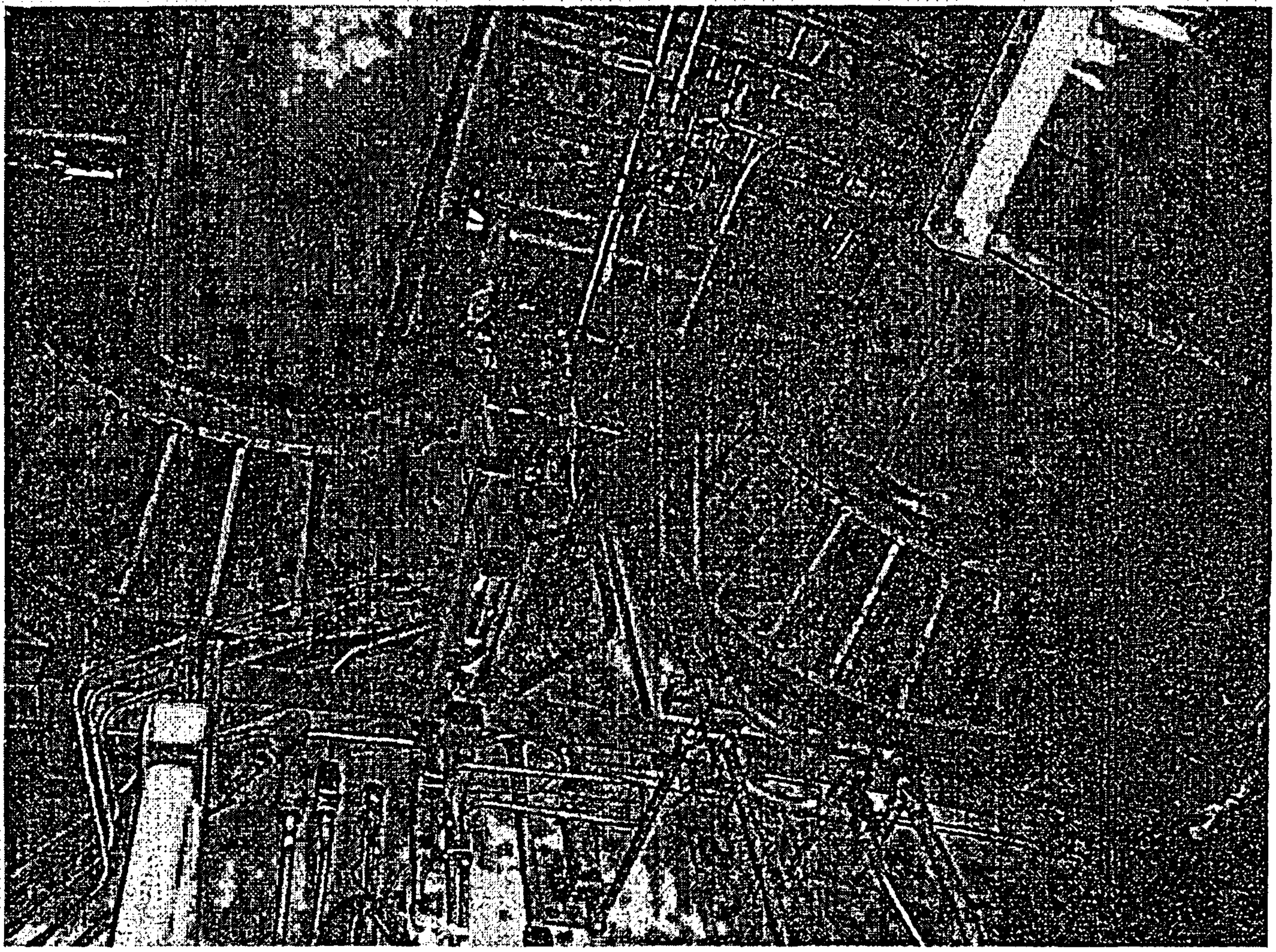
Enercon Services, Inc.



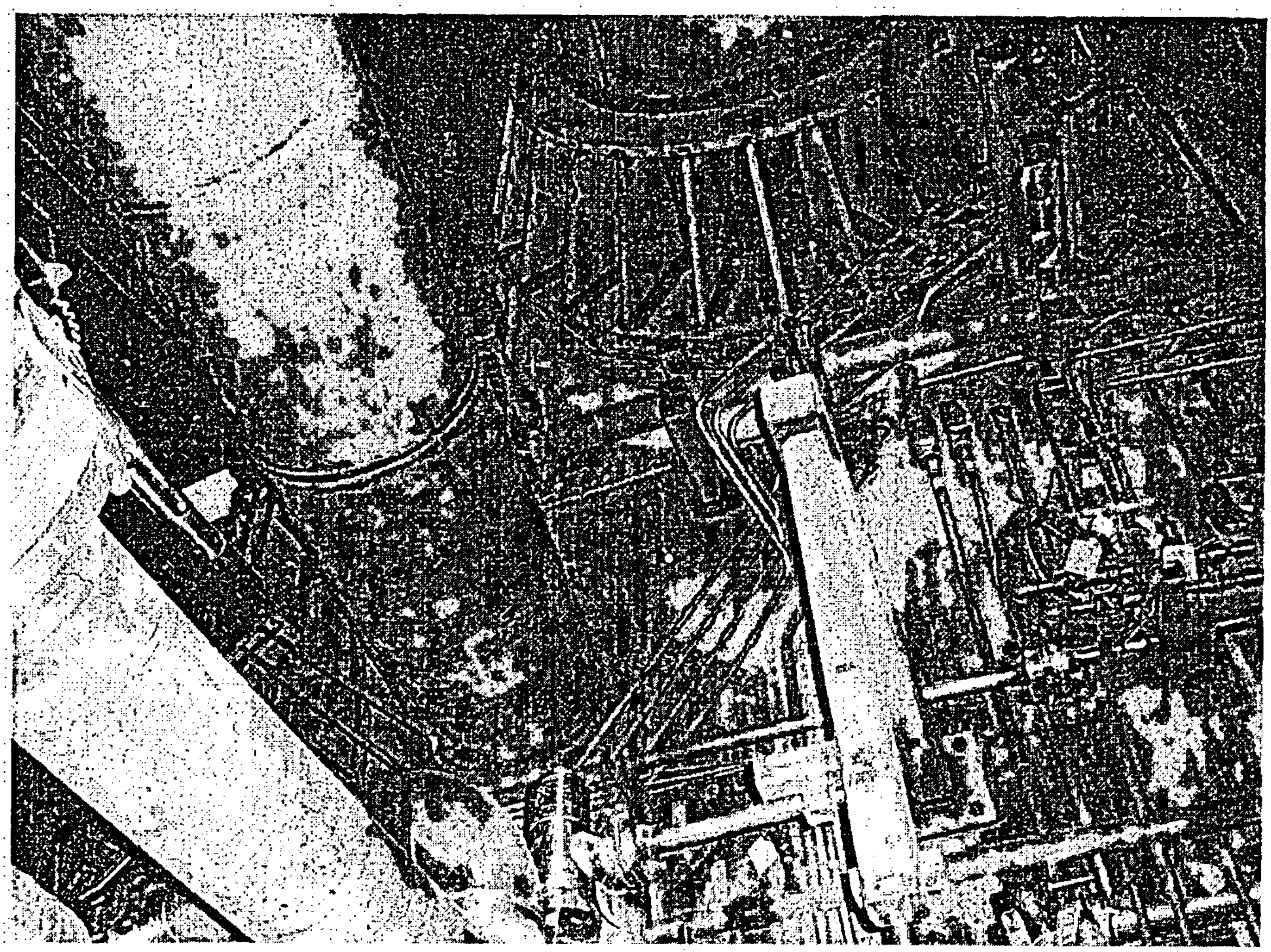
WBN 2 Hot Leg



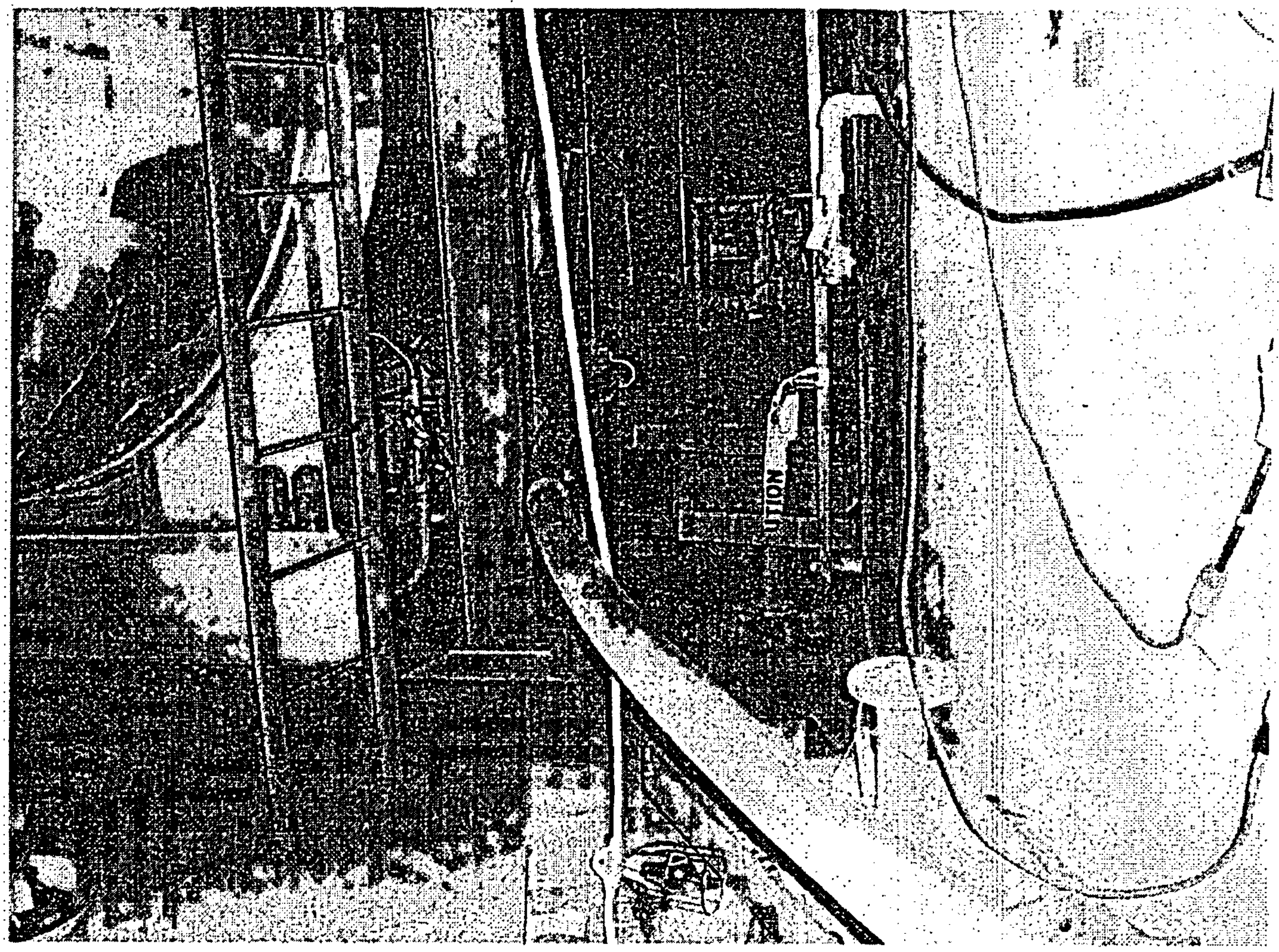
WBN 2 HVAC



WBN 2 Looking up at MSL

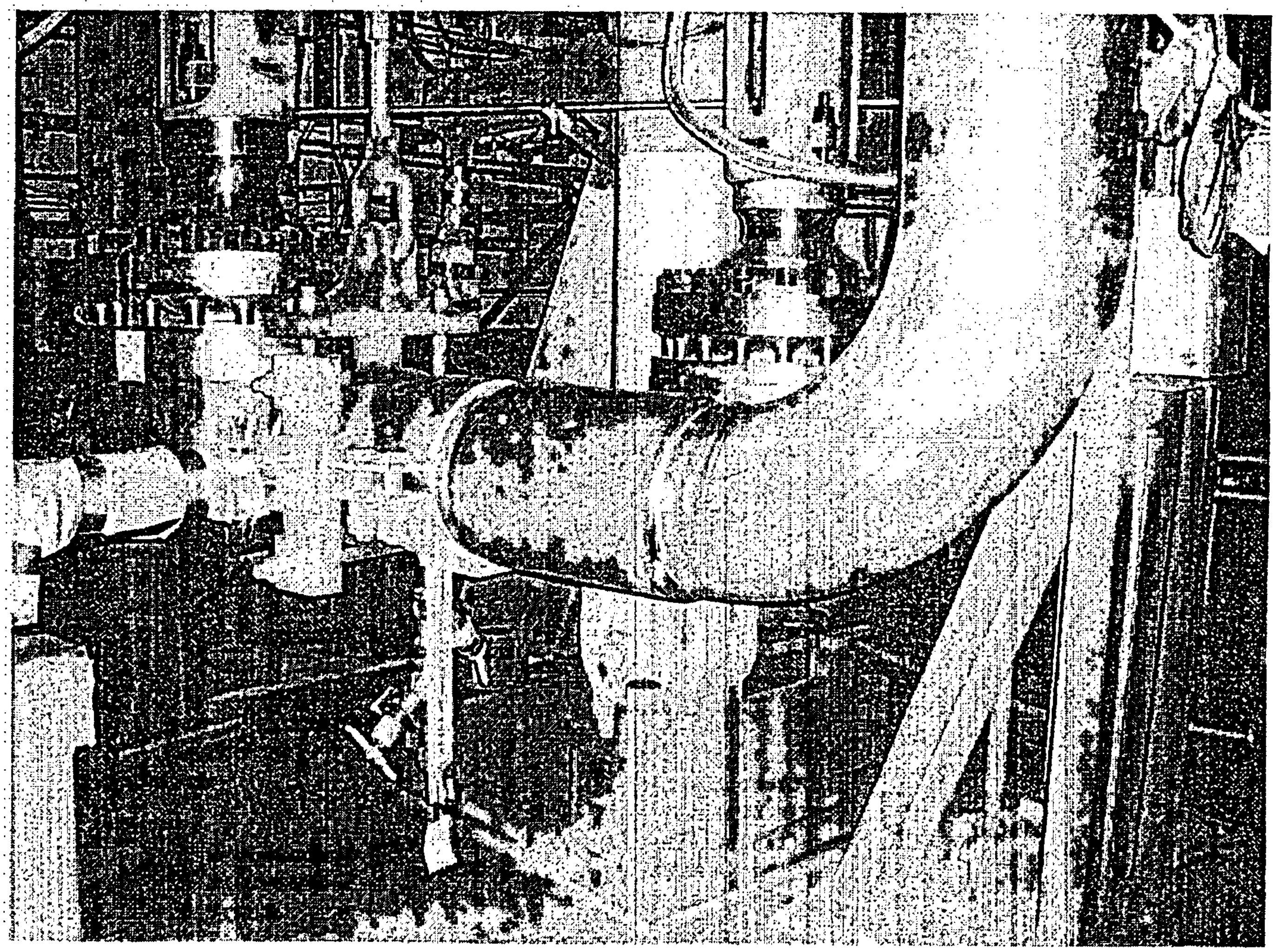


WBN 2 Looking UP FW



WBN 2 PZR Quench Tank

Enercon Services, Inc



WBN 2 RHR piping

ATTACHMENT G:

CONTAINMENT COATINGS WALKDOWN

Originator Jon R Cavallo — Jon Cavallo — 8/24/04 Date

Checker Michael Caldwell — Michael Caldwell — 8/24/04 Date

WATTS BAR NUCLEAR PLANT – UNIT 1 CONTAINMENT COATINGS WALKDOWN

Purpose of Walkdown

The Watts Bar Nuclear Plant – Unit 1 (Watts Bar) Containment Coatings Walkdown was conducted to identify existing coatings within the Watts Bar Containment which might fail under normal or accident conditions (DB-LOCA) and contribute to the Containment emergency sump debris source term.

Coating Estimating Techniques

The coating surface area estimating technique used in developing the coating quantities listed in this report were developed by Mr. Cavallo during work at other nuclear facilities. Except as specifically noted, the exposed surface areas of coated components exhibiting complex shapes (such as Limitorque operators, pumps, motors, etc.) were estimated by treating these components as simple geometric shapes such as spheres, cubes, and rectangles. The dimensions of the simple shapes were selected such that they enveloped the actual complex component. This estimating technique permits the person performing the walkdown to expeditiously determine conservative coating surface areas while reducing radiation dose (ALARA). This methodology is consistent with the guidelines of NEI 02-01in that "using containment drawings, the walkdown should document the location and the type of coatings systems applied, as well as the approximate area and, to the extent possible and practical, the thickness of the coating in question."

The estimated thicknesses of coatings contained in this report are recorded by Mr. Cavallo either from station records (coating specifications, drawings, etc.) or by previous experience at other nuclear facilities (such as OEM machinery enamel on electrical boxes).

General Observations:

Visibility restricted in Lower Containment by lead blankets.

In general, containment coatings are well maintained, and plant and outage craft personnel are taking appropriate steps to protect containment coatings from damage.

12 ladder enclosures in loop rooms painted yellow, 40 feet high X 3 feet diameter each – 75 sq ft each unqualified.

Yellow handrails at various locations throughout lower containment – estimate 200 sq ft unqualified.

Significant areas of inorganic coatings exist within the Watts Bar upper containment and lower containment within the crane wall which may be directly exposed to containment quench spray or Sodium Tetraborate from the ice condenser. These areas may be unqualified and are not currently accounted for in the Watts Bar "unqualified/uncontrolled coatings" program. These areas include:

a. The exposed containment liner plate in the upper containment dome. If exposed to containment quench spray, some or all of the exposed zinc pigment in the inorganic zinc coating applied to the liner plate would rapidly oxidize, producing small metallic particulates (≈ 10 to 20 mils in size) which would be washed down into the lower containment and the ECCS sump. WBN calculations show that the spray pattern does not come into direct contact with the upper containment dome liner.[1] The method for CFD modeling of the exposed zinc pigment in the inorganic coating applied to the liner plate will be resolved during performance of the CFD analysis.

[1] EPM-IVS-121291 Rev. 0, *Evaluation of Spray Coverage of Containment Volume*

b. The steam generators, pressurizer and reactor vessel. These vessels are coated with a high temperature silicone coating which is not DBA-qualified. Watts Bar has taken the position that these coated areas will not contribute to the post-DBA containment debris loading because they are covered with "metal mirror-type insulation."

c. The pressurizer relief tank (note- the visual appearance of this tank indicates that it may have been partially or completely recoated in the past).

The areas identified in a., b. and c. above should be considered "indeterminate" temporarily and investigated to determine whether or not they are non-DBA qualified and, if failed, might contribute to the ECCS sump debris source term.

Fan Rooms 1 and 2

Fan Rooms 1 and 2 do not communicate with the lower containment at an elevation below the maximum post-accident pool depth (~13 ft), as such, changing the classification of coatings inside the Fan Rooms from Service Level I to Service Level II is recommended. Coatings in the Fan Rooms are not included in the coating debris listing.

Accumulator Room 1

Accumulator Room 1 does not communicate with the lower containment at an elevation below the maximum post-accident pool depth (~13 ft), as such, changing the classification of coating s inside the Accumulator Rooms from Service Level I to Service Level II is recommended. Coatings in the Accumulator Rooms are not included in the coating debris listing.

Accumulator Room 2

Accumulator Room 2 does not communicate with the lower containment at an elevation below the maximum post-accident pool depth (~13 ft), as such, changing the classification of coating s inside the Accumulator Rooms from Service Level I to Service Level II is recommended. Coatings in the Accumulator Rooms are not included in the coating debris listing.

Accumulator Room 3 and 4

Accumulator rooms 3 and 4 have the air return fans in them. Containment spray water that directly impacts the fans goes into these accumulator rooms. Curbs on the refueling floor prevent spray water hitting the floor from running into the air return fans. Water going through the fans is drained directly from these rooms into the lower compartment. Latent debris in these rooms could go to the sump.

Upper Containment (10/3/03)

Access very restricted due to refueling operations.

Containment liner above the ice condenser was originally primed using Carboline Carbozinc 11 and topcoated to a dado height of 6 feet above the ice condenser with Carboline Phenoline 305 epoxy phenolic topcoat. The Phenoline 305 has reportedly been removed in the past by scraping.

Polar crane coating in visually good condition.

Coatings on concrete steam generator and pressurizer "dog houses" are visually in good condition.

Floor coatings are somewhat worn but sound.

Some Phenoline 305 topcoat present on the containment liner adjacent to the equipment hatch – spot peeling of the topcoat has occurred in the past and scraping has been used to removed the disbonded coating.

Lower Containment (10/3/03)

Elev. 702'

Floor coating are in good condition. Protective temporary floor coverings are in use at various locations.

Containment liner coated with untopcoated Carbozinc 11. Some staining present. Light superficial rust visible on some welds.

Phenoline 305 topcoat applied to piping, structural members, etc. from floor level up six feet.

Steam generator lateral restraints touched up in spots with a green coating.

Large yellow hydraulic valve operator (containment isolation valve) and blue Limitorque operator on platform adjacent to entrance to Loop Rooms 1 and 4 – 20 sq ft each.

Safety Injection Accumulator No. 1 topcoated to a height of 6 feet.

3 electrical junction boxes adjacent of Safety Injection Accumulator No. 1 – 2 sq ft each.

1large and one small blue Limitorque operator adjacent of Safety Injection Accumulator No. 1 – 20 sq ft and 12 sq ft.

Large electrical box (1-PENT-293-1) just outside loop room door, exhibiting recoating – 40 sq ft.

Large electrical box (1-PENT-293-2) just outside loop room door, exhibiting recoating – 40 sq ft.

Large electrical panel (1-JB-293-471A) at access ladder to Safety Injection Accumulator No. 2 – 50 sq ft.

~50% delamination of topcoat on Safety Injection Accumulator No. 2 – has been scraped and IOZ primer in good condition.

4 boxes apparently coated with alkyd enamel and labeled, "ALARA Engineered Shielding Systems" – 60 sq ft each.

1 large and 1 small MOV adjacent to 1-CCU-3077 Containment Lower Compartment Cooler – 12 sq ft and 4 sq ft.

2 large and 2 small Limitorque operators – 12 sq ft and 4 sq ft.

4 electrical heaters on outboard walls – 12 sq ft each.

Enamel light fixture outboard of Steam Generator No. 3 typical – 2 others at other locations – 4 sq ft ea.

Pressurizer Relief Tank may have been repainted at some point - coating system appears to consist of an IOZ primer with an epoxy topcoat up to a dado height of six feet from the floor.

8 large motor operated RHR valves – 40 sq ft each.

5 electrical junction boxes outboard of Pressurizer Relief Tank – 2 sq ft each.

Hydraulic operated valve outboard of Pressurizer Relief Tank - 10 sq ft.

Elev. 716'

1 large Limitorque operator adjacent to Pressurizer – 12 sq ft.

Adjacent to primary shield wall – enamel coated grating, appears to be off-the-shelf - 200 sq ft total.

Support steel associated with Reactor Coolant Pump 2 – some Phenoline 305 topcoat peeling from Carbozinc 11 primer- areas have been scraped to remove peeling topcoat.

Loop Rooms

Two pump & motor combinations in each loop room with unqualified coatings – 15 sq ft each combination.

Two blue pneumatic valve operators near Az. 286 next to fuel transfer canal – 12 sq ft each.

Large electrical box (1-PENT-293-4) just outside loop room 1 and 4 door, exhibiting some touchup – 40 sq ft.

Four CRDM Fan Coolers -3 ft dia X 8 ft long with motors and appurtenances – 200 sq ft each.

Coatings on Steam Generator Supports in good condition.

Interior of Sump Enclosure

Coatings in very good condition – small amount of damage on floor due to duct tape application and removal.

Deck grating coating good condition.

Missile shield / trash rack grating coating in good condition.

SUMMARY

Unqualified / Unacceptable coatings in Watts Bar Containment:

System, Structure or Component	Coating Material	Condition Description	Square Footage	DFT (mils)	Volume (cu ft)
Yellow Ladders and Enclosures and Handrails in Lower Containment	alkyd enamel	Unqualified	1,100	2	0.18
Steam Generator, Pressurizer and Reactor Vessel	Carboline 4674 modified silicone	Unqualified	14,695 (Ref. 1)	1	1.23
Reactor Head Lifting Device	alkyd enamel	Unqualified	50	1.5	0.01
Limitorque and other valve operators	alkyd enamel	Unqualified / Unacceptable	486	1.5	0.06
CRDM Fan Coolers (4)	alkyd enamel	Unqualified	4 @ 200	1.5	0.10
Electrical Junction Boxes, Motors and Equipment in Lower Containment	alkyd enamel	Unqualified	276	1.5	0.04
Enamel grating adjacent to Primary Shield Wall	alkyd enamel	Unqualified	200	1.5	0.03
"ALARA Engineered Shielding Systems" Storage Boxes	alkyd enamel	Unqualified	4 @ 60	1.5	0.03

Unqualified / Unacceptable Coating Totals

Carboline 4674 Modified Silicone on Steam Generators, Pressurizer and Reactor Vessel	**1.23 cu ft**
Alkyd Enamel (Various Manufacturers)	**0.45 cu ft**

Currently indeterminate coatings in Watts Bar Containment (note that the provenance of these coatings should be determined and the affected coatings reclassified as DBA-qualified or DBA-unqualified prior to performance of future debris generation analyses):

System, Structure or Component	Coating Material	Condition Description	Square Footage	DFT (mils)	Volume (cu ft)
Pressurizer Relief Tank	Shop-applied prime coat of Epoxy Primer (Ref. 2), and one field-applied topcoat of Carboline Phenoline 305 (bottom 6 ft only)	System not irradiation Tested nor DBA tested	400 sq ft	8	0.27
Containment Liner Exposed to Fluids from Containment Quench Spray and Ice Condenser	Untopcoated Carboline Carbozinc 11	DBA Qualification Test Records Need to be Located and Filed	TBD	TBD	TBD

REFERENCES

1. Watts Bar FSAR Question and Response 6.1.4 (formerly 342.42)

2. Westinghouse Electric Corporation Process Specification PS 597755 dated January 5, 1976

ATTACHMENT H:

LIST OF INSULATION VOLUMES INCLUDING LINE/PROBLEM NUMBERS AND CORRESPONDING WALKDOWN PACKAGE

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	RACEWAY	702'	1	SEALANT AROUND STAINLESS CONTAINMENT WALL	N/A	SEE CALC	SILICON/RTV	SEE CALC	0.327	N/A	N/A	N/A	SEALANT BET SHEET METAL AND STEEL CONTAINMENT	A
N/A	RACEWAY	702'	1	BEHIND PANEL	N/A	SEE CALC	FOAMGLASS	SEE CALC	260.73	N/A	N/A	N/A	N/A	A
N/A	RACEWAY	702'	1	SEALANT AROUND COVERS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEALANT APPLIED ALL AROUND COVER	B
N/A	RACEWAY	702'	1	MIRROR REFLECTIVE INSULATION	N/A	N/A	N/A	SEE CALC WB1-DWD-001G	N/A	N/A	N/A	N/A	MRI (LETDOWN LINES)	C
N/A	RACEWAY	702'	1	LABELS, SIGNS, & PENETRATION NO.	N/A	N/A	N/A	N/A	0.00	N/A	N/A	N/A	SEE REPORT FOR COMMENTS	D
N/A	RACEWAY	702'	1	TIE WRAPS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEE REPORT COMMENTS	E
N/A	RACEWAY	702'	1	CALCIUM SILICATE	SEE CALC	SEE CALC	CALCIUM SILICATE	SEE CALC	56.70	N/A	N/A	N/A	SEE CALCULATION	E
N/A	RACEWAY	702'	1	SEAL AROUND PENETRATION PIPE	N/A	N/A	RTV	SEE CALC	0.02	N/A	N/A	N/A	N/A	F
N/A	RACEWAY	702'	1	FOAM IN PENETRATION	N/A	N/A	FOAM	SEE CALC	3.18	N/A	N/A	N/A	N/A	F
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	3.50	64.75	RMI	1.75	12.98	S.S.	STD	N/A	7" OD INSULATION	G
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	2.38	130.34	RMI	1.81	21.57	S.S.	STD	N/A	6" OD INSULATION	G
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	2.28	5.34	RMI	4.31	3.31	S.S.	STD	N/A	11" OD INSULATION	G
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	2.38	4.36	RMI	0.81	0.25	S.S.	STD	N/A	4" OD INSULATION	G

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	2.38	2.70	RMI	1.31	0.28	S.S.	STD	N/A	5" OD INSULATION (2.38" OD PIPING)	G
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	1.06	0.80	RMI	1.97	0.10	S.S.	STD	N/A	5" OD INSULATION (1.06" OD PIPING)	G
N/A	RACEWAY	702'	1	CALCIUM SILICATE	SEE CALC	SEE CALC	CALCIUM SILICATE	SEE CALC	56.79	N/A	N/A	N/A	SEE CALCULATION	G
N/A	RACEWAY	702'	1	EXCESS LETDOWN	1.32	7.46	RMI	2.34	1.39	S.S.	STD	N/A	6" OD INSULATION	J
N/A	RACEWAY	702'	1	EXCESS LETDOWN	1.32	3.44	RMI	1.84	0.44	S.S.	STD	N/A	5" OD INSULATION	J
N/A	RACEWAY	702'	1	EXCESS LETDOWN	1.32	1.00	RMI	3.84	0.43	S.S.	STD	N/A	9" OD INSULATION	J
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	160.00	RMI	1.75	38.18	S.S.	STD	N/A	8" OD INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	2.05	MIN-K	0.75	0.18	N/A	N/A	N/A	6" OD MIN-K INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	3.79	RMI	1.25	0.59	S.S.	STD	N/A	7" OD INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	1.58	MIN-K	0.5	0.09	N/A	N/A	N/A	5.5" OD MIN-K INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	1.52	MIN-K	0.5	0.08	N/A	N/A	N/A	6.12" OD MIN-K INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	0.94	RMI	1.625	0.20	S.S.	STD	N/A	7.75" OD INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	3.50	17.54	RMI	1.75	3.52	S.S.	STD	N/A	7" OD INSULATION	K

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	3.50	1.00	MIN-K	0.56	0.05	N/A	N/A	N/A	4.62" OD MIN-K INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	3.50	2.74	RMI	1.25	0.35	S.S.	STD	N/A	6" OD INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	1.06	6.87	RMI	1.47	0.56	S.S.	STD	N/A	4" OD INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	1.06	1.37	MIN-K	1.47	0.11	S.S.	STD	N/A	4" OD MIN-K INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	1.06	0.92	RMI	3.97	0.40	S.S.	STD	N/A	9" OD INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	2.38	2.76	RMI	1.31	0.29	S.S.	STD	N/A	5" OD INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	2.38	0.65	RMI	1.81	0.11	S.S.	STD	N/A	6" OD INSULATION	K
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	2.38	2.34	RMI	2.31	0.55	S.S.	STD	N/A	7" OD INSULATION	K
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	149.59	RMI	2.25	49.57	S.S.	STD	N/A	9" OD INSULATION	L
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	2.57	RMI	1.75	0.61	S.S.	STD	N/A	8" OD INSULATION	L
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	1.52	MIN-K	1.375	0.27	S.S.	STD	N/A	7.25" OD INSULATION	L
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	2.38	1.54	RMI	2.31	0.36	S.S.	STD	N/A	7" OD INSULATION	L
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	2.38	1.72	RMI	2.81	0.55	S.S.	STD	N/A	8" OD INSULATION	L

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	178.00	RMI	2.25	58.98	S.S.	STD	N/A	9" OD INSULATION	M
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	1.27	RMI	1.75	0.30	S.S.	STD	N/A	8" OD INSULATION	M
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	2.48	RMI	1.25	0.39	S.S.	STD	N/A	7" OD INSULATION	M
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	2.38	1.48	RMI	2.31	0.35	S.S.	STD	N/A	7" OD INSULATION	M
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	2.38	2.00	RMI	3.31	0.82	S.S.	STD	N/A	9" OD INSULATION	M
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	8.62	0.73	RMI	2.19	0.38	S.S.	STD	N/A	13" OD INSULATION (FLANGE)	M
N/A	LOOP 1	702'	2	RC INTERIM LEG	SEE CALC	SEE CALC	RMI	SEE CALC	88.62	S.S.	STD	N/A	N/A	A
N/A	LOOP 1	702'	2	REACTOR COOLANT PUMP	SEE CALC	SEE CALC	RMI	SEE CALC	63.45	S.S.	STD	N/A	N/A	B
0600200-13-09	LOOP 1	702'	2	INTERIM LEG DRAIN	2.38	0.88	RMI	3.8125	0.45	S.S.	STD	N/A	10" OD INSULATION	C
0600200-13-09	LOOP 1	702'	2	INTERIM LEG DRAIN	2.38	14.00	RMI	2.8125	4.46	S.S.	STD	N/A	8" OD INSULATION	C
0600200-13-09	LOOP 1	702'	2	INTERIM LEG DRAIN	2.38	0.55	RMI	2.3125	0.13	S.S.	STD	N/A	7" OD INSULATION	C
0600200-13-09	LOOP 1	702'	2	INTERIM LEG DRAIN	2.38	0.50	RMI	1.3125	0.05	S.S.	STD	N/A	5" OD INSULATION	C
N/A	LOOP 1	702'	2	LABELS, SIGNS, & PENETRATION NO.	N/A	N/A	N/A	N/A	0.00	N/A	N/A	N/A	SEE REPORT FOR COMMENTS	D

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	LOOP 2	702'	3	RC INTERIM LEG	SEE CALC	SEE CALC	RMI	SEE CALC	86.81	S.S.	STD	N/A	N/A	A
N/A	LOOP 2	702'	3	REACTOR COOLANT PUMP	SEE CALC	SEE CALC	RMI	SEE CALC	63.45	S.S.	STD	N/A	N/A	B
0600200-13-10	LOOP 2	702'	3	INTERIM LEG DRAIN	2.38	0.88	RMI	3.8125	0.45	S.S.	STD	N/A	10" OD INSULATION	C
0600200-13-10	LOOP 2	702'	3	INTERIM LEG DRAIN	2.38	14.00	RMI	2.8125	4.46	S.S.	STD	N/A	8" OD INSULATION	C
N/A	LOOP 2	702'	3	CALCIUM SILICATE	SEE CALC	SEE CALC	CALCIUM SILICATE	SEE CALC	70.68	N/A	N/A	N/A	SEE CALCULATION	D
N/A	LOOP 3	702'	4	RC INTERIM LEG	SEE CALC	SEE CALC	RMI	SEE CALC	85.43	S.S.	STD	N/A	N/A	A
N/A	LOOP 3	702'	4	INTERIM LEG DRAIN	2.38	1.92	RMI	3.8125	0.99	S.S.	STD	N/A	10" OD INSULATION	B
N/A	LOOP 3	702'	4	INTERIM LEG DRAIN	2.38	9.50	RMI	2.8125	3.02	S.S.	STD	N/A	8" OD INSULATION	B
0600200-08-10	LOOP 3	702'	4	LETDOWN LINE	3.50	13.25	RMI	3.25	6.34	S.S.	STD	N/A	10" OD INSULATION	C
N/A	LOOP 3	702'	4	REACTOR COOLANT PUMP	SEE CALC	SEE CALC	RMI	SEE CALC	63.45	S.S.	STD	N/A	N/A	D
N/A	LOOP 3	702'	4	CALCIUM SILICATE	SEE CALC	SEE CALC	CALCIUM SILICATE	SEE CALC	42.24	N/A	N/A	N/A	SEE CALCULATION	E
N/A	LOOP 4	702'	5	RC INTERIM LEG	SEE CALC	SEE CALC	RMI	SEE CALC	85.05	S.S.	STD	N/A	N/A	A
N/A	LOOP 4	702'	5	REACTOR COOLANT PUMP	SEE CALC	SEE CALC	RMI	SEE CALC	63.45	S.S.	STD	N/A	N/A	B

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-13-12	LOOP 4	702'	5	INTERIM LEG DRAIN	2.38	1.92	RMI	3.8125	0.99	S.S.	STD	N/A	10" OD INSULATION	C
0600200-13-12	LOOP 4	702'	5	INTERIM LEG DRAIN	2.38	12.92	RMI	2.8125	4.11	S.S.	STD	N/A	8" OD INSULATION	C
N/A	LOOP 4	702'	5	MIN K TO WASTE DISP LINE	4.50	2.00	MIN-K	SEE CALC	0.05	N/A	N/A	N/A	WRAP AROUND 4" PIPE	D
N/A	LOOP 4	702'	5	TAGS, LABELS, & SIGNS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEE REPORT FOR COMMENTS	E
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	14.00	58.75	RMI	2	41.02	S.S.	STD	N/A	18" OD INSULATION	F
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	14.00	5.00	RMI	1	1.64	S.S.	STD	N/A	16" OD INSULATION	F
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	14.00	1.83	RMI	1.75	1.10	S.S.	STD	N/A	17.5" OD INSULATION	F
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	10.75	15.67	RMI	2.125	9.35	S.S.	STD	N/A	15" OD INSULATION	F
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	14.00	3.13	RMI	12	21.31	S.S.	STD	N/A	38" OD INSULATION (VALVE)	F
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	10.75	2.75	RMI	11.125	14.60	S.S.	STD	N/A	33" OD INSULATION (VALVE)	F
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	1.05	1.13	RMI	1.475	0.09	S.S.	STD	N/A	4" OD INSULATION	F
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	1.05	2.21	RMI	2.475	0.42	S.S.	STD	N/A	6" OD INSULATION	F
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	6.63	2.91	RMI	0.6875	0.32	S.S.	STD	N/A	8" OD INSULATION	F

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-03-01	LOOP 4	702'	5	RESIDUAL HEAT REMOVAL	6.63	2.05	RMI	8.6875	5.95	S.S.	STD	N/A	24" OD INSULATION	F
N/A	LOOP 1	716'	6	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	215.60	S.S.	STD	N/A	N/A	A
N/A	LOOP 1	716'	6	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	0.66	S.S.	STD	N/A	AT ROOT VALVES	A
0600200-02-01	LOOP 1	716'	6	FEEDWATER	16.00	24.10	RMI	2.5	24.32	S.S.	STD	N/A	21" OD INSULATION	B
0600200-02-01	LOOP 1	716'	6	FEEDWATER	16.00	10.59	RMI	0.5	1.91	S.S.	STD	N/A	17" OD INSULATION	B
0600200-02-01	LOOP 1	716'	6	FEEDWATER	SEE CALC	SEE CALC	RMI	SEE CALC	0.42	S.S.	STD	N/A	AT 1.88" OD LINE	B
0600200-02-01	LOOP 1	716'	6	FEEDWATER	SEE CALC	SEE CALC	RMI	SEE CALC	0.26	S.S.	STD	N/A	AT 1" LINE	B
0600200-02-01	LOOP 1	716'	6	FEEDWATER	30.25	0.50	MINERAL WOOL	2	0.70	N/A	STD	N/A	AT PENETRATION # X-12A	B
N/A	LOOP 1	716'	6	PAINT CHIP	N/A	N/A	N/A	N/A	0.00	N/A	N/A	N/A	SEE PAINT INSPECTION REPORT	C
N/A	LOOP 1	716'	6	CONDUIT 3M-M20C INSULATION	1.32	N/A	3M-M20C	0.1875	2.35	N/A	N/A	N/A	SEE CALCULATION	D
N/A	LOOP 1	716'	6	CONDUIT 3M-M20C INSULATION	1.90	N/A	3M-M20C	0.1875	1.43	N/A	N/A	N/A	SEE CALCULATION	D
N/A	LOOP 1	716'	6	CONDUIT 3M-M20C INSULATION	2.38	N/A	3M-M20C	0.1875	1.70	N/A	N/A	N/A	SEE CALCULATION	D
N/A	LOOP 1	716'	6	CONDUIT 3M-M20C INSULATION	N/A	N/A	N/A	N/A	0.52	N/A	N/A	N/A	JUNCTION BOXES SEE CALCULATION	D

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	LOOP 1	716'	6	CONDUIT 3M-M20C INSULATION	N/A	N/A	N/A	N/A	2.31	N/A	N/A	N/A	SUPPORT SEE CALCULATION	D
N/A	LOOP 1	710-720	6	LABELS, TAGS, AND TIE WRAPS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEE REPORT FOR COMMENTS	E
0600200-13-02	LOOP 1	716'	6	4" PRESSURIZER SPRAY LINE	4.50	43.40	RMI	2.75	18.88	S.S.	STD	N/A	10" OD INSULATION	F
0600200-13-02	LOOP 1	716'	6	4" PRESSURIZER SPRAY LINE	4.50	1.21	RMI	0.75	0.10	S.S.	STD	N/A	6" OD INSULATION	F
0600200-13-02	LOOP 1	716'	6	4" PRESSURIZER SPRAY LINE	4.50	0.67	MIN-K	1.5	0.13	S.S.	STD	N/A	7.5" OD INSULATION	F
0600200-13-02	LOOP 1	716'	6	4" PRESSURIZER SPRAY LINE	4.50	1.21	RMI	7.75	2.51	S.S.	STD	N/A	20" OD INSULATION	F
0600200-13-02	LOOP 1	716'	6	3/4" PRESSURIZER SPRAY BYPASS LINE	1.05	5.17	RMI	2.975	1.35	S.S.	STD	N/A	7" OD INSULATION	F
0600200-13-02	LOOP 1	716'	6	3/4" PRESSURIZER SPRAY BYPASS LINE	1.05	4.34	RMI	1.475	0.35	S.S.	STD	N/A	4" OD INSULATION	F
0600200-13-02	LOOP 1	716'	6	3/4" PRESSURIZER SPRAY BYPASS LINE	1.05	0.50	RMI	3.35	0.16	S.S.	STD	N/A	7.5" OD INSULATION	F
N/A	LOOP 1	716'	6	HOT LEG	SEE CALC	SEE CALC	RMI	SEE CALC	69.55	S.S.	STD	N/A	N/A	G
N/A	LOOP 1	716'	6	COLD LEG	SEE CALC	SEE CALC	RMI	SEE CALC	55.34	S.S.	STD	N/A	N/A	H
0600200-09-05	LOOP 1	716'	6	BORON INJECTION	1.90	5.65	RMI	2.55	1.40	S.S.	STD	N/A	7" OD INSULATION	J
0600200-09-05	LOOP 1	716'	6	BORON INJECTION	1.90	0.96	RMI	7.6	1.51	S.S.	STD	N/A	9.5" OD INSULATION	J

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-09-01	LOOP 1	716'	6	ACCUMULATOR INJECTION	10.75	2.36	RMI	0.795	0.47	S.S.	STD	N/A	12.34" OD INSULATION	K
0600200-09-01	LOOP 1	716'	6	ACCUMULATOR INJECTION	10.75	16.42	RMI	3.125	15.53	S.S.	STD	N/A	17" OD INSULATION	K
0600200-09-01	LOOP 1	716'	6	ACCUMULATOR INJECTION	10.75	2.65	MIN-K	1.25	0.87	S.S.	STD	N/A	13.25" OD INSULATION	K
0600200-09-01	LOOP 1	716'	6	ACCUMULATOR INJECTION	10.75	5.09	RMI	9.635	21.81	S.S.	STD	N/A	30" OD INSULATION	K
0600200-09-01	LOOP 1	716'	6	ACCUMULATOR INJECTION	10.75	0.57	RMI	6.126	1.29	S.S.	STD	N/A	23" OD INSULATION	K
0600200-09-01	LOOP 1	716'	6	LOWHEAD SAFETY INJECTION	6.63	7.94	RMI	2.6875	4.34	S.S.	STD	N/A	12" OD INSULATION	L
N/A	LOOP 1	716'	6	RESIDUAL HEAT REMOVAL	6.63	3.50	RMI	3.6875	2.90	S.S.	STD	N/A	14" OD INSULATION	M
N/A	LOOP 1	716'	6	RESIDUAL HEAT REMOVAL	6.63	2.09	RMI	0.6875	0.23	S.S.	STD	N/A	8" OD INSULATION	M
N/A	LOOP 1	716'	6	RESIDUAL HEAT REMOVAL	6.63	2.17	RMI	9.6875	7.48	S.S.	STD	N/A	26" OD INSULATION	M
N/A	LOOP 1	716'	6	RESIDUAL HEAT REMOVAL	8.63	26.50	RMI	9.6875	102.56	S.S.	STD	N/A	11" OD INSULATION	M
N/A	LOOP 1	716'	6	RESIDUAL HEAT REMOVAL	8.63	1.10	MIN-K	0.9375	0.22	S.S.	STD	N/A	10.5" OD INSULATION	M
0600200-08-11	LOOP 1	716'	6	NORMAL CHARGING	3.50	54.50	RMI	2.75	20.44	S.S.	STD	N/A	9" OD INSULATION	N
0600200-08-11	LOOP 1	716'	6	NORMAL CHARGING	3.50	0.89	RMI	1.5	0.15	S.S.	STD	N/A	6.5" OD INSULATION	N

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-11	LOOP 1	716'	6	NORMAL CHARGING	3.50	2.50	RMI	2	0.60	S.S.	STD	N/A	7.5" OD INSULATION	N
0600200-07-01	LOOP 1	716'	6	STEAM GENERATOR BLOWDOWN	3.50	41.67	RMI	2.25	11.76	S.S.	STD	N/A	8" OD INSULATION	P
0600200-07-01	LOOP 1	716'	6	STEAM GENERATOR BLOWDOWN	4.50	28.75	RMI	2.25	9.53	S.S.	STD	N/A	9" OD INSULATION	P
0600200-07-01	LOOP 1	716'	6	STEAM GENERATOR BLOWDOWN	4.50	3.01	RMI	0.75	0.26	S.S.	STD	N/A	6" OD INSULATION	P
0600200-07-01	LOOP 1	716'	6	STEAM GENERATOR BLOWDOWN	1.35	0.59	RMI	3.325	0.20	S.S.	STD	N/A	8" OD INSULATION	P
0600200-07-01	LOOP 1	716'	6	STEAM GENERATOR BLOWDOWN	1.33	1.22	RMI	3.335	0.41	S.S.	STD	N/A	8" OD INSULATION	P
0600200-07-01	LOOP 1	716'	6	STEAM GENERATOR BLOWDOWN	1.31	0.75	RMI	2.345	0.14	S.S.	STD	N/A	6" OD INSULATION	P
0600200-07-01	LOOP 1	716'	6	STEAM GENERATOR BLOWDOWN	1.30	1.13	RMI	3.35	0.38	S.S.	STD	N/A	8" OD INSULATION	P
0600200-07-01	LOOP 1	716'	6	STEAM GENERATOR BLOWDOWN	2.91	0.29	RMI	2.045	0.06	S.S.	STD	N/A	7" OD INSULATION	P
N/A	LOOP 1	716'	6	MIN-K	N/A	N/A	MIN-K	3.38	0.944	N/A	N/A	N/A	N/A	Q
0600200-08-11	LOOP 1	716'	6	3" ALTERNATE CHARGING	3.50	44.09	RMI	2.75	16.53	S.S.	STD	N/A	9" OD INSULATION	R
0600200-08-11	LOOP 1	716'	6	3" ALTERNATE CHARGING	3.50	1.83	MIN-K	1.25	0.24	S.S.	STD	N/A	6" OD INSULATION	R
N/A	LOOP 2	716'	7	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	215.60	S.S.	STD	N/A	N/A	A

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	LOOP 2	716'	7	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	0.67	S.S.	STD	N/A	AT ROOT VALVES	A
N/A	LOOP 2	716'	7	CONDUIT 3M-M20C INSULATION	1.90	50.00	3M-M20C	0.1875	2.19	N/A	N/A	N/A	SEE CALCULATION	B
N/A	LOOP 2	716'	7	CONDUIT 3M-M20C INSULATION	2.38	70.00	3M-M20C	0.1875	3.65	N/A	N/A	N/A	SEE CALCULATION	B
N/A	LOOP 2	716'	7	CONDUIT 3M-M20C INSULATION	N/A	N/A	3M-M20C	N/A	1.79	N/A	N/A	N/A	SUPPORT INSULATION SEE CALCULATION	B
0600200-13-01	LOOP 2	716'	7	PRESSURIZER SURGE LINE	14.00	34.40	RMI	4.5	62.48	S.S.	STD	N/A	23" OD INSULATIONS	C
0600200-13-01	LOOP 2	716'	7	PRESSURIZER SURGE LINE	14.00	7.67	RMI	0.5	1.21	S.S.	STD	N/A	15" OD INSULATIONS	C
0600200-13-01	LOOP 2	716'	7	PRESSURIZER SURGE LINE	14.00	3.34	RMI	1	1.09	S.S.	STD	N/A	16" OD INSULATIONS	C
0600200-13-01	LOOP 2	716'	7	PRESSURIZER SURGE LINE	14.00	3.01	RMI	2.5	2.71	S.S.	STD	N/A	19" OD INSULATIONS	C
0600200-13-01	LOOP 2	716'	7	PRESSURIZER SURGE LINE	14.00	8.67	RMI	1.5	4.40	S.S.	STD	N/A	17" OD INSULATIONS	C
0600200-02-02	LOOP 2	716'	7	FEEDWATER	16.00	18.50	RMI	2.5	18.67	S.S.	STD	N/A	21" OD INSULATION	D
0600200-02-02	LOOP 2	716'	7	FEEDWATER	16.00	0.80	RMI	2	0.63	S.S.	STD	N/A	20" OD INSULATION	D
0600200-02-02	LOOP 2	716'	7	FEEDWATER	16.00	1.59	MIN-K	1	0.59	S.S.	STD	N/A	18" OD INSULATION	D
0600200-02-02	LOOP 2	716'	7	FEEDWATER	16.00	10.84	RMI	0.5	1.95	S.S.	STD	N/A	17" OD INSULATION	D

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-02-02	LOOP 2	716'	7	FEEDWATER	SEE CALC	SEE CALC	RMI	SEE CALC	0.42	S.S.	STD	N/A	AT 1.88" OD LINE	D
0600200-02-02	LOOP 2	716'	7	FEEDWATER	SEE CALC	SEE CALC	RMI	SEE CALC	0.27	S.S.	STD	N/A	AT 1" LINE	D
0600200-02-02	LOOP 2	716'	7	FEEDWATER	30.25	0.50	MINERAL WOOL	2	0.70	N/A	STD	N/A	AT PENETRATION # X-12B	D
0600200-13-02	LOOP 2	716'	7	4" PRESSURIZER SPRAY LINE	4.50	32.67	RMI	2.75	14.21	S.S.	STD	N/A	10" OD INSULATION	E
0600200-13-02	LOOP 2	716'	7	4" PRESSURIZER SPRAY LINE	4.50	1.21	RMI	7.75	2.51	S.S.	STD	N/A	20" OD INSULATION	E
0600200-13-02	LOOP 2	716'	7	3/4" PRESSURIZER SPRAY BYPASS LINE	1.05	0.42	RMI	2.975	0.11	S.S.	STD	N/A	7" OD INSULATION	E
0600200-13-02	LOOP 2	716'	7	3/4" PRESSURIZER SPRAY BYPASS LINE	1.05	8.42	RMI	1.475	0.68	S.S.	STD	N/A	4" OD INSULATION	E
N/A	LOOP 2	716'	7	HOT LEG	SEE CALC	SEE CALC	RMI	SEE CALC	74.60	S.S.	STD	N/A	N/A	F
N/A	LOOP 2	716'	7	HOT LEG	SEE CALC	SEE CALC	RMI	SEE CALC	8.15	S.S.	STD	N/A	AT 6" SAFETY INJECTION	F
N/A	LOOP 2	716'	7	COLD LEG	SEE CALC	SEE CALC	RMI	SEE CALC	55.42	S.S.	STD	N/A	N/A	G
0600200-09-06	LOOP 2	716'	7	BORON INJECTION	1.90	3.94	RMI	2.55	0.98	S.S.	STD	N/A	7" OD INSULATION	H
0600200-09-06	LOOP 2	716'	7	BORON INJECTION	1.90	1.08	RMI	7.6	1.70	S.S.	STD	N/A	9.5" OD INSULATION	H
0600200-09-02	LOOP 2	716'	7	ACCUMULATOR INJECTION	10.75	17.75	RMI	3.125	16.79	S.S.	STD	N/A	17" OD INSULATION	J

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-09-02	LOOP 2	716'	7	ACCUMULATOR INJECTION	10.75	4.98	RMI	9.625	21.31	S.S.	STD	N/A	30" OD INSULATION	J
0600200-09-02	LOOP 2	716'	7	ACCUMULATOR INJECTION	10.75	0.96	RMI	0.625	0.15	S.S.	STD	N/A	12" OD INSULATION	J
0600200-09-02	LOOP 2	716'	7	ACCUMULATOR INJECTION	10.75	1.24	RMI	1.625	0.54	S.S.	STD	N/A	14" OD INSULATION	J
0600200-09-02	LOOP 2	716'	7	LOWHEAD SAFETY INJECTION	6.63	9.75	RMI	2.6875	5.32	S.S.	STD	N/A	12" OD INSULATION	K
N/A	LOOP 2	716'	7	RESIDUAL HEAT REMOVAL	8.63	31.25	RMI	1.1875	7.94	S.S.	STD	N/A	11" OD INSULATION	L
N/A	LOOP 2	716'	7	RESIDUAL HEAT REMOVAL	8.63	2.74	MIN-K	0.5625	0.31	S.S.	STD	N/A	9.75" OD MIN-K INSULATION	L
0600200-08-11	LOOP 2	716'	7	NORMAL CHARGING	3.50	26.92	RMI	2.75	10.09	S.S.	STD	N/A	9" OD INSULATION	M
0600200-08-11	LOOP 2	716'	7	NORMAL CHARGING	3.50	1.92	RMI	0.5	0.08	S.S.	STD	N/A	4.5" OD INSULATION	M
0600200-08-11	LOOP 2	716'	7	NORMAL CHARGING	3.50	0.84	RMI	1	0.08	S.S.	STD	N/A	5.5" OD MIN-K INSULATION	M
0600200-08-11	LOOP 2	716'	7	NORMAL CHARGING	3.50	3.17	RMI	0.75	0.22	S.S.	STD	N/A	5" OD INSULATION	M
0600200-08-12	LOOP 2	716'	7	EXCESS LETDOWN	1.32	39.67	RMI	2.34	7.41	S.S.	STD	N/A	6" OD INSULATION	N
0600200-08-12	LOOP 2	716'	7	EXCESS LETDOWN	1.32	3.87	MIN-K	2.34	0.72	S.S.	STD	N/A	6" OD INSULATION	N
0600200-08-12	LOOP 2	716'	7	EXCESS LETDOWN	1.32	6.75	RMI	1.84	0.86	S.S.	STD	N/A	5" OD INSULATION	N

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-12	LOOP 2	716'	7	EXCESS LETDOWN	1.32	0.59	RMI	0.84	0.02	S.S.	STD	N/A	3" OD INSULATION	N
0600200-07-02	LOOP 2	716'	7	STEAM GENERATOR BLOWDOWN	3.50	35.25	RMI	2.25	9.95	S.S.	STD	N/A	8" OD INSULATION	P
0600200-07-02	LOOP 2	716'	7	STEAM GENERATOR BLOWDOWN	4.50	28.59	RMI	2.25	9.47	S.S.	STD	N/A	9" OD INSULATION	P
0600200-07-02	LOOP 2	716'	7	STEAM GENERATOR BLOWDOWN	4.50	3.50	RMI	1.25	0.55	S.S.	STD	N/A	7" OD INSULATION	P
0600200-07-02	LOOP 2	716'	7	STEAM GENERATOR BLOWDOWN	1.31	1.67	RMI	2.845	0.43	S.S.	STD	N/A	7" OD INSULATION	P
0600200-07-02	LOOP 2	716'	7	STEAM GENERATOR BLOWDOWN	1.31	0.73	RMI	2.345	0.14	S.S.	STD	N/A	6" OD INSULATION	P
0600200-07-02	LOOP 2	716'	7	STEAM GENERATOR BLOWDOWN	1.31	0.59	RMI	3.345	0.20	S.S.	STD	N/A	8" OD INSULATION	P
0600200-07-02	LOOP 2	716'	7	STEAM GENERATOR BLOWDOWN	2.88	0.28	RMI	2.06	0.06	S.S.	STD	N/A	7" OD INSULATION	P
N/A	LOOP 2	720-737	7	CONDUIT INSULATION 3M RADIANT	1.32	45.00	3M20C	SEE CALC	1.51	N/A	N/A	N/A	SEE CALCULATION	Q
N/A	LOOP 2	720-737	7	SUPPORT	N/A	N/A	N/A	SEE CALC	0.77	N/A	N/A	N/A	SEE CALCULATION	Q
0600200-08-10	LOOP 2	716'	7	LETDOWN LINE	3.50	2.17	RMI	4.25	1.56	S.S.	STD	N/A	12" OD INSULATION	R
0600200-08-10	LOOP 2	716'	7	LETDOWN LINE	3.50	47.50	RMI	3.25	22.73	S.S.	STD	N/A	10" OD INSULATION	R
0600200-08-10	LOOP 2	716'	7	LETDOWN LINE	3.50	4.29	RMI	2.25	1.21	S.S.	STD	N/A	8" OD INSULATION	R

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-10	LOOP 2	716'	7	LETDOWN LINE	3.50	3.09	RMI	1.5	0.51	S.S.	STD	N/A	6.5" OD INSULATION	R
0600200-08-10	LOOP 2	716'	7	LETDOWN LINE	3.50	0.59	MIN-K	0.75	0.04	S.S.	STD	N/A	AT MIN-K INSULATION	R
0600200-08-11	LOOP 2	716'	7	3" ALTERNATE CHARGING	3.50	25.09	RMI	2.75	9.41	S.S.	STD	N/A	9" OD INSULATION	S
0600200-08-11	LOOP 2	716'	7	3" ALTERNATE CHARGING	3.50	1.25	RMI	0.5	0.05	S.S.	STD	N/A	4.5" OD INSULATION	S
0600200-08-11	LOOP 2	716'	7	3" ALTERNATE CHARGING	3.50	3.04	RMI	0.75	0.21	S.S.	STD	N/A	5" OD INSULATION	S
N/A	LOOP 3	716'	8	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	215.60	S.S.	STD	N/A	N/A	A
N/A	LOOP 3	716'	8	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	0.62	S.S.	STD	N/A	AT ROOT VALVES	A
0600200-02-03	LOOP 3	716'	8	FEEDWATER	16.00	19.42	RMI	2.5	19.60	S.S.	STD	N/A	21" OD INSULATION	B
0600200-02-03	LOOP 3	716'	8	FEEDWATER	16.00	1.09	RMI	2	0.86	S.S.	STD	N/A	19" OD INSULATION	B
0600200-02-03	LOOP 3	716'	8	FEEDWATER	16.00	6.34	RMI	0.5	1.14	S.S.	STD	N/A	17" OD INSULATION	B
0600200-02-03	LOOP 3	716'	8	FEEDWATER	SEE CALC	SEE CALC	RMI	SEE CALC	0.35	S.S.	STD	N/A	AT 1.88" OD LINE	B
0600200-02-03	LOOP 3	716'	8	FEEDWATER	SEE CALC	SEE CALC	RMI	SEE CALC	0.24	S.S.	STD	N/A	AT 1" LINE	B
0600200-02-03	LOOP 3	716'	8	FEEDWATER	30.25	0.50	MINERAL WOOL	2	0.70	N/A	STD	N/A	AT PENETRATION # X-12C	B

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-10	LOOP 3	716'	8	LETDOWN LINE	3.50	38.50	RMI	3.25	18.43	S.S.	STD	N/A	10" OD INSULATION	C
N/A	LOOP 3	716'	8	HOT LEG	SEE CALC	SEE CALC	RMI	SEE CALC	49.89	S.S.	STD	N/A	N/A	D
N/A	LOOP 3	716'	8	COLD LEG	SEE CALC	SEE CALC	RMI	SEE CALC	54.98	S.S.	STD	N/A	N/A	E
0600200-09-06	LOOP 3	716'	8	BORON INJECTION	1.90	5.20	RMI	2.55	1.29	S.S.	STD	N/A	7" OD INSULATION	F
0600200-09-06	LOOP 3	716'	8	BORON INJECTION	1.90	0.96	RMI	7.6	1.51	S.S.	STD	N/A	9.5" OD INSULATION	F
0600200-09-02	LOOP 3	716'	8	ACCUMULATOR INJECTION	10.75	17.25	RMI	3.125	16.32	S.S.	STD	N/A	17" OD INSULATION	G
0600200-09-02	LOOP 3	716'	8	ACCUMULATOR INJECTION	10.75	5.18	RMI	9.625	22.16	S.S.	STD	N/A	30" OD INSULATION	G
0600200-09-02	LOOP 3	716'	8	ACCUMULATOR INJECTION	10.75	1.07	RMI	0.625	0.17	S.S.	STD	N/A	12" OD INSULATION	G
0600200-09-02	LOOP 3	716'	8	ACCUMULATOR INJECTION	10.75	1.82	RMI	0.375	0.17	S.S.	STD	N/A	11.5" OD INSULATION	G
0600200-09-02	LOOP 3	716'	8	LOWHEAD SAFETY INJECTION	6.63	2.53	RMI	2.6875	1.38	S.S.	STD	N/A	12" OD INSULATION	H
0600200-09-02	LOOP 3	716'	8	LOWHEAD SAFETY INJECTION	6.63	4.26	RMI	0.6875	0.47	S.S.	STD	N/A	8" OD INSULATION	H
N/A	LOOP 3	716'	8	RESIDUAL HEAT REMOVAL	8.63	6.09	RMI	1.1875	1.55	S.S.	STD	N/A	11" OD INSULATION	J
N/A	LOOP 3	716'	8	RESIDUAL HEAT REMOVAL	6.63	2.17	RMI	9.6875	7.48	S.S.	STD	N/A	26" OD INSULATION (VALVE)	J

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	LOOP 3	716'	8	RESIDUAL HEAT REMOVAL	6.63	3.75	RMI	0.6875	0.41	S.S.	STD	N/A	8" OD INSULATION	J
N/A	LOOP 3	716'	8	RESIDUAL HEAT REMOVAL	6.63	2.67	RMI	3.6875	2.22	S.S.	STD	N/A	14" OD INSULATION	J
0600200-08-12	LOOP 3	716'	8	EXCESS LETDOWN	1.32	42.84	RMI	2.34	8.00	S.S.	STD	N/A	6" OD INSULATION	K
0600200-08-12	LOOP 3	716'	8	EXCESS LETDOWN	1.32	0.63	RMI	2.84	0.16	S.S.	STD	N/A	7" OD INSULATION (VALVE)	K
0600200-08-12	LOOP 3	716'	8	EXCESS LETDOWN	1.32	6.17	RMI	1.84	0.78	S.S.	STD	N/A	5" OD INSULATION	K
0600200-08-12	LOOP 3	716'	8	EXCESS LETDOWN	1.05	0.78	RMI	1.975	0.10	S.S.	STD	N/A	5" OD INSULATION	K
0600200-08-12	LOOP 3	716'	8	EXCESS LETDOWN	1.05	0.46	RMI	2.475	0.09	S.S.	STD	N/A	6" OD INSULATION (VALVE)	K
0600200-07-03	LOOP 3	716'	8	STEAM GENERATOR BLOWDOWN	3.50	44.92	RMI	2.25	12.68	S.S.	STD	N/A	8" OD INSULATION	L
0600200-07-03	LOOP 3	716'	8	STEAM GENERATOR BLOWDOWN	4.50	21.42	RMI	2.25	7.10	S.S.	STD	N/A	9" OD INSULATION	L
0600200-07-03	LOOP 3	716'	8	STEAM GENERATOR BLOWDOWN	4.50	3.17	RMI	1.25	0.50	S.S.	STD	N/A	7" OD INSULATION	L
0600200-07-03	LOOP 3	716'	8	STEAM GENERATOR BLOWDOWN	1.31	1.75	RMI	2.845	0.45	S.S.	STD	N/A	7" OD INSULATION	L
0600200-07-03	LOOP 3	716'	8	STEAM GENERATOR BLOWDOWN	1.31	0.75	RMI	2.345	0.14	S.S.	STD	N/A	6" OD INSULATION	L
0600200-07-03	LOOP 3	716'	8	STEAM GENERATOR BLOWDOWN	1.31	1.11	RMI	3.345	0.38	S.S.	STD	N/A	8" OD INSULATION	L

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-07-03	LOOP 3	716'	8	STEAM GENERATOR BLOWDOWN	2.88	0.28	RMI	2.06	0.06	S.S.	STD	N/A	7" OD INSULATION	L
N/A	LOOP 4	716'	9	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	215.60	S.S.	STD	N/A	N/A	A
N/A	LOOP 4	716'	9	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	0.58	S.S.	STD	N/A	AT ROOT VALVES	A
0600200-02-04	LOOP 4	716'	9	FEEDWATER	16.00	20.07	RMI	2.5	20.25	S.S.	STD	N/A	21" OD INSULATION	B
0600200-02-04	LOOP 4	716'	9	FEEDWATER	16.00	6.78	RMI	0.5	1.22	S.S.	STD	N/A	17" OD INSULATION	B
0600200-02-04	LOOP 4	716'	9	FEEDWATER	SEE CALC	SEE CALC	RMI	SEE CALC	0.35	S.S.	STD	N/A	AT 1.88" OD LINE	B
0600200-02-04	LOOP 4	716'	9	FEEDWATER	SEE CALC	SEE CALC	RMI	SEE CALC	0.14	S.S.	STD	N/A	AT 1" LINE	B
0600200-02-04	LOOP 4	716'	9	FEEDWATER	30.25	0.50	MINERAL WOOL	2	0.70	N/A	STD	N/A	AT PENETRATION # X-12D	B
N/A	LOOP 4	716'	9	HOT LEG	SEE CALC	SEE CALC	RMI	SEE CALC	72.51	S.S.	STD	N/A	N/A	C
N/A	LOOP 4	716'	9	COLD LEG	SEE CALC	SEE CALC	RMI	SEE CALC	54.86	S.S.	STD	N/A	N/A	D
0600200-09-05	LOOP 4	716'	9	BORON INJECTION	1.90	4.45	RMI	2.55	1.10	S.S.	STD	N/A	7" OD INSULATION	E
0600200-09-05	LOOP 4	716'	9	BORON INJECTION	1.90	0.90	RMI	7.6	1.42	S.S.	STD	N/A	9.5" OD INSULATION	E
0600200-09-01	LOOP 4	716'	9	ACCUMULATOR INJECTION	10.75	26.25	RMI	3.125	24.83	S.S.	STD	N/A	17" OD INSULATION	F

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-09-01	LOOP 4	716'	9	ACCUMULATOR INJECTION	10.75	5.42	RMI	9.625	23.19	S.S.	STD	N/A	30" OD INSULATION	F
0600200-09-01	LOOP 4	716'	9	LOWHEAD SAFETY INJECTION	6.63	7.04	RMI	1.1875	1.43	S.S.	STD	N/A	9" OD INSULATION	G
N/A	LOOP 4	720-737	9	LABELS AND TIE WRAPS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEE REPORT FOR COMMENTS	H
N/A	LOOP 4	720-737	9	RTV SEALANT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	J
0600200-07-04	LOOP 4	716'	9	STEAM GENERATOR BLOWDOWN	3.50	35.25	RMI	2.25	9.95	S.S.	STD	N/A	8" OD INSULATION	K
0600200-07-04	LOOP 4	716'	9	STEAM GENERATOR BLOWDOWN	4.50	36.84	RMI	2.25	12.21	S.S.	STD	N/A	9" OD INSULATION	K
0600200-07-04	LOOP 4	716'	9	STEAM GENERATOR BLOWDOWN	4.50	0.79	RMI	1.25	0.12	S.S.	STD	N/A	7" OD INSULATION	K
0600200-07-04	LOOP 4	716'	9	STEAM GENERATOR BLOWDOWN	1.32	1.63	RMI	2.84	0.42	S.S.	STD	N/A	7" OD INSULATION	K
0600200-07-04	LOOP 4	716'	9	STEAM GENERATOR BLOWDOWN	1.32	0.75	RMI	2.34	0.14	S.S.	STD	N/A	6" OD INSULATION	K
0600200-07-04	LOOP 4	716'	9	STEAM GENERATOR BLOWDOWN	1.32	0.59	RMI	3.34	0.20	S.S.	STD	N/A	8" OD INSULATION	K
0600200-07-03	LOOP 4	716'	9	STEAM GENERATOR BLOWDOWN	2.88	0.34	RMI	2.56	0.10	S.S.	STD	N/A	8" OD INSULATION	K
0600200-08-11	LOOP 4	716'	9	3" ALTERNATE CHARGING	3.50	65.75	RMI	2.75	24.65	S.S.	STD	N/A	9" OD INSULATION	L
0600200-08-11	LOOP 4	716'	9	3" ALTERNATE CHARGING	3.50	2.34	RMI	2.25	0.66	S.S.	STD	N/A	8" OD INSULATION	L

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-11	LOOP 4	716'	9	3" ALTERNATE CHARGING	3.50	2.91	RMI	6.75	4.39	S.S.	STD	N/A	17" OD INSULATION AT VALVES	L
0600200-06-01	LOOP 1	745'	10	MAIN STEAM	32.00	63.17	RMI	3.5	171.24	S.S.	STD	N/A	N/A	A
0600200-06-01	LOOP 1	745'	10	MAIN STEAM	32.00	3.55	MIN-K	6	17.66	S.S.	N/A	N/A	NEAR PENETRATION	A
0600200-06-01	LOOP 1	745'	10	MAIN STEAM	32.00	2.83	MIN-K	1.5	3.10	S.S.	N/A	N/A	NEAR TOP OF SG	A
0600200-06-01	LOOP 1	745'	10	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	1.48	S.S.	STD	N/A	AT 1" VENT LINE	A
0600200-06-01	LOOP 1	745'	10	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	0.34	S.S.	STD	N/A	AT 1" INSTRUMENT TEST LINE	A
0600200-06-01	LOOP 1	745'	10	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	1.34	S.S.	STD	N/A	AT 3/4" INSTRUMENT TEST LINES	A
N/A	LOOP 1	745'	10	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	451.03	S.S.	STD	N/A	N/A	B
0600200-02-05	LOOP 1	745'	10	AUXILIARY FEEDWATER	6.63	3.17	RMI	5.1875	4.24	S.S.	STD	N/A	17" OD INSULATION	C
0600200-02-05	LOOP 1	745'	10	AUXILIARY FEEDWATER	6.63	59.00	RMI	2.6875	32.21	S.S.	STD	N/A	12" OD INSULATION	C
0600200-02-05	LOOP 1	745'	10	AUXILIARY FEEDWATER	6.63	3.01	MIN-K	2.8125	1.74	S.S.	STD	N/A	12.25" OD INSULATION	C
0600200-02-05	LOOP 1	745'	10	AUXILIARY FEEDWATER	6.63	1.43	RMI	1.6875	0.44	S.S.	STD	N/A	10" OD INSULATION	C
0600200-02-05	LOOP 1	745'	10	AUXILIARY FEEDWATER	1.31	1.20	RMI	2.845	0.31	S.S.	STD	N/A	AT 1.31" OD LINE	C

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	LOOP 1	745'	10	SEAL AROUND HVAC DIFFUSER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D
N/A	LOOP 1	745'	10	CONDUIT INSULATION 3M RADIANT	1.90	5.00	3M20C	SEE CALC	0.22	N/A	N/A	N/A	SEE CALCULATION	E
N/A	LOOP 1	745'	10	JUNCTION BOX	N/A	N/A	3M20C	SEE CALC	0.26	N/A	N/A	N/A	SEE CALCULATION	E
N/A	LOOP 1	745'	10	SUPPORT	N/A	N/A	3M20C	SEE CALC	0.26	N/A	N/A	N/A	SEE CALCULATION	E
0600200-06-02	LOOP 2	745'	11	MAIN STEAM	32.00	67.50	RMI	3.5	182.97	S.S.	STD	N/A	N/A	A
0600200-06-02	LOOP 2	745'	11	MAIN STEAM	32.00	2.75	MIN-K	1.5	3.01	S.S.	N/A	N/A	NEAR TOP OF SG	A
0600200-06-02	LOOP 2	745'	11	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	1.63	S.S.	STD	N/A	AT 1" VENT LINE	A
0600200-06-02	LOOP 2	745'	11	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	0.37	S.S.	STD	N/A	AT 1" INSTRUMENT TEST LINE	A
0600200-06-02	LOOP 2	745'	11	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	1.41	S.S.	STD	N/A	AT 3/4" INSTRUMENT TEST LINES	A
N/A	LOOP 2	745'	11	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	451.03	S.S.	STD	N/A	N/A	B
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	6.63	3.50	RMI	5.1875	4.68	S.S.	STD	N/A	17" OD INSULATION	C
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	6.63	2.28	RMI	3.6875	1.89	S.S.	STD	N/A	14" OD INSULATION	C
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	6.63	50.72	RMI	2.6875	27.69	S.S.	STD	N/A	12" OD INSULATION	C

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	6.63	2.10	RMI	1.6875	0.64	S.S.	STD	N/A	10" OD INSULATION	C
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	6.63	2.44	MIN-K	0.3775	0.14	S.S.	STD	N/A	7.38" OD INSULATION	C
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	6.63	15.09	RMI	2.6875	8.24	S.S.	STD	N/A	12" OD INSULATION	E
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	4.50	26.09	RMI	2.75	11.35	S.S.	STD	N/A	10" OD INSULATION	E
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	4.50	2.84	RMI	6.75	4.71	S.S.	STD	N/A	18" OD INSULATION	E
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	1.31	0.45	RMI	2.345	0.08	S.S.	STD	N/A	6" OD INSULATION	E
0600200-05-02	LOOP 2	745'	11	AUXILIARY FEEDWATER	1.31	1.11	RMI	2.847	0.29	S.S.	STD	N/A	7" OD INSULATION	E
0600200-06-03	LOOP 3	745'	12	MAIN STEAM	32.00	66.70	RMI	3.5	180.80	S.S.	STD	N/A	N/A	A
0600200-06-03	LOOP 3	745'	12	MAIN STEAM	32.00	3.10	MIN-K	1.5	3.40	S.S.	N/A	N/A	NEAR TOP OF SG	A
0600200-06-03	LOOP 3	745'	12	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	1.42	S.S.	STD	N/A	AT 1" VENT LINE	A
0600200-06-03	LOOP 3	745'	12	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	0.38	S.S.	STD	N/A	AT 1" INSTRUMENT TEST LINE	A
0600200-06-03	LOOP 3	745'	12	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	1.35	S.S.	STD	N/A	AT 3/4" INSTRUMENT TEST LINES	A
N/A	LOOP 3	745'	12	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	451.03	S.S.	STD	N/A	N/A	B

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	6.63	3.50	RMI	5.1875	4.68	S.S.	STD	N/A	17" OD INSULATION	C
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	6.63	2.67	RMI	3.6875	2.22	S.S.	STD	N/A	14" OD INSULATION	C
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	6.63	48.70	RMI	2.6875	26.59	S.S.	STD	N/A	12" OD INSULATION	C
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	6.63	3.00	RMI	1.6875	0.92	S.S.	STD	N/A	10" OD INSULATION	C
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	6.63	1.92	RMI	0.6875	0.21	S.S.	STD	N/A	8" OD INSULATION	C
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	6.63	18.50	RMI	2.6875	10.10	S.S.	STD	N/A	12" OD INSULATION	D
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	4.50	20.50	RMI	2.75	8.92	S.S.	STD	N/A	10" OD INSULATION	D
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	4.50	1.72	RMI	1.75	0.41	S.S.	STD	N/A	8" OD INSULATION	D
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	4.50	3.32	RMI	7.25	6.17	S.S.	STD	N/A	19" OD INSULATION	D
0600200-05-01	LOOP 3	745'	12	AUXILIARY FEEDWATER	1.31	2.18	RMI	2.345	0.41	S.S.	STD	N/A	6" OD INSULATION	D
N/A	LOOP 4	745'	13	DUST BETWEEN GRATING	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	A
0600200-06-04	LOOP 4	745'	13	MAIN STEAM	32.00	63.09	RMI	3.5	171.02	S.S.	STD	N/A	N/A	B
0600200-06-04	LOOP 4	745'	13	MAIN STEAM	32.00	3.51	MIN-K	6	17.46	S.S.	N/A	N/A	NEAR PENETRATION	B

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-06-04	LOOP 4	745'	13	MAIN STEAM	32.00	3.17	MIN-K	1.5	3.48	S.S.	N/A	N/A	NEAR TOP OF SG	B
0600200-06-04	LOOP 4	745'	13	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	1.45	S.S.	STD	N/A	AT 1" VENT LINE	B
0600200-06-04	LOOP 4	745'	13	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	0.35	S.S.	STD	N/A	AT 1" INSTRUMENT TEST LINE	B
0600200-06-04	LOOP 4	745'	13	MAIN STEAM	SEE CALC	SEE CALC	RMI	SEE CALC	1.13	S.S.	STD	N/A	AT 3/4" INSTRUMENT TEST LINES	B
N/A	LOOP 4	745'	13	STEAM GENERATOR	SEE CALC	SEE CALC	RMI	SEE CALC	451.03	S.S.	STD	N/A	N/A	C
0600200-02-08	LOOP 4	745'	13	AUXILIARY FEEDWATER	6.63	3.34	RMI	5.1875	4.47	S.S.	STD	N/A	17" OD INSULATION	D
0600200-02-08	LOOP 4	745'	13	AUXILIARY FEEDWATER	6.63	49.20	RMI	2.6875	26.86	S.S.	STD	N/A	12" OD INSULATION	D
0600200-02-08	LOOP 4	745'	13	AUXILIARY FEEDWATER	6.63	3.01	MIN-K	2.8125	1.74	S.S.	STD	N/A	12.25" OD INSULATION	D
0600200-02-08	LOOP 4	745'	13	AUXILIARY FEEDWATER	6.63	1.18	RMI	1.6875	0.36	S.S.	STD	N/A	10" OD INSULATION	D
0600200-02-08	LOOP 4	745'	13	AUXILIARY FEEDWATER	SEE CALC	SEE CALC	RMI	SEE CALC	0.43	S.S.	STD	N/A	AT 1" PIPE	D
N/A	LOOP 4	745'	13	LABELS AND TIE WRAPS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEE REPORT FOR COMMENTS	E
N/A	LOOP 4	745'	13	CONDUIT INSULATION 3M RADIANT	1.90	2.50	3M20C	SEE CALC	0.08	N/A	N/A	N/A	SEE CALCULATION	F
N/A	LOOP 4	745'	13	SUPPORT	N/A	N/A	3M20C	SEE CALC	0.26	N/A	N/A	N/A	SEE CALCULATION	F

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	FAN ROOM 1	716'	14	MIN-K-WR	N/A	SEE CALC	MIN-K-WR	0.25	0.02	N/A	N/A	N/A	ENCAPSULATED IN STAINLESS FOIL	A
N/A	FAN ROOM 1	716'	14	MIN-K-WR	N/A	SEE CALC	MIN-K-WR	0.375	0.02	N/A	N/A	N/A	ENCAPSULATED IN STAINLESS FOIL	B
N/A	FAN ROOM 1	716'	14	MIN-K-WR	N/A	SEE CALC	MIN-K-WR	0.375	0.04	N/A	N/A	N/A	ENCAPSULATED IN STAINLESS FOIL	C
N/A	FAN ROOM 1	716'	14	MIN-K-WR	N/A	SEE CALC	MIN-K-WR	0.5	0.03	N/A	N/A	N/A	ENCAPSULATED IN STAINLESS FOIL	D
N/A	FAN ROOM 1	716'	14	MIN-K-WR	N/A	SEE CALC	MIN-K-WR	SEE CALC	0.24	N/A	N/A	N/A	ENCAPSULATED IN STAINLESS	F
0600200-07-04	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	23.92	RMI	2.25	7.93	S.S.	STD	N/A	9" OD INSULATION	G
0600200-07-04	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.34	RMI	4.75	1.28	S.S.	STD	N/A	14" OD INSULATION (VALVE)	G
0600200-07-04	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	11.75	1.59	RMI	2.125	1.02	S.S.	STD	N/A	16" OD INSULATION (FLANGE)	G
0600200-07-04	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.55	RMI	4.25	1.26	S.S.	STD	N/A	13" OD INSULATION (VALVE)	G
0600200-07-04	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	2.38	1.96	RMI	3.31	0.81	S.S.	STD	N/A	9" OD INSULATION (VALVE)	G
0600200-07-04	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	2.38	0.40	RMI	12.5	1.62	S.S.	STD	N/A	7" OD INSULATION	G
0600200-07-04	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	8.62	0.64	RMI	2.19	0.33	S.S.	STD	N/A	13" OD INSULATION (FLANGE)	G
0600200-07-04	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	2.85	MIN-K	1.5	0.56	S.S.	STD	N/A	7.5" OD INSULATION	G

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	FAN ROOM 1	716'	14	CONDUIT INSULATION 3M RADIANT	1.32	40.00	3M20C	SEE CALC	1.34	N/A	N/A	N/A	SEE CALCULATION	H
N/A	FAN ROOM 1	716'	14	SUPPORT	N/A	N/A	3M20C	SEE CALC	0.64	N/A	N/A	N/A	SEE CALCULATION	H
N/A	FAN ROOM 1	716'	14	BOX	N/A	N/A	3M20C	SEE CALC	2.08	N/A	N/A	N/A	SEE CALCULATION	H
0600200-09-01	FAN ROOM 1	716'	14	LOWHEAD SAFETY INJECTION	6.63	54.00	RMI	2.6875	29.48	S.S.	STD	N/A	12" OD INSULATION	J
0600200-09-01	FAN ROOM 1	716'	14	LOWHEAD SAFETY INJECTION	1.05	0.43	RMI	0.975	0.02	S.S.	STD	N/A	3" OD INSULATION	J
0600200-09-01	FAN ROOM 1	716'	14	LOWHEAD SAFETY INJECTION	1.05	0.34	RMI	1.475	0.03	S.S.	STD	N/A	4" OD INSULATION	J
0600200-09-01	FAN ROOM 1	716'	14	LOWHEAD SAFETY INJECTION	2.38	0.63	RMI	0.81	0.04	S.S.	STD	N/A	4" OD INSULATION	J
N/A	FAN ROOM 1	716'	14	MIN-K-WR	N/A	SEE CALC	MIN-K-WR	0.5	0.02	N/A	N/A	N/A	ENCAPSULATED IN STAINLESS FOIL	K
N/A	FAN ROOM 1	716'	14	RESIDUAL HEAT REMOVAL	8.63	49.84	RMI	1.1875	12.67	S.S.	STD	N/A	11" OD INSULATION	L
N/A	FAN ROOM 1	716'	14	RESIDUAL HEAT REMOVAL	8.63	49.84	RMI	1.1875	12.67	S.S.	STD	N/A	11" OD INSULATION	M
N/A	FAN ROOM 1	716'	14	RESIDUAL HEAT REMOVAL	8.63	1.72	MIN-K	0.9375	0.34	S.S.	STD	N/A	10.5" OD MIN-K INSULATION	M
0600200-09-02	FAN ROOM 1	716'	14	LOWHEAD SAFETY INJECTION	8.63	44.60	RMI	1.1875	11.34	S.S.	STD	N/A	11" OD INSULATION	N
0600200-09-02	FAN ROOM 1	716'	14	LOWHEAD SAFETY INJECTION	8.63	1.98	MIN-K	0.56	0.22	S.S.	STD	N/A	9.75" OD INSULATION	N

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-09-02	FAN ROOM 1	716'	14	LOWHEAD SAFETY INJECTION	8.63	2.50	RMI	0.6875	0.35	S.S.	STD	N/A	10" OD INSULATION	N
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	30.09	RMI	2.25	9.97	S.S.	STD	N/A	9" OD INSULATION	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.04	RMI	1.75	0.25	S.S.	STD	N/A	8" OD INSULATION	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.81	MIN-K	1.25	0.28	S.S.	STD	N/A	7" OD INSULATION	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.28	RMI	4.75	1.23	S.S.	STD	N/A	14" OD INSULATION	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	11.50	1.50	RMI	2.25	1.01	S.S.	STD	N/A	16" OD INSULATION (FLANGES)	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.57	RMI	4.25	1.27	S.S.	STD	N/A	13" OD INSULATION	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	2.38	1.79	RMI	3.31	0.74	S.S.	STD	N/A	9" OD INSULATION	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	2.38	1.33	RMI	2.31	0.31	S.S.	STD	N/A	7" OD INSULATION	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	8.62	0.56	RMI	2.19	0.29	S.S.	STD	N/A	13" OD INSULATION (FLANGES)	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	2.00	0.59	RMI	2.81	0.17	S.S.	STD	N/A	8" OD INSULATION	P
0600200-07-01	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.13	MIN-K	0.56	0.07	S.S.	STD	N/A	5.62" OD INSULATION	P
0600200-07-02	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	28.42	RMI	2.25	9.42	S.S.	STD	N/A	9" OD INSULATION	Q

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-07-02	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.61	RMI	4.25	1.31	S.S.	STD	N/A	13" OD INSULATION	Q
0600200-07-02	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.37	RMI	4.75	1.31	S.S.	STD	N/A	14" OD INSULATION	Q
0600200-07-03	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	20.00	RMI	2.25	6.63	S.S.	STD	N/A	9" OD INSULATION	R
0600200-07-03	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	0.50	RMI	1.25	0.08	S.S.	STD	N/A	7" OD INSULATION	R
0600200-07-03	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.34	RMI	4.75	1.28	S.S.	STD	N/A	14" OD INSULATION (VALVE)	R
0600200-07-03	FAN ROOM 1	716'	14	STEAM GENERATOR BLOWDOWN	4.50	1.55	RMI	4.25	1.26	S.S.	STD	N/A	13" OD INSULATION (VALVE)	R
N/A	FAN ROOM 2	716'	15	MIN-K-WR	N/A	SEE CALC	MIN-K-WR	0.5	0.02	N/A	N/A	N/A	ENCAPSULATED IN STAINLESS FOIL	A
N/A	FAN ROOM 2	716	15	MARINITE BOARD	N/A	SEE CALC	MARINITE	1	0.03	N/A	N/A	N/A	N/A	A
0600200-09-02	FAN ROOM 2	716'	15	LOWHEAD SAFETY INJECTION	6.63	46.09	RMI	1.1875	9.33	S.S.	STD	N/A	9" OD INSULATION	B
0600200-09-02	FAN ROOM 2	716'	15	LOWHEAD SAFETY INJECTION	6.63	2.25	RMI	0.6875	0.25	S.S.	STD	N/A	8" OD INSULATION	B
0600200-09-02	FAN ROOM 2	716'	15	LOWHEAD SAFETY INJECTION	6.63	0.85	MIN-K	1.1875	0.17	S.S.	STD	N/A	9" OD MIN-K INSULATION	B
N/A	FAN ROOM 2	716'	15	CONDUIT INSULATION 3M RADIANT	2.38	47.50	3M20C	SEE CALC	2.48	N/A	N/A	N/A	SEE CALCULATION	C
N/A	FAN ROOM 2	716'	15	SUPPORT	N/A	N/A	3M20C	SEE CALC	0.77	N/A	N/A	N/A	SEE CALCULATION	C

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	FAN ROOM 2	716'	15	BOX	N/A	N/A	3M20C	SEE CALC	2.08	N/A	N/A	N/A	SEE CALCULATION	C
0600200-07-02	FAN ROOM 2	716'	15	STEAM GENERATOR BLOWDOWN	4.50	11.75	RMI	2.25	3.89	S.S.	STD	N/A	9" OD INSULATION	D
0600200-07-02	FAN ROOM 2	716'	15	STEAM GENERATOR BLOWDOWN	2.38	1.66	RMI	2.31	0.39	S.S.	STD	N/A	7" OD INSULATION	D
0600200-07-03	FAN ROOM 2	716'	15	STEAM GENERATOR BLOWDOWN	4.50	11.05	RMI	2.25	3.66	S.S.	STD	N/A	9" OD INSULATION	E
0600200-07-03	FAN ROOM 2	716'	15	STEAM GENERATOR BLOWDOWN	2.38	0.82	RMI	2.31	0.19	S.S.	STD	N/A	7" OD INSULATION	E
0600200-07-03	FAN ROOM 2	716'	15	STEAM GENERATOR BLOWDOWN	2.38	0.59	RMI	2.81	0.19	S.S.	STD	N/A	8" OD INSULATION	E
N/A	FAN ROOM 2	716'	15	MIN-K	N/A	N/A	MIN-K	0.505	0.03	N/A	N/A	N/A	N/A	F
N/A	ACCUMULATOR ROOM 1	716'	16	TAGS & LABELS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEE REPORT FOR COMMENTS	A
N/A	ACCUMULATOR ROOM 1	716'	16	POTENTIAL PAINT CHIPS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEE REPORT FOR PAINT ISSUE	B
N/A	ACCUMULATOR ROOM 1	716'	16	MIRROR INSULATIONS	SEE COMMENT	SEE COMMENT	SEE COMMENT	SEE CALC	SEE COMMENT	SEE COMMENT	N/A	N/A	SEE WB1-DWD-014D, -014E, -16F & -16G	C
0600200-09-01	ACCUMULATOR ROOM 1	716'	16	LOWHEAD SAFETY INJECTION	6.63	16.24	RMI	2.6875	8.87	S.S.	STD	N/A	12" OD INSULATION	D
0600200-09-01	ACCUMULATOR ROOM 1	716'	16	LOWHEAD SAFETY INJECTION	6.63	2.17	RMI	8.6875	6.30	S.S.	STD	N/A	24" OD INSULATION	D
0600200-09-01	ACCUMULATOR ROOM 1	716'	16	LOWHEAD SAFETY INJECTION	2.38	8.16	RMI	2.3125	1.93	S.S.	STD	N/A	7" OD INSULATION	D

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-09-01	ACCUMULATOR ROOM 1	716'	16	LOWHEAD SAFETY INJECTION	1.05	0.43	RMI	1.8125	0.05	S.S.	STD	N/A	6" OD INSULATION	D
0600200-09-01	ACCUMULATOR ROOM 1	716'	16	LOWHEAD SAFETY INJECTION	1.05	0.84	MIN-K	0.25	0.01	S.S.	STD	N/A	.25" THK. MIN-K INSULATION	D
0600200-09-01	ACCUMULATOR ROOM 1	716'	16	LOWHEAD SAFETY INJECTION	1.05	0.40	MIN-K	2.2	0.06	S.S.	STD	N/A	3.25" OD MIN-K INSULATION	D
N/A	ACCUMULATOR ROOM 1	716'	16	RESIDUAL HEAT REMOVAL	8.63	19.92	RMI	1.1875	5.06	S.S.	STD	N/A	11" OD INSULATION	E
N/A	ACCUMULATOR ROOM 1	716'	16	RESIDUAL HEAT REMOVAL	8.63	2.25	RMI	5.69	4.00	S.S.	STD	N/A	20" OD INSULATION	E
N/A	ACCUMULATOR ROOM 1	716'	16	RESIDUAL HEAT REMOVAL	8.63	2.64	RMI	1.6875	1.00	S.S.	STD	N/A	12" OD INSULATION	E
N/A	ACCUMULATOR ROOM 1	716'	16	RESIDUAL HEAT REMOVAL	2.38	4.50	RMI	1.31	0.47	S.S.	STD	N/A	5" OD INSULATION	E
N/A	ACCUMULATOR ROOM 1	716'	16	RESIDUAL HEAT REMOVAL	2.38	0.88	RMI	2.31	0.21	S.S.	STD	N/A	7" OD INSULATION	E
N/A	ACCUMULATOR ROOM 1	716'	16	RESIDUAL HEAT REMOVAL	1.06	0.71	RMI	2.47	0.14	S.S.	STD	N/A	6" OD INSULATION	E
N/A	ACCUMULATOR ROOM 1	716'	16	RESIDUAL HEAT REMOVAL	8.63	14.56	RMI	1.1875	3.70	S.S.	STD	N/A	11" OD INSULATION	F
0600200-09-02	ACCUMULATOR ROOM 1	716'	16	LOWHEAD SAFETY INJECTION	8.63	16.92	RMI	1.1875	4.30	S.S.	STD	N/A	11" OD INSULATION	G
0600200-13-02	ACCUMULATOR ROOM 2	716'	17	3" AUXILIARY SPRAY LINE	3.50	1.28	RMI	1.25	0.17	S.S.	STD	N/A	6" OD INSULATION	A
0600200-13-02	ACCUMULATOR ROOM 2	716'	17	3" AUXILIARY SPRAY LINE	3.50	22.91	RMI	2.75	8.59	S.S.	STD	N/A	9" OD INSULATION	A

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-13-02	ACCUMULATOR ROOM 2	716'	17	3" AUXILIARY SPRAY LINE	3.50	0.66	MIN-K	1.5	0.11	S.S.	STD	N/A	6.5" OD INSULATION	A
0600200-13-02	ACCUMULATOR ROOM 2	716'	17	3" AUXILIARY SPRAY LINE	3.50	1.09	RMI	4.25	0.78	S.S.	STD	N/A	12" OD INSULATION	A
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	6.63	18.42	RMI	1.1875	3.73	S.S.	STD	N/A	9" OD INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	6.63	1.92	RMI	6.6875	3.73	S.S.	STD	N/A	20" OD INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	8.63	13.59	RMI	1.1875	3.45	S.S.	STD	N/A	11" OD INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	2.38	1.34	MIN-K	0.8125	0.08	S.S.	STD	N/A	4" OD MIN-K INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	2.38	0.78	RMI	0.5625	0.03	S.S.	STD	N/A	3.5" OD INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	2.38	0.92	MIN-K	0.5625	0.03	S.S.	STD	N/A	3.5" OD MIN-K INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	2.38	0.50	MIN-K	1.3125	0.05	S.S.	STD	N/A	5" OD MIN-K INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	2.38	4.29	RIM	1.3125	0.45	S.S.	STD	N/A	5" OD INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	2.38	10.00	RIM	2.3125	2.36	S.S.	STD	N/A	7" OD INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	2.38	1.15	RIM	3.8125	0.59	S.S.	STD	N/A	10" OD INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	2.38	1.45	RIM	3.8125	0.75	S.S.	STD	N/A	8" OD INSULATION	B

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	1.05	0.51	RIM	1.475	0.04	S.S.	STD	N/A	4" OD INSULATION	B
0600200-09-02	ACCUMULATOR ROOM 2	716'	17	LOWHEAD SAFETY INJECTION	1.05	3.67	RIM	2.975	0.96	S.S.	STD	N/A	7" OD INSULATION	B
N/A	ACCUMULATOR ROOM 2	716'	17	RESIDUAL HEAT REMOVAL	8.63	27.84	RMI	1.1875	7.08	S.S.	STD	N/A	11" OD INSULATION	C
N/A	ACCUMULATOR ROOM 2	716'	17	RESIDUAL HEAT REMOVAL	8.63	2.17	RMI	8.6875	7.12	S.S.	STD	N/A	26" OD INSULATION	C
0600200-08-11	ACCUMULATOR ROOM 2	716'	17	NORMAL CHARGING	3.50	3.00	RMI	1.75	0.60	S.S.	STD	N/A	7" OD INSULATION	D
0600200-08-11	ACCUMULATOR ROOM 2	716'	17	NORMAL CHARGING	3.50	0.65	RMI	1.25	0.08	S.S.	STD	N/A	6" OD INSULATION	D
0600200-08-11	ACCUMULATOR ROOM 2	716'	17	NORMAL CHARGING	3.50	0.96	RMI	2.75	0.36	S.S.	STD	N/A	9" OD INSULATION	D
0600200-08-12	ACCUMULATOR ROOM 2	716'	17	EXCESS LETDOWN	1.32	11.09	RMI	2.34	2.07	S.S.	STD	N/A	6" OD INSULATION	E
0600200-08-12	ACCUMULATOR ROOM 2	716'	17	EXCESS LETDOWN	1.32	2.00	RMI	1.84	0.25	S.S.	STD	N/A	5" OD INSULATION	E
0600200-08-12	ACCUMULATOR ROOM 2	716'	17	EXCESS LETDOWN	1.05	1.07	RMI	1.975	0.14	S.S.	STD	N/A	5" OD INSULATION	E
0600200-08-12	ACCUMULATOR ROOM 2	716'	17	EXCESS LETDOWN	1.05	0.67	RMI	2.975	0.18	S.S.	STD	N/A	7" OD INSULATION (VALVE)	E
0600200-08-11	ACCUMULATOR ROOM 2	716'	17	3" ALTERNATE CHARGING	3.50	11.84	RMI	2.75	4.44	S.S.	STD	N/A	9" OD INSULATION	F
0600200-08-11	ACCUMULATOR ROOM 2	716'	17	3" ALTERNATE CHARGING	3.50	2.75	RMI	1.25	0.36	S.S.	STD	N/A	6" OD INSULATION	F

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-11	ACCUMULATOR ROOM 2	716'	17	3" ALTERNATE CHARGING	3.50	2.34	RMI	2.25	0.66	S.S.	STD	N/A	8" OD INSULATION	F
N/A	ACCUMULATOR ROOM 4	716'	19	TAGS & LABELS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEE REPORT FOR COMMENTS	A
N/A	ACCUMULATOR ROOM 4	716'	19	TAGS & LABELS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SHOW RUBBER GASKETS	B
N/A	ACCUMULATOR ROOM 4	716'	19	TAGS & LABELS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SEE REPORT FOR COMMENTS	C
N/A	ACCUMULATOR ROOM 4	716'	19	PENETRATIONS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NO POTENTIAL DEBRIS FROM THESE PENETRATIONS	D
0600200-08-09	ACCUMULATOR ROOM 4	716'	19	LETDOWN LINE	2.38	23.17	RMI	1.81	3.83	S.S.	STD	N/A	N/A	E
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	6.63	15.67	RMI	1.1875	3.17	S.S.	STD	N/A	9" OD INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	6.63	2.17	RMI	9.6875	7.48	S.S.	STD	N/A	26" OD INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	8.63	35.09	RMI	1.1875	8.92	S.S.	STD	N/A	11" OD INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	8.63	0.53	RMI	2.8187	0.37	S.S.	STD	N/A	13" OD INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	1.05	8.92	RMI	2.475	1.70	S.S.	STD	N/A	6" OD INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	1.05	0.90	MIN-K	0.726	0.03	S.S.	STD	N/A	2.5" OD MIN-K INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	1.05	0.94	RMI	3.475	0.32	S.S.	STD	N/A	8" OD INSULATION	F

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	2.38	6.25	RMI	2.31	1.48	S.S.	STD	N/A	7" OD INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	2.38	0.71	RMI	4.3125	0.45	S.S.	STD	N/A	11" OD INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	1.05	1.80	RMI	2.475	0.34	S.S.	STD	N/A	6" OD INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	1.05	3.42	RMI	1.975	0.45	S.S.	STD	N/A	5" OD INSULATION	F
0600200-09-01	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	1.05	0.84	RMI	4.975	0.55	S.S.	STD	N/A	11" OD INSULATION	F
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	8.63	51.59	RMI	1.1875	13.11	S.S.	STD	N/A	11" OD INSULATION	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	8.63	1.00	MIN-K	0.935	0.20	S.S.	STD	N/A	10.5" OD INSULATION	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	8.63	2.52	RMI	0.6875	0.35	S.S.	STD	N/A	10" OD INSULATION	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	12.75	21.92	RMI	1.125	7.46	S.S.	STD	N/A	15" OD INSULATION	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	12.75	1.50	RMI	2.625	1.32	S.S.	STD	N/A	18" OD INSULATION	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	1.05	1.75	RMI	2.475	0.33	S.S.	STD	N/A	6" OD INSULATION	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	1.05	0.80	RMI	1.475	0.07	S.S.	STD	N/A	4" OD INSULATION	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	2.88	0.84	RMI	1.06	0.08	S.S.	STD	N/A	5" OD INSULATION (TIEBACK SUPPORT)	G

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	1.05	0.46	RMI	1.975	0.06	S.S.	STD	N/A	5" OD INSULATION	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	2.88	0.53	RMI	1.56	0.08	S.S.	STD	N/A	6" OD INSULATION (TIEBACK SUPPORT)	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	1.05	11.09	RMI	1.475	0.90	S.S.	STD	N/A	4" OD INSULATION (DRAIN LINE)	G
N/A	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	1.05	1.07	RMI	1.975	0.14	S.S.	STD	N/A	5" OD INSULATION (DRAIN VALVE)	G
0600200-03-01	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	14.00	10.50	RMI	2	7.33	S.S.	STD	N/A	18" OD INSULATION	H
0600200-03-01	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	10.75	6.00	RMI	2.125	3.58	S.S.	STD	N/A	15" OD INSULATION	H
0600200-03-01	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	14.00	3.11	RMI	9.5	15.15	S.S.	STD	N/A	33" OD INSULATION (VALVE)	H
0600200-03-01	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	10.75	2.72	RMI	8.625	9.92	S.S.	STD	N/A	28" OD INSULATION (VALVE)	H
0600200-03-01	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	3.50	0.34	RMI	1.75	0.07	S.S.	STD	N/A	7" OD INSULATION	H
0600200-03-01	ACCUMULATOR ROOM 4	716'	19	RESIDUAL HEAT REMOVAL	1.05	0.82	RMI	0.975	0.04	S.S.	STD	N/A	3" OD INSULATION	H
0600200-09-02	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	8.63	39.75	RMI	1.1875	10.11	S.S.	STD	N/A	11" OD INSULATION	J
0600200-09-02	ACCUMULATOR ROOM 4	716'	19	LOWHEAD SAFETY INJECTION	8.63	5.17	MIN-K	0.9375	1.01	S.S.	STD	N/A	10.5" OD MIN-K INSULATION	J
0600200-08-06	ACCUMULATOR ROOM 4	716'	19	SEAL WATER RETURN LINE	4.50	14.67	RMI	1.75	3.50	S.S.	STD	N/A	8" OD INSULATION	K

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-06	ACCUMULATOR ROOM 4	716'	19	SEAL WATER RETURN LINE	4.50	1.17	RMI	4.75	1.12	S.S.	STD	N/A	14" OD INSULATION	K
0600200-08-06	ACCUMULATOR ROOM 4	716'	19	SEAL WATER RETURN LINE	4.50	0.80	RMI	3.75	0.54	S.S.	STD	N/A	12" OD INSULATION	K
0600200-08-06	ACCUMULATOR ROOM 4	716'	19	SEAL WATER RETURN LINE	1.06	3.80	RMI	1.47	0.31	S.S.	STD	N/A	4" OD INSULATION	K
0600200-08-06	ACCUMULATOR ROOM 4	716'	19	SEAL WATER RETURN LINE	1.06	1.71	RMI	2.47	0.33	S.S.	STD	N/A	6" OD INSULATION	K
0600200-08-06	ACCUMULATOR ROOM 4	716'	19	SEAL WATER RETURN LINE	2.38	1.83	RMI	1.31	0.19	S.S.	STD	N/A	5" OD INSULATION	K
0600200-08-06	ACCUMULATOR ROOM 4	716'	19	SEAL WATER RETURN LINE	2.38	0.26	RMI	3.31	0.11	S.S.	STD	N/A	9" OD INSULATION	K
N/A	ACCUMULATOR ROOM 4	716'	19	MIN-K	N/A	N/A	MIN-K	0.72	0.04	N/A	N/A	N/A	N/A	L
N/A	UPPER CONTAINMENT	756'	20	GLYCOL RETURN/SUPPLY LINES	2.38	29.03	FOAMGLASS	3	10.22	S.S.	N/A	STD	EL. 756' TO EL. 769'-10 5/8"	A
N/A	UPPER CONTAINMENT	756'	20	GLYCOL RETURN/SUPPLY LINES	2.38	10.10	FOAMPLASTIC	3	3.56	N/A	N/A	N/A	EL. 771'-6"	A
N/A	UPPER CONTAINMENT	756'	20	GLYCOL RETURN/SUPPLY LINES	0.84	6.25	FOAMPLASTIC	3	1.57	N/A	N/A	N/A	EL. 771'-6"	A
N/A	UPPER CONTAINMENT	756'	20	GLYCOL RETURN/SUPPLY LINES	2.38	14.10	FOAMPLASTIC	3	4.96	N/A	N/A	N/A	EL. 775'-0"	A
N/A	UPPER CONTAINMENT	756'	20	GLYCOL RETURN/SUPPLY LINES	0.84	8.75	FOAMPLASTIC	3	2.20	N/A	N/A	N/A	EL. 775'-0"	A
N/A	UPPER CONTAINMENT	756'	20	GLYCOL RETURN/SUPPLY LINES	0.84	2.50	FOAMGLASS	3	0.63	S.S.	N/A	STD	CHECK VALVES	A

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	UPPER CONTAINMENT	756'	20	GLYCOL RETURN/SUPPLY LINES	SEE CALC	SEE CALC	FOAMPLASTIC	1	1.65	N/A	N/A	N/A	AT SUPPORTS	A
N/A	ICE CONDENSER	803'	21	VENT-CURTAINS	N/A	SEE CALC	SEE CALC	SEE CALC	2.20	N/A	N/A	N/A	N/A	A
N/A	ICE CONDENSER	803'	21	SEAL FRAME & VESSEL SHELL	N/A	SEE CALC	SEE CALC	SEE CALC	8.38	N/A	N/A	N/A	N/A	A
N/A	ICE CONDENSER	756'	21	GLYCOL RETURN/SUPPLY LINES	2.38	318.00	FOAMGLASS	3	111.97	S.S.	N/A	STD	N/A	B
N/A	ICE CONDENSER	756'	21	GLYCOL RETURN/SUPPLY LINES	1.05	264.00	FOAMGLASS	3	69.98	S.S.	N/A	STD	N/A	B
N/A	ICE CONDENSER	756'	21	DRAIN LINES	12.75	255.00	FOAMGLASS	3	262.86	S.S.	N/A	STD	N/A	B
N/A	ICE CONDENSER	819'-7 1/2"	21	TOP DECK BLANKET ASSEMBLY	SEE CALC	SEE CALC	SPONGE	0.75	444.00	S.S.	N/A	STITCHES	2 BLANKET LAYERS	C
N/A	ICE CONDENSER	803'	21	END WALLS/DOORS	SEE CALC	SEE CALC	FOAM RUBBER	1	40.20	N/A	N/A	N/A	N/A	D
N/A	ICE CONDENSER	803'	21	GLYCOL SUPPLY LINE	6.63	29.81	FOAMGLASS	3	18.78	N/A	N/A	N/A	S.S. JACKETING USED ON SOME PIPING OUTSIDE OF ICE CONDENSER BAY	E
N/A	ICE CONDENSER	803'	21	GLYCOL SUPPLY LINE	4.50	14.30	FOAMGLASS	3	7.02	N/A	N/A	N/A	S.S. JACKETING USED ON SOME PIPING OUTSIDE OF ICE CONDENSER BAY	E
N/A	ICE CONDENSER	803'	21	GLYCOL SUPPLY LINE	4.50	553.47	FOAMPLASTIC	2.5	211.31	N/A	N/A	N/A	S.S. JACKETING USED ON SOME PIPING OUTSIDE OF ICE CONDENSER BAY	E
N/A	ICE CONDENSER	803'	21	GLYCOL RETURN LINE	6.63	10.00	FOAMGLASS	3	6.30	N/A	N/A	N/A	S.S. JACKETING USED ON SOME PIPING OUTSIDE OF ICE CONDENSER BAY	E
N/A	ICE CONDENSER	803'	21	GLYCOL RETURN LINE	4.50	29.67	FOAMGLASS	3	14.56	N/A	N/A	N/A	S.S. JACKETING USED ON SOME PIPING OUTSIDE OF ICE CONDENSER BAY	E

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	ICE CONDENSER	803'	21	GLYCOL RETURN LINE	4.50	529.00	FOAMPLASTIC	2.5	201.97	N/A	N/A	N/A	S.S. JACKETING USED ON SOME PIPING OUTSIDE OF ICE CONDENSER BAY	E
N/A	ICE CONDENSER	803'	21	GLYCOL SUPPLY BY-PASS LINE	0.84	7.17	FOAMPLASTIC	2.5	1.31	N/A	N/A	N/A	N/A	E
N/A	ICE CONDENSER	803'	21	GLYCOL SUPPLY BY-PASS LINE	0.84	0.50	FOAMGLASS	3	0.13	N/A	N/A	N/A	VALVE	E
N/A	ICE CONDENSER	803'	21	GLYCOL RETURN BY-PASS LINE	0.84	8.27	FOAMPLASTIC	2.5	1.51	N/A	N/A	N/A	N/A	E
N/A	ICE CONDENSER	803'	21	GLYCOL RETURN BY-PASS LINE	0.84	0.50	FOAMGLASS	3	0.13	N/A	N/A	N/A	VALVE	E
N/A	ICE CONDENSER	803'	21	GLYCOL EXPANSION TANK LINES	3.50	0.59	FOAMPLASTIC	2.5	0.19	N/A	N/A	N/A	N/A	E
N/A	ICE CONDENSER	803'	21	GLYCOL EXPANSION TANK LINES	1.32	32.72	FOAMPLASTIC	2.5	6.82	N/A	N/A	N/A	N/A	E
N/A	ICE CONDENSER	803'	21	GLYCOL SUPPLY/RETURN LINES TO AHU'S	1.32	750.00	FOAMPLASTIC	2.5	156.26	N/A	N/A	N/A	N/A	E
N/A	ICE CONDENSER	803'	21	HEADER LINES	1.90	462.55	FOAMGLASS	3	148.34	S.S.	N/A	STD	N/A	E
N/A	ICE CONDENSER	803'	21	HEADER/AHU DRAINS/TRAPS	1.90	150.00	FOAMGLASS	3	48.11	S.S.	N/A	STD	N/A	E
N/A	ICE CONDENSER	803'	21	HEADER/AHU DRAINS/TRAPS	1.90	60.00	FOAMPLASTIC	2.5	14.40	S.S.	N/A	STD	N/A	E
N/A	ICE CONDENSER	803'	21	TOP DECK BEAMS	N/A	SEE CALC	FOAMPLASTIC	1	1376.00	N/A	N/A	N/A	N/A	F
N/A	ICE CONDENSER	803'	21	DUCT FLEX CONNECTIONS	N/A	SEE CALC	SEE CALC	SEE CALC	0.32	N/A	N/A	N/A	N/A	G

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	ICE CONDENSER	803'	21	DUCT FLEX CONNECTIONS	N/A	SEE CALC	SEE CALC	SEE CALC	4.59	N/A	N/A	N/A	N/A	G
N/A	ICE CONDENSER	803'	21	VENT-CURTAINS	N/A	SEE CALC	SEE CALC	SEE CALC	3.89	N/A	N/A	N/A	N/A	H
N/A	REACTOR VESSEL	713'	22	REACTOR VESSEL	SEE CALC	SEE CALC	RMI	SEE CALC	810.76	S.S.	STD	N/A	N/A	A
N/A	REACTOR VESSEL	713'	22	REACTOR VESSEL	1.06	SEE CALC	RMI	1.47	1.57	S.S.	STD	N/A	FILLED WITH MED. S.S. WOOL	A
N/A	PRESSURIZER	729'	23	PRESSURIZER	SEE CALC	SEE CALC	RMI	SEE CALC	449.41	S.S.	STD	N/A	N/A	A
0600200-13-02	PRESSURIZER	729'	23	6" PRESSURIZER SPRAY LINE	5.56	0.29	RMI	7.22	0.58	S.S.	STD	N/A	20" OD INSULATION	B
0600200-13-02	PRESSURIZER	729'	23	6" PRESSURIZER SPRAY LINE	5.56	0.38	RMI	2.22	0.14	S.S.	STD	N/A	10" OD INSULATION	B
0600200-13-02	PRESSURIZER	729'	23	6" PRESSURIZER SPRAY LINE	4.50	0.79	RMI	2.75	0.34	S.S.	STD	N/A	10" OD INSULATION	B
0600200-13-02	PRESSURIZER	729'	23	6" PRESSURIZER SPRAY LINE	6.62	49.34	RMI	2.69	26.96	S.S.	STD	N/A	12" OD INSULATION	B
0600200-13-02	PRESSURIZER	729'	23	6" PRESSURIZER SPRAY LINE	6.62	0.65	RMI	2	0.24	S.S.	STD	N/A	8.5" OD INSULATION	B
0600200-13-02	PRESSURIZER	729'	23	6" PRESSURIZER SPRAY LINE	1.05	1.05	RMI	2.975	0.27	S.S.	STD	N/A	7" OD INSULATION	B
0600200-13-02	PRESSURIZER	729'	23	3" AUXILIARY SPRAY LINE	3.50	16.75	RMI	2.75	6.28	S.S.	STD	N/A	9" OD INSULATION	B
0600200-13-02	PRESSURIZER	729'	23	3" AUXILIARY SPRAY LINE	3.50	1.34	MIN-K	0.56	0.07	S.S.	STD	N/A	4.62" OD INSULATION	B

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-13-02	PRESSURIZER	729'	23	3" AUXILIARY SPRAY LINE	3.50	1.30	RMI	0.75	0.09	S.S.	STD	N/A	5" OD INSULATION	B
0600200-13-02	PRESSURIZER	729'	23	3" AUXILIARY SPRAY LINE	3.50	1.46	RMI	6.25	1.94	S.S.	STD	N/A	16" OD INSULATION	B
0600200-13-02	PRESSURIZER	729'	23	3" AUXILIARY SPRAY LINE	3.50	0.70	MIN-K	1.5	0.11	S.S.	STD	N/A	6.5" OD INSULATION	B
N/A	PRESSURIZER	729'	23	3/4" INSTRUMENTATION	1.05	5.84	RMI	4.98	3.83	S.S.	STD	N/A	11" OD INSULATION	C
N/A	PRESSURIZER	729'	23	3/4" INSTRUMENTATION	1.05	1.46	RMI	3.98	0.64	S.S.	STD	N/A	9" OD INSULATION	C
N/A	PRESSURIZER	729'	23	PRESSURE RELIEF	6.63	9.84	RMI	2.6875	5.37	S.S.	STD	N/A	12" OD INSULATION	D
N/A	PRESSURIZER	729'	23	PRESSURE RELIEF	3.50	2.67	RMI	6.5	3.79	S.S.	STD	N/A	16.5" OD INSULATION	D
N/A	PRESSURIZER	729'	23	PRESSURE RELIEF	3.50	4.27	RMI	2.75	1.60	S.S.	STD	N/A	9" OD INSULATION	D
N/A	PRESSURIZER	729'	23	PRESSURE RELIEF	12.00	1.11	RMI	2	0.68	S.S.	STD	N/A	16" OD INSULATION (FLANGE)	D
N/A	PRESSURIZER	729'	23	PRESSURE RELIEF	3.50	1.67	RMI	3.75	0.99	S.S.	STD	N/A	11" OD INSULATION	D
N/A	PRESSURIZER	729'	23	PRESSURE RELIEF	3.50	0.64	RMI	2.25	0.18	S.S.	STD	N/A	8" OD INSULATION	D
N/A	PRESSURIZER	729'	23	PRESSURE RELIEF	12.00	1.11	RMI	2.25	0.78	S.S.	STD	N/A	13.5" OD INSULATION (FLANGE)	D
N/A	PRESSURIZER	729'	23	PRESSURE RELIEF	1.06	1.98	RMI	2.97	0.52	S.S.	STD	N/A	7" OD INSULATION	D

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-08-10	INSTRUMENT ROOM	716'	24	LETDOWN LINE	3.50	16.67	RMI	3.25	7.98	S.S.	STD	N/A	N/A	A
N/A	INSTRUMENT ROOM	716'	24	LETDOWN LINE	3.50	30.84	RMI	3.25	14.76	S.S.	STD	N/A	N/A	B
N/A	INSTRUMENT ROOM	716'	24	REGENERATIVE HEAT EXCHANGER	10.90	SEE CALC	RMI	3.05	45.63	S.S.	STD	N/A	N/A	B
0600200-08-09	INSTRUMENT ROOM	716'	24	LETDOWN LINE	3.50	15.34	RMI	1.74	3.05	S.S.	STD	N/A	N/A	C
0600200-08-11	INSTRUMENT ROOM	716'	24	NORMAL CHARGING LINE	3.50	23.67	RMI	2.75	8.88	S.S.	STD	N/A	AT 9" OD INSULATION	D
0600200-08-11	INSTRUMENT ROOM	716'	24	NORMAL CHARGING LINE	3.50	1.24	RMI	1.25	0.16	S.S.	STD	N/A	AT 6" OD INSULATION	D
0600200-08-11	INSTRUMENT ROOM	716'	24	NORMAL CHARGING LINE	3.50	2.82	RMI	1.75	0.57	S.S.	STD	N/A	AT 7" OD INSULATION	D
0600200-08-11	INSTRUMENT ROOM	716'	24	ALTERNATE CHARGING LINE	3.50	1.18	RMI	2.75	0.44	S.S.	STD	N/A	AT 9" OD INSULATION	D
0600200-08-11	INSTRUMENT ROOM	716'	24	ALTERNATE CHARGING LINE	3.50	1.69	RMI	2.25	0.48	S.S.	STD	N/A	AT 8" OD INSULATION	D
0600200-08-11	INSTRUMENT ROOM	716'	24	NORMAL CHARGING BYPASS LINE	1.05	3.34	RMI	1.975	0.44	S.S.	STD	N/A	AT 5" OD INSULATION	D
0600200-08-11	INSTRUMENT ROOM	716'	24	NORMAL CHARGING BYPASS LINE	1.05	1.80	RMI	0.975	0.08	S.S.	STD	N/A	AT 4" OD INSULATION	D
0600200-08-11	INSTRUMENT ROOM	716'	24	AUXILIARY SPRAY LINE	2.38	10.84	RMI	2.81	3.45	S.S.	STD	N/A	AT 8" OD INSULATION	D
0600200-13-02	INSTRUMENT ROOM	716'	24	AUXILIARY SPRAY LINE	3.50	1.05	RMI	2.75	0.39	S.S.	STD	N/A	AT 9" OD INSULATION	D

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
0600200-13-02	INSTRUMENT ROOM	716'	24	AUXILIARY SPRAY LINE	3.50	0.84	RMI	0.25	0.02	S.S.	STD	N/A	AT 4" OD INSULATION	D
0600200-13-02	INSTRUMENT ROOM	716'	24	AUXILIARY SPRAY LINE	3.50	0.59	RMI	0.75	0.04	S.S.	STD	N/A	AT 5" OD INSULATION	D
0600200-13-02	INSTRUMENT ROOM	716'	24	AUXILIARY SPRAY LINE	3.50	2.21	RMI	0.5	0.10	S.S.	N/A	STD	AT 4.5" OD INSULATION	D
N/A	INSTRUMENT ROOM	716'	24	RESIDUAL HEAT REMOVAL	8.63	55.34	RMI	1.1875	14.07	S.S.	STD	N/A	11" OD INSULATION	E
0600200-09-02	INSTRUMENT ROOM	716'	24	LOWHEAD SAFETY INJECTION	8.63	72.67	RMI	1.1875	18.47	S.S.	STD	N/A	11" OD INSULATION	F
0600200-08-12	INSTRUMENT ROOM	716'	24	EXCESS LETDOWN	1.32	16.67	RMI	2.34	3.11	S.S.	STD	N/A	6" OD INSULATION	G
0600200-08-12	INSTRUMENT ROOM	716'	24	EXCESS LETDOWN	1.32	1.17	MIN-K	1.34	0.09	S.S.	STD	N/A	4" OD INSULATION	G
0600200-08-12	INSTRUMENT ROOM	716'	24	EXCESS LETDOWN	1.32	0.72	RMI	1.84	0.09	S.S.	STD	N/A	5" OD INSULATION	G
0600200-08-12	INSTRUMENT ROOM	716'	24	EXCESS LETDOWN	1.05	0.93	RMI	2.84	0.22	S.S.	STD	N/A	7" OD INSULATION	G
N/A	INSTRUMENT ROOM	720-737	24	CONDUIT 3M-M20C INSULATION	1.90	50.00	3M-M20C	0.1875	2.19	N/A	N/A	N/A	SEE CALCULATION	H
N/A	INSTRUMENT ROOM	720-737	24	CONDUIT 3M-M20C INSULATION	0.68	50.00	3M-M20C	0.1875	1.00	N/A	N/A	N/A	SEE CALCULATION	H
N/A	INSTRUMENT ROOM	720-737	24	CONDUIT 3M-M20C INSULATION	N/A	N/A	3M-M20C	0.1875	1.54	N/A	N/A	N/A	SUPPORT INSULATION SEE CALCULATION	H
N/A	INSTRUMENT ROOM	720-737	24	MIN-K INSULATION	0.68	20.00	MIN-K	0.75	1.06	N/A	N/A	N/A	SEE CALCULATION	H

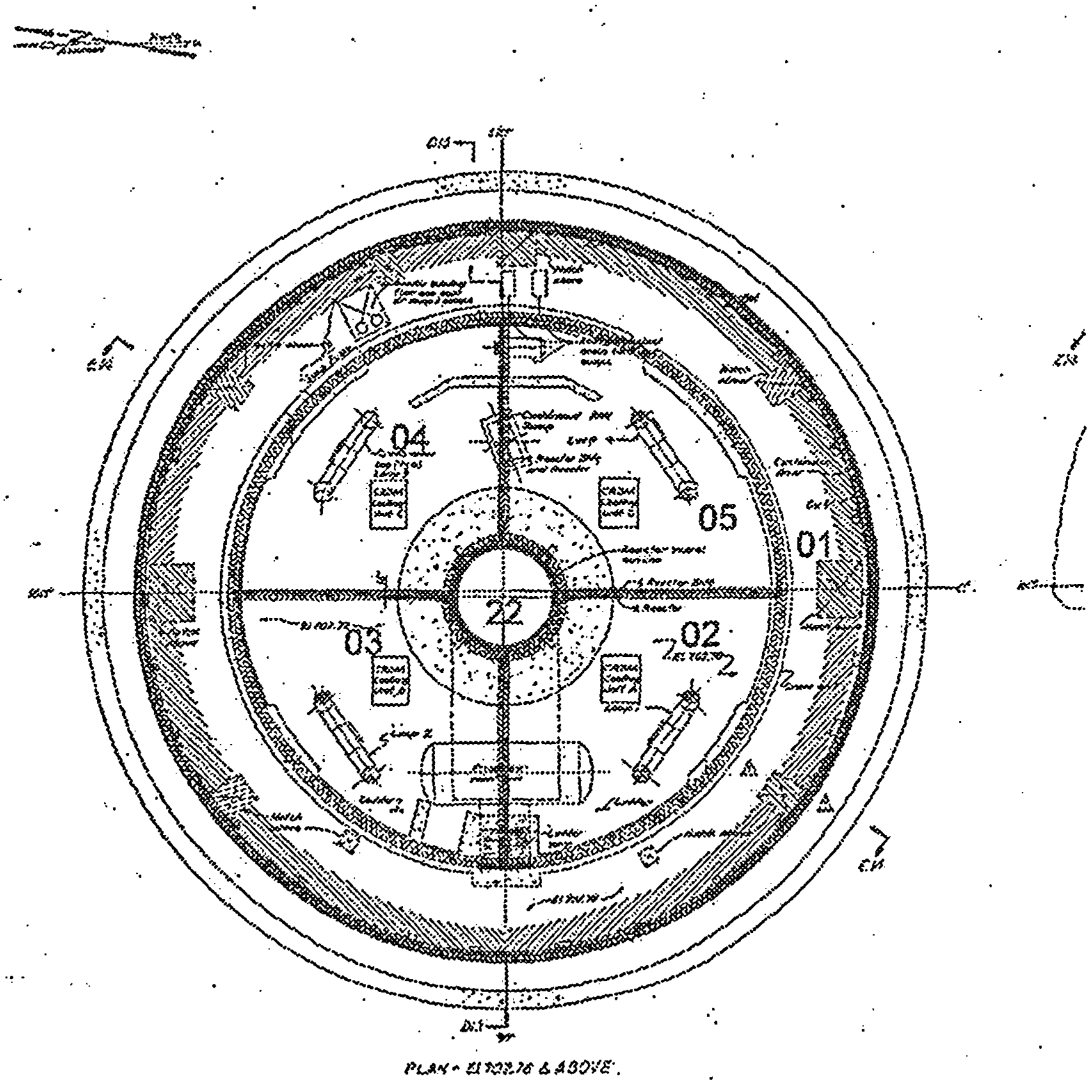
WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS														
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSUL. TYPE	INSULATION THICKNESS (IN)	INSUL. VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS	PACKET LETTER
N/A	INSTRUMENT ROOM	716'	24	EXCESS LETDOWN HEAT EXCHANGER	18.75	SEE CALC	RMI	SEE CALC	4.00	S.S.	STD	N/A	25" OD INSULATION	J
N/A	INSTRUMENT ROOM	716'	24	EXCESS LETDOWN	1.32	6.00	RMI	2.34	1.12	S.S.	STD	N/A	6" OD INSULATION	K
N/A	INSTRUMENT ROOM	716'	24	EXCESS LETDOWN	1.32	1.32	RMI	2.84	0.34	S.S.	STD	N/A	7" OD INSULATION	K
N/A	INSTRUMENT ROOM	716'	24	EXCESS LETDOWN	1.32	0.84	RMI	4.34	0.45	S.S.	STD	N/A	10" OD INSULATION	K

ATTACHMENT I:

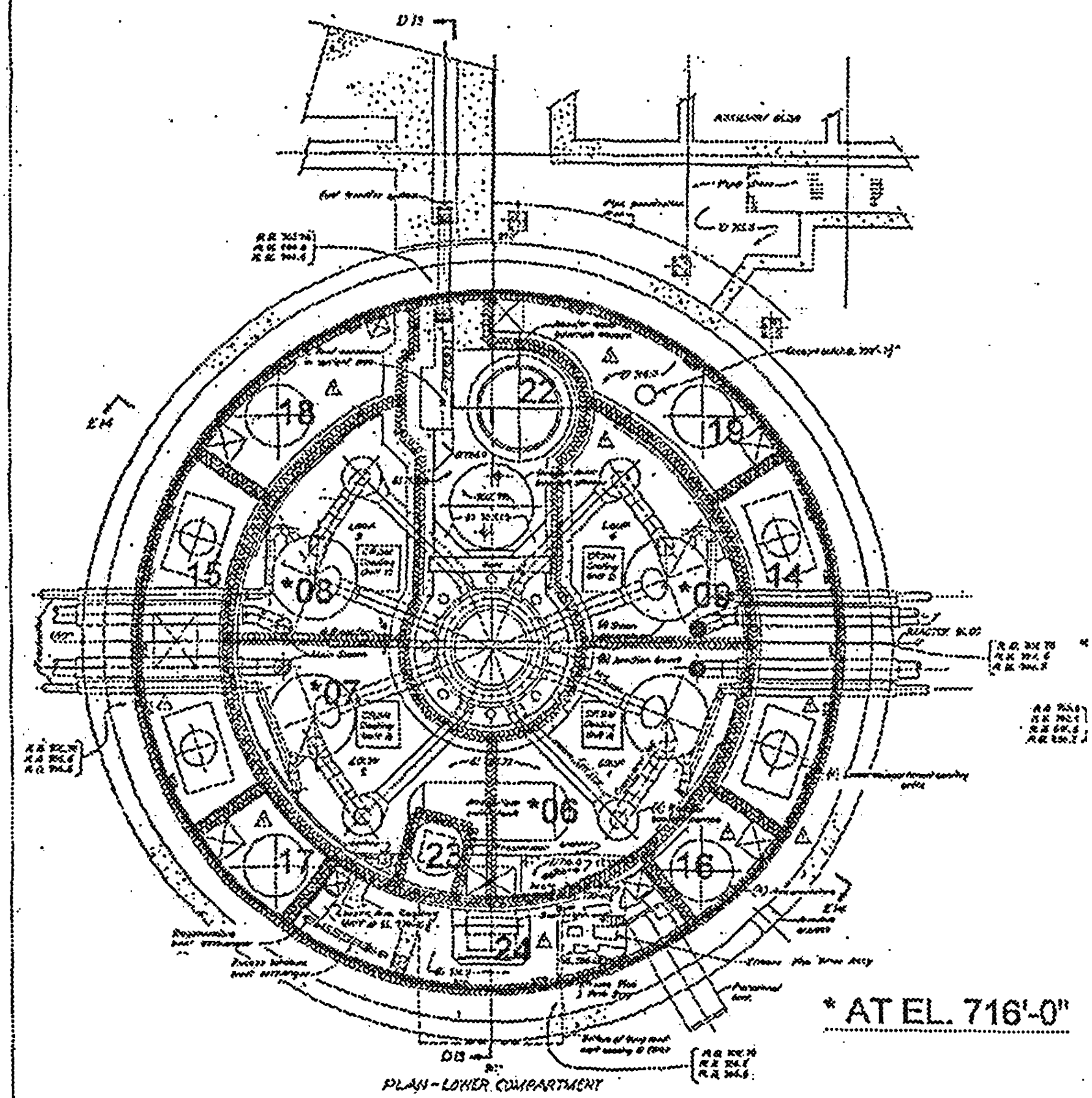
AREA MAP FOR INSULATION WALKDOWN PACKAGES

WALKDOWN PACKAGE LOCATIONS

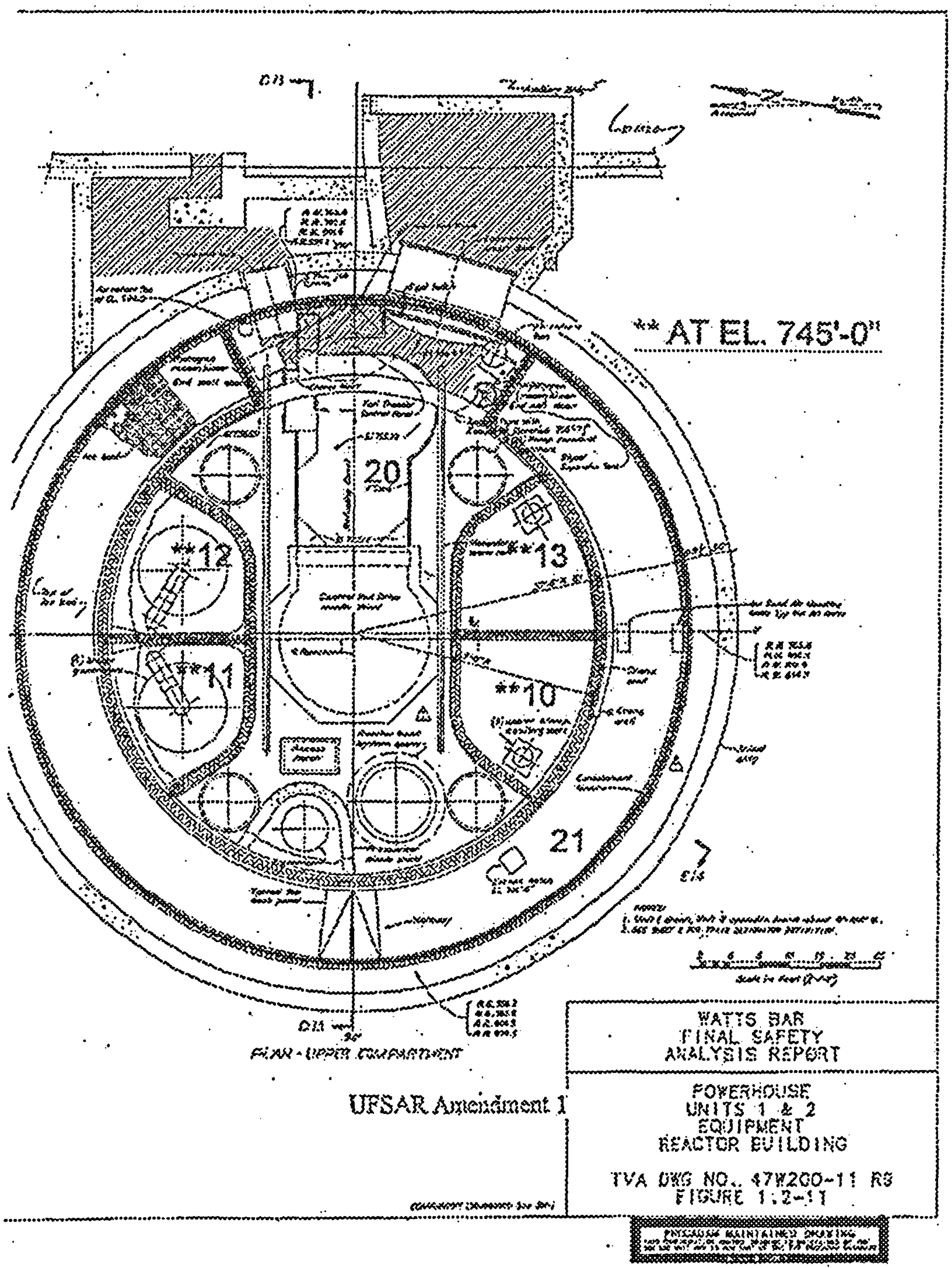
AREA	ELEVATION	ROOM
01	702'	RACEWAY
02	702'	LOOP 1 (AZ 0° TO 90°)
03	702'	LOOP 2 (AZ 90° TO 180°)
04	702'	LOOP 3 (AZ 180° TO 270°)
05	702'	LOOP 4 (AZ 270° TO 0°)
06	716'	LOOP 1 (AZ 0° TO 90°)
07	716'	LOOP 2 (AZ 90° TO 180°)
08	716'	LOOP 3 (AZ 180° TO 270°)
09	716'	LOOP 4 (AZ 270° TO 0°)
10	745'	LOOP 1 (AZ 0° TO 90°)
11	745'	LOOP 2 (AZ 90° TO 180°)
12	745'	LOOP 3 (AZ 180° TO 270°)
13	745'	LOOP 4 (AZ 270° TO 0°)
14	716'	FAN ROOM 1
15	716'	FAN ROOM 2
16	716'	ACCUMULATOR ROOM 1
17	716'	ACCUMULATOR ROOM 2
18	716'	ACCUMULATOR ROOM 3
19	716'	ACCUMULATOR ROOM 4
20	757'	UPPER CONTAINMENT
21	803'	ICE CONDENSER
22	713'	REACTOR VESSEL
23	729'	PRESSURIZER
24	716'	INSTRUMENT ROOM/REGEN. HEAT EXCHANGER RM



Ref TVA Dwg No. 47W200-12, R9



Ref: TVA Dwg # 47W200-11, R9


** AT EL. 745'-0"
20
**12
**13
**11
**10
21
PLAN - UPPER COMPARTMENT
UFSAR Amendment 1
WATTS BAR
FINAL SAFETY
ANALYSIS REPORT
POWERHOUSE
UNITS 1 & 2
EQUIPMENT
REACTOR BUILDING
TVA DWG NO. 47W200-11 R3
FIGURE 1.2-11

ATTACHMENT J:

WALKDOWN PACKAGES

Originator: Glenn Walls 8-20-04
Glenn Walls
Date

Checker: Michael Caldwell 8/20/04
Michael Caldwell
Date

Watts Bar Unit 1 Walk Down Packages

BINDER LOCATION	PACKAGE NUMBER	TOTAL PAGES
1	WB1-DWD-001A	7
1	WB1-DWD-001B	7
1	WB1-DWD-001C	13
1	WB1-DWD-001D	27
1	WB1-DWD-001E	6
1	WB1-DWD-001F	7
1	WB1-DWD-001G	6
1	WB1-DWD-001H	Not Used
1	WB1-DWD-001I	Not Used
1	WB1-DWD-001J	3
1	WB1-DWD-001K	10
1	WB1-DWD-001L	5
1	WB1-DWD-001M	5
1	WB1-DWD-002A	3
1	WB1-DWD-002B	6
1	WB1-DWD-002C	4
1	WB1-DWD-002D	12
1	WB1-DWD-002E	3
1	WB1-DWD-003A	4
1	WB1-DWD-003B	4
1	WB1-DWD-003C	4
1	WB1-DWD-003D	3
1	WB1-DWD-004A	3
1	WB1-DWD-004B	4
1	WB1-DWD-004C	5
1	WB1-DWD-004D	4
1	WB1-DWD-004E	3
1	WB1-DWD-005A	3
1	WB1-DWD-005B	10
1	WB1-DWD-005C	4
1	WB1-DWD-005D	8
1	WB1-DWD-005E	14
1	WB1-DWD-005F	7
1	WB1-DWD-005G	3
1	WB1-DWD-006A	9
1	WB1-DWD-006B	4
1	WB1-DWD-006C	4
1	WB1-DWD-006D	20
1	WB1-DWD-006E	10
1	WB1-DWD-006F	4
1	WB1-DWD-006G	3
1	WB1-DWD-006H	3
1	WB1-DWD-006I	Not Used
1	WB1-DWD-006J	4
1	WB1-DWD-006K	4
1	WB1-DWD-006L	4

Watts Bar Unit 1 Walk Down Packages

BINDER LOCATION	PACKAGE NUMBER	TOTAL PAGES
1	WB1-DWD-006M	3
1	WB1-DWD-006N	4
1	WB1-DWD-006O	Not Used
1	WB1-DWD-006P	7
1	WB1-DWD-006Q	4
1	WB1-DWD-006R	4
2	WB1-DWD-007A	11
2	WB1-DWD-007B	4
2	WB1-DWD-007C	5
2	WB1-DWD-007D	4
2	WB1-DWD-007E	4
2	WB1-DWD-007F	6
2	WB1-DWD-007G	5
2	WB1-DWD-007H	3
2	WB1-DWD-007I	Not Used
2	WB1-DWD-007J	4
2	WB1-DWD-007K	4
2	WB1-DWD-007L	3
2	WB1-DWD-007M	4
2	WB1-DWD-007N	5
2	WB1-DWD-007O	Not Used
2	WB1-DWD-007P	5
2	WB1-DWD-007Q	4
2	WB1-DWD-007R	6
2	WB1-DWD-007S	6
2	WB1-DWD-008A	10
2	WB1-DWD-008B	4
2	WB1-DWD-008C	5
2	WB1-DWD-008D	4
2	WB1-DWD-008E	5
2	WB1-DWD-008F	4
2	WB1-DWD-008G	4
2	WB1-DWD-008H	4
2	WB1-DWD-008I	Not Used
2	WB1-DWD-008J	3
2	WB1-DWD-008K	6
2	WB1-DWD-008L	6
2	WB1-DWD-009A	9
2	WB1-DWD-009B	4
2	WB1-DWD-009C	3
2	WB1-DWD-009D	3
2	WB1-DWD-009E	4
2	WB1-DWD-009F	3
2	WB1-DWD-009G	4
2	WB1-DWD-009H	12
2	WB1-DWD-009I	Not Used
2	WB1-DWD-009J	4

Watts Bar Unit 1 Walk Down Packages

BINDER LOCATION	PACKAGE NUMBER	TOTAL PAGES
2	WB1-DWD-009K	6
2	WB1-DWD-009L	5
2	WB1-DWD-0010A	6
2	WB1-DWD-0010B	9
2	WB1-DWD-0010C	4
2	WB1-DWD-0010D	7
2	WB1-DWD-0010E	8
2	WB1-DWD-0011A	8
2	WB1-DWD-0011B	10
2	WB1-DWD-0011C	6
2	WB1-DWD-0011D	Not Used
2	WB1-DWD-0011E	6
2	WB1-DWD-0012A	7
2	WB1-DWD-0012B	9
2	WB1-DWD-0012C	6
2	WB1-DWD-0012D	4
2	WB1-DWD-0013A	5
2	WB1-DWD-0013B	6
2	WB1-DWD-0013C	9
2	WB1-DWD-0013D	5
2	WB1-DWD-0013E	5
2	WB1-DWD-0013F	4
3	WB1-DWD-0014A	5
3	WB1-DWD-0014B	5
3	WB1-DWD-0014C	5
3	WB1-DWD-0014D	5
3	WB1-DWD-0014E	6
3	WB1-DWD-0014F	12
3	WB1-DWD-0014G	4
3	WB1-DWD-0014H	10
3	WB1-DWD-0014I	Not Used
3	WB1-DWD-0014J	4
3	WB1-DWD-0014K	5
3	WB1-DWD-0014L	3
3	WB1-DWD-0014M	3
3	WB1-DWD-0014N	3
3	WB1-DWD-0014O	Not Used
3	WB1-DWD-0014P	6
3	WB1-DWD-0014Q	4
3	WB1-DWD-0014R	3
3	WB1-DWD-0015A	4
3	WB1-DWD-0015B	3
3	WB1-DWD-0015C	5
3	WB1-DWD-0015D	5
3	WB1-DWD-0015E	4
3	WB1-DWD-0015F	4

Watts Bar Unit 1 Walk Down Packages

BINDER LOCATION	PACKAGE NUMBER	TOTAL PAGES
3	WB1-DWD-0016A	8
3	WB1-DWD-0016B	6
3	WB1-DWD-0016C	10
3	WB1-DWD-0016D	3
3	WB1-DWD-0016E	3
3	WB1-DWD-0016F	3
3	WB1-DWD-0016G	3
3	WB1-DWD-0017A	4
3	WB1-DWD-0017B	4
3	WB1-DWD-0017C	3
3	WB1-DWD-0017D	4
3	WB1-DWD-0017E	4
3	WB1-DWD-017F	4
3	WB1-DWD-0018A	4
3	WB1-DWD-0019A	13
3	WB1-DWD-0019B	11
3	WB1-DWD-0019C	9
3	WB1-DWD-0019D	8
3	WB1-DWD-0019E	4
3	WB1-DWD-0019F	5
3	WB1-DWD-0019G	3
3	WB1-DWD-0019H	4
3	WB1-DWD-0019I	Not Used
3	WB1-DWD-0019J	4
3	WB1-DWD-0019K	4
3	WB1-DWD-0019L	4
4	WB1-DWD-0020A	12
4	WB1-DWD-0021A	3
4	WB1-DWD-0021B	11
4	WB1-DWD-0021C	5
4	WB1-DWD-0021D	6
4	WB1-DWD-0021E	29
4	WB1-DWD-0021F	5
4	WB1-DWD-0021G	7
4	WB1-DWD-0022A	3
4	WB1-DWD-0023A	9
4	WB1-DWD-0023B	5
4	WB1-DWD-0023C	3
4	WB1-DWD-0023D	3

Watts Bar Unit 1 Walk Down Packages

BINDER LOCATION	PACKAGE NUMBER	TOTAL PAGES
4	WB1-DWD-0024A	5
4	WB1-DWD-0024B	3
4	WB1-DWD-0024C	5
4	WB1-DWD-0024D	6
4	WB1-DWD-0024E	3
4	WB1-DWD-0024F	3
4	WB1-DWD-0024G	4
4	WB1-DWD-0024H	10
4	WB1-DWD-0024I	Not Used
4	WB1-DWD-0024J	3
4	WB1-DWD-0024K	3

ATTACHMENT J:

WALKDOWN PACKAGES

BINDER 1

AREAS 1 - 6

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001A SHEET 1 OF 7

DATE:	10/10/2003	AREA:	RACEWAY	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	48N401 R10	
Tools:	SPECIFICATION N3M-936, REV 4	
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify installation of insulation as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any undocumented insulation.
3	Inspect and determine longitudinal seam location and band spacing if necessary.
4	Document any irregularities of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any undocumented fibrous insulation (e.g., within rupture restraints).
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal).
7	Inspect the area for any weak components that could be dislodged by jet and that could be transported to sump.
8	Inspect any equipment insulation in the area.
9	Inspect and document the general cleanliness of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	SEALANT APPLIED ALL AROUND CONTAINMENT VESSEL INSULATION STAINLESS LINER

Prepared By: FRANK C YAO *F C Y* Date: 10/10/03

Checked By: MIKE CALDWELL *Michael Caldwell* Date: 10/10/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001A SHEET 2 OF 7

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	RACEWAY	702	1	SEALANT AROUND STAINLESS CONTAINMENT WALL	NA	SEE CALC	SILICON/RTV	SEE CALC	0 327	NA	NA	NA	SEALANT BET SHEET METAL AND STEEL CONTAINMENT
N/A	RACEWAY	702	1	BEHIND PANEL	NA	SEE CALC	FOAMGLASS	SEE CALC	260.73	NA	NA	NA	

CALCULATION

SEALANT CROSS SECTION = 0.25"X0.25" RIGHT ANGLE SHAPE
THIS APPLIED ALL AROUND CONTAINMENT VESSEL

R IN FT	PI	PERIMETER(FT)	IN CU IN(0.25X0.25X0.5)	TOTAL CU IN	TOTAL CU FT	3 RINGS TOTAL
57.5	3.1416	361.28	0.03125	135	0.078	0.235

3' VERTICAL LENGTH AT APPROX. 4.5' SPACING, NO.OF VERTICALS = 36.28/4.5 = 81

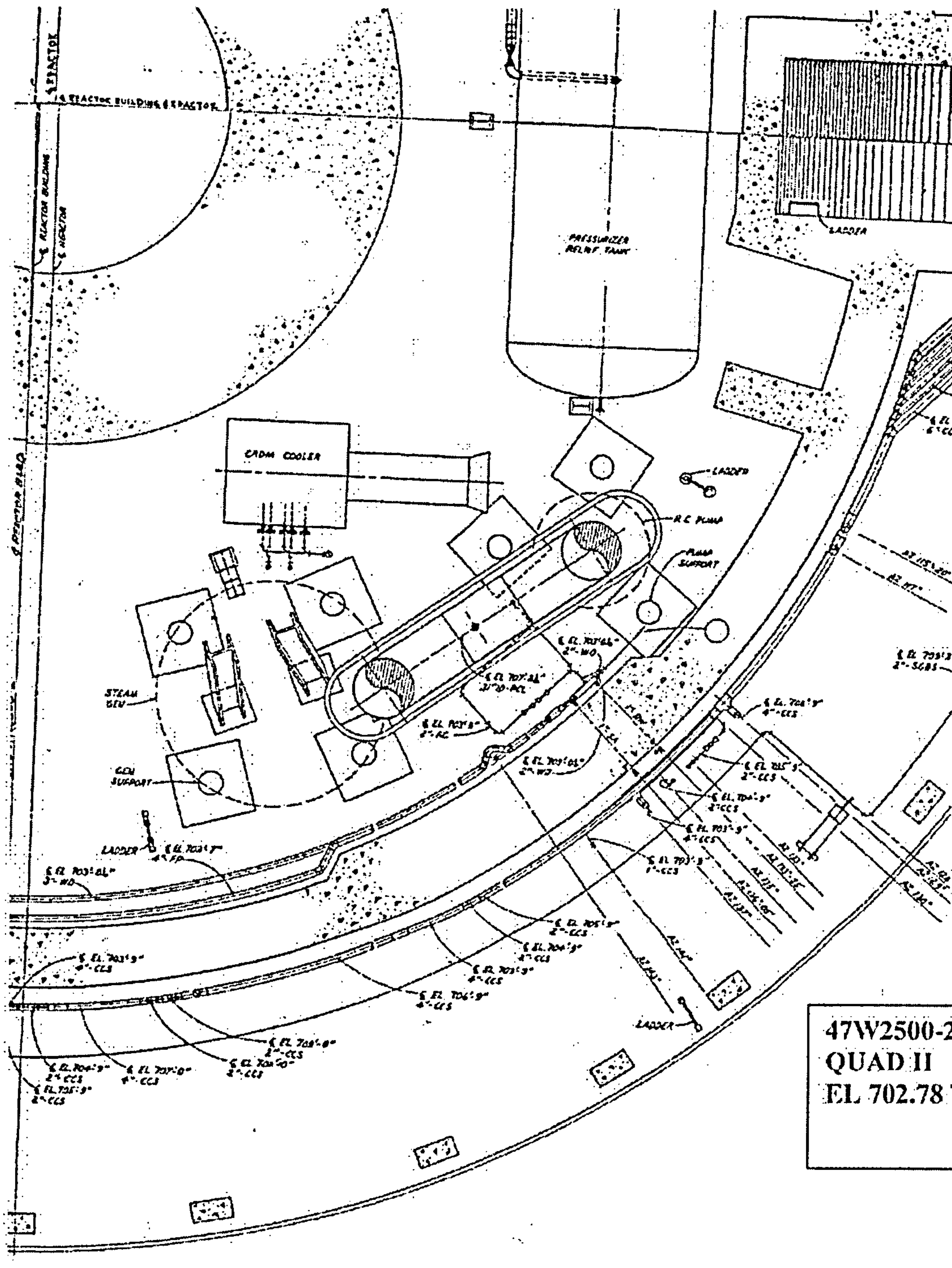
LENGTH/EA	NO. OF VERT	TOTAL LENGTH	CU IN(0.25X0.25X0.5)/IN	TOTAL CU IN	TOTAL CU FT
3	81	243	0.03125	91	0.053

SILICON/RTV KEYWAY TOP TO BOTTOM FLEX JOINT, TWO BEADS BOTH SIDES

HEIGHT(FT)	NO OF BEAD	SIDES	TOTAL LENGTH	CU IN(0.25X0.25X0.5)/IN	TOTAL CU IN	TOTAL CU FT
45	2	2	180	0.03125	68	0.039

TOTAL SILICON/RTV =0.235+0.053+0.012= 0.327 CU FT

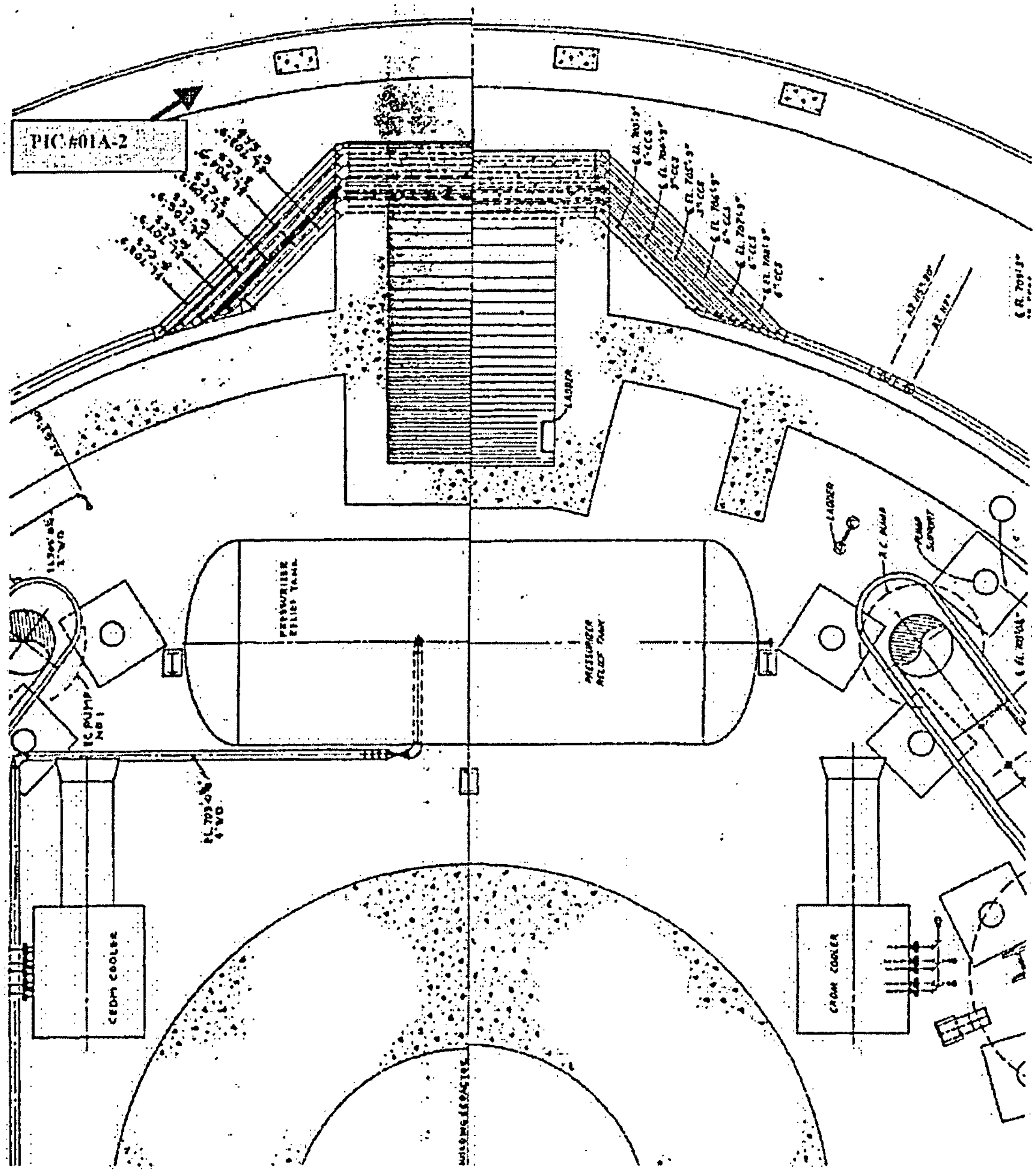
VESSEL INSULATION (FOAMGLASS 2" THICK), APPROX 4 '-4" IN HEIGHT				
THICK(IN)	PERIMETER(F	HEIGHT (FT)	VOLUME (CU IN)	VOLUME (CU FT)
2	361.28	4.33	450535.6	260.73

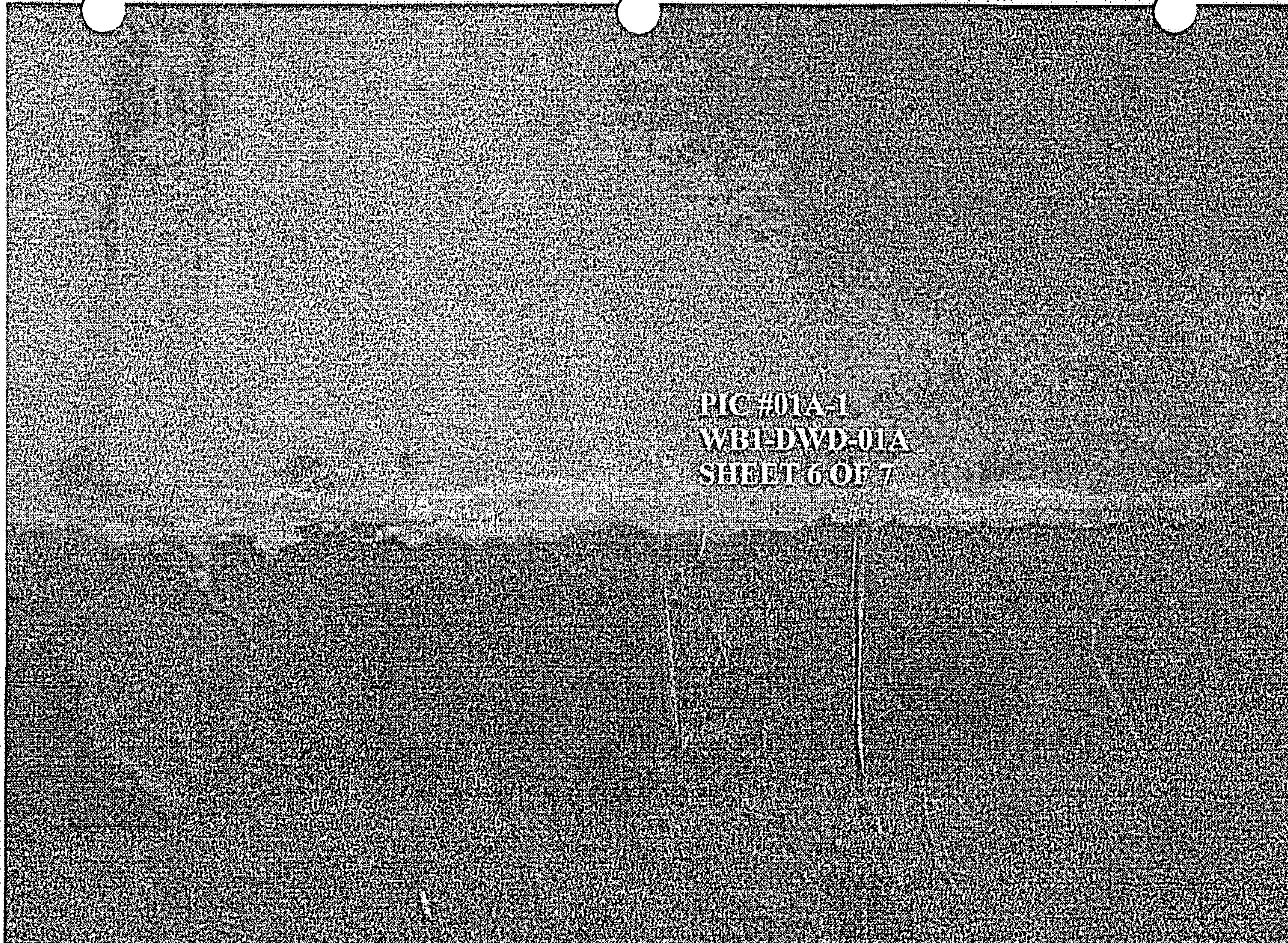


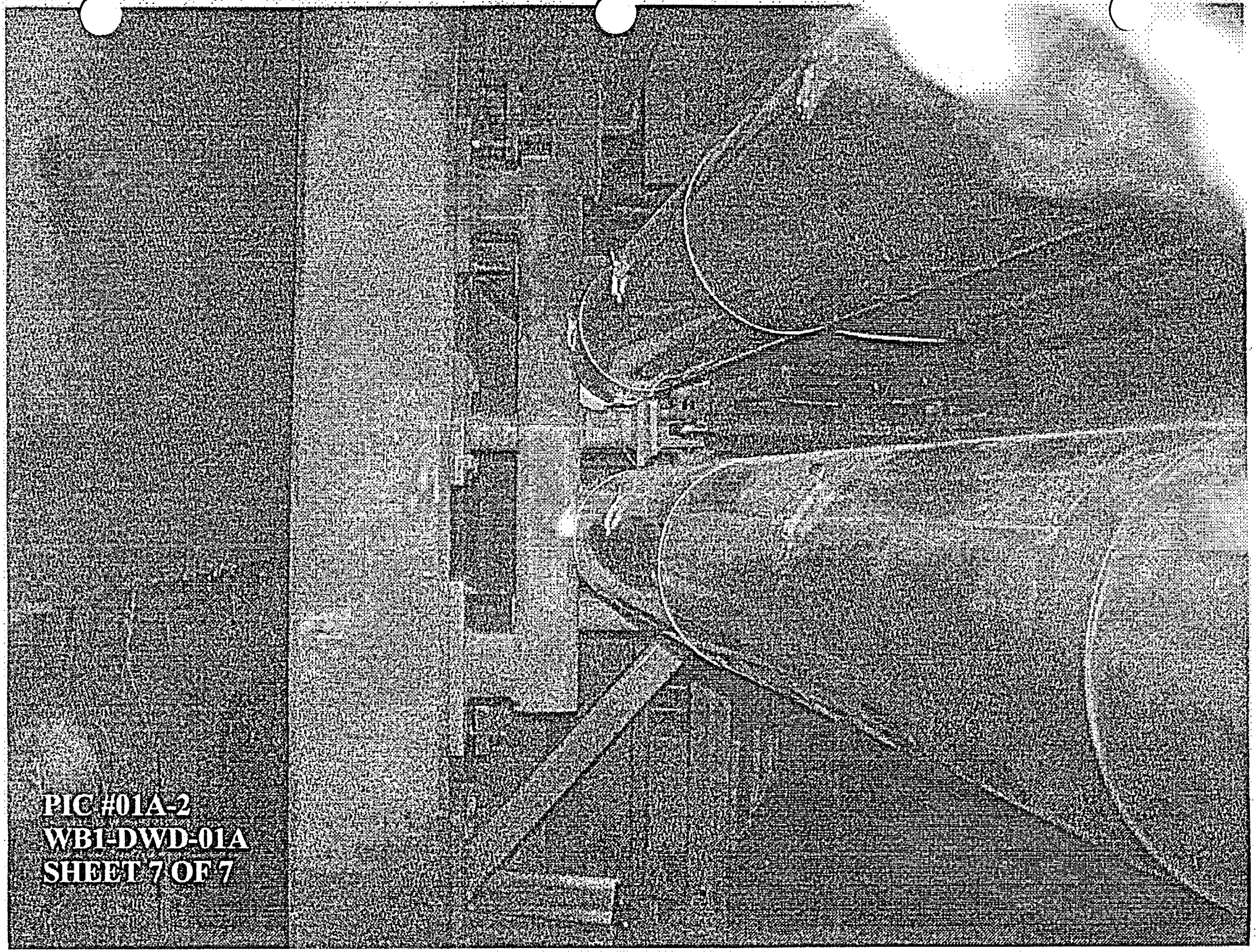
47W2500-2
QUAD II
EL 702.78 TO 710.0

47W2500-1
QUAD II
EL 702.78 TO 710.0

47W2500-2
QUAD II
EL 702.78 TO 710.0




PIC #01A-1
WB1-DWD-01A
SHEET 6 OF 7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WB1-DWD-01A
SHEET 7 OF 7

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001B SHEET 1 OF 7

DATE:	10/10/2003	AREA:	Raceway	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	48N401 R10	
Tools:		
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify **installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	SEALANT APPLIED ALL AROUND COVERS.

Prepared By: FRANK C YAO *[signature]* Date: 10/10/03

Checked By: MIKE CALDWELL *[signature]* Date: 10/10/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001B SHEET 2 OF 7

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	RACEWAY	702	1	SEALANT AROUND COVERS	NA	NA	NA	NA	NA	NA	NA	NA	SEALANT APPLIED ALL AROUND COVER

CALCULATION

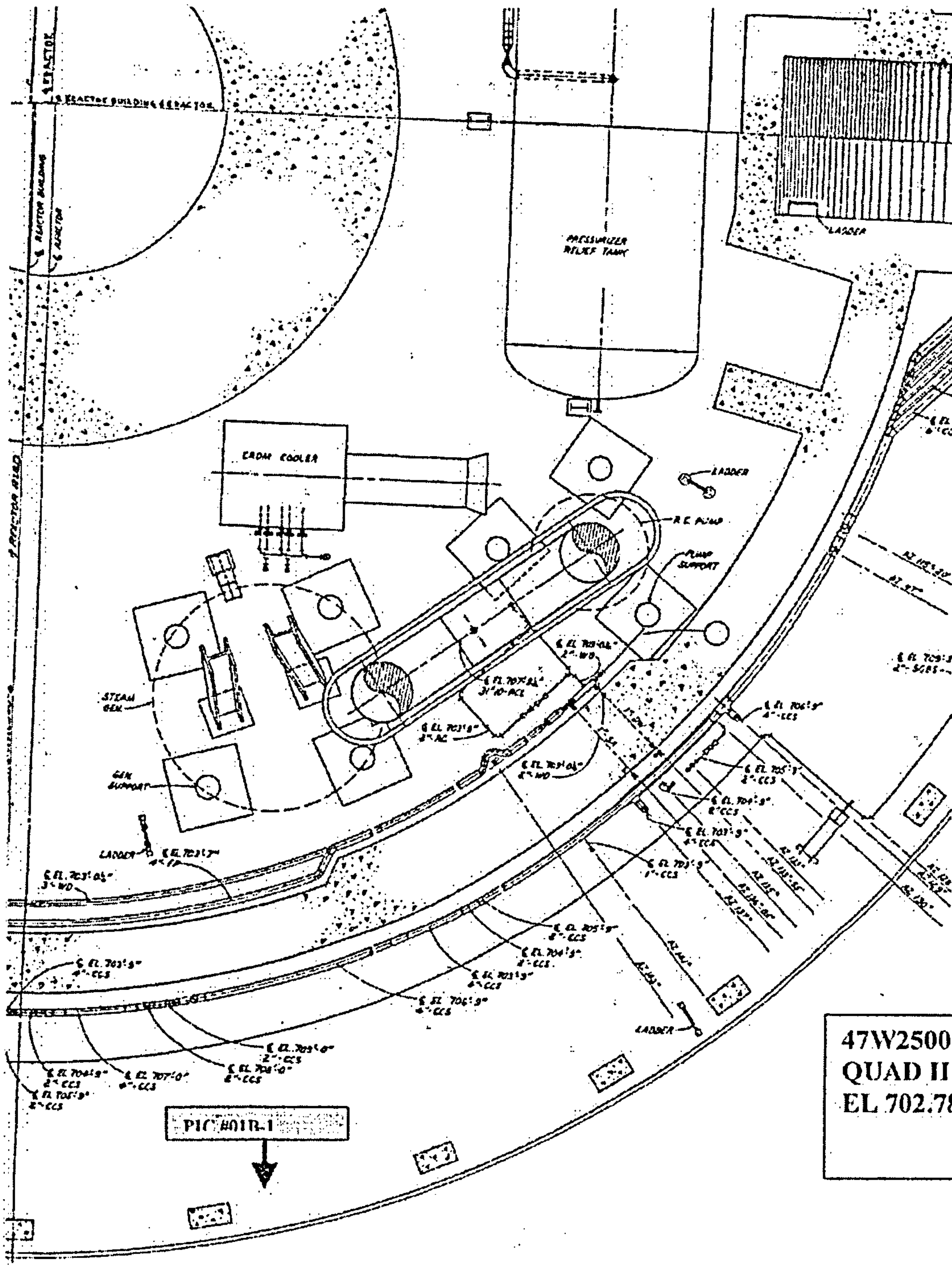
SEALANT CROSS SECTION = 0.25"X0.25" RIGHT ANGLE SHAPE
THIS APPLPIED ALL AROUND SQUARE COVERPLATES
NUMBER OF COVERS= 15

PERIMTER = NO. OF PLATESX4XLENGTH/SIDE=

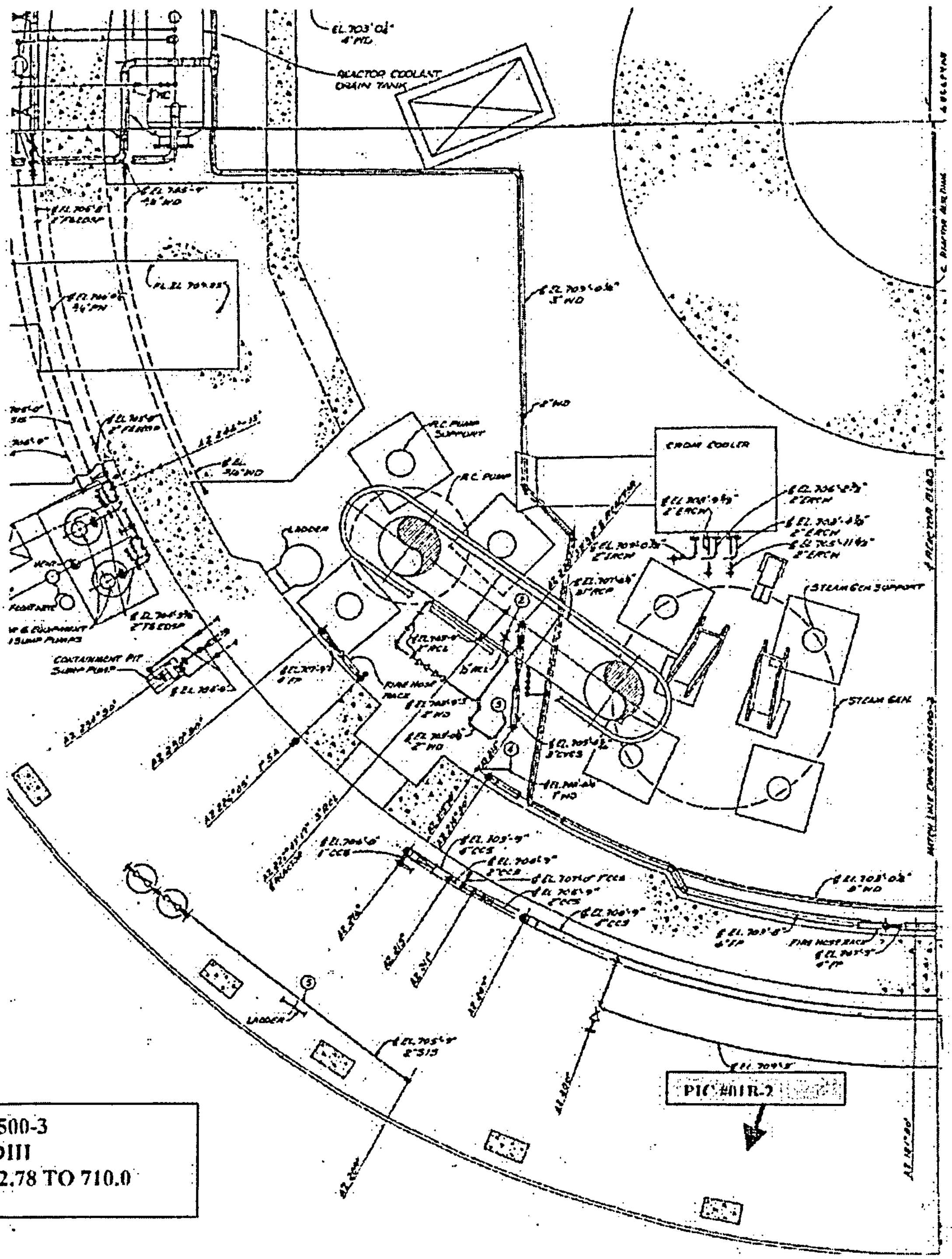
(IN INCH)	IN FT
1080	90

LENGTH(FT)	IN CU IN(0.25X0.25X0.5)	TOTAL CU (IN)	IN CUBIC FT
90.00	0.03125	34	0.0195

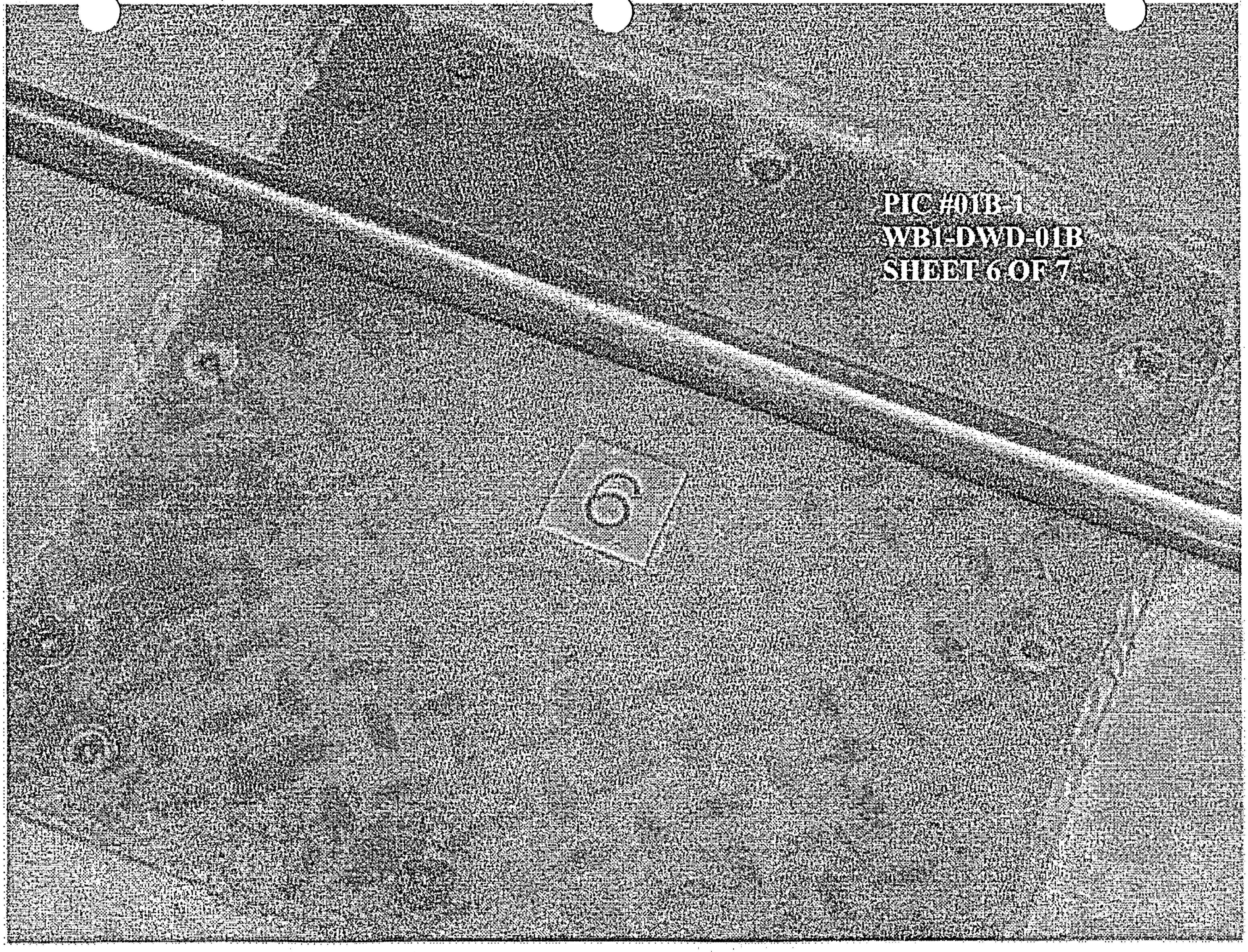
FOR INFORMATION ONLY



47W2500-2
QUAD II
EL 702.78 TO 710.0



47W2500-3
QUADIII
EL 702.78 TO 710.0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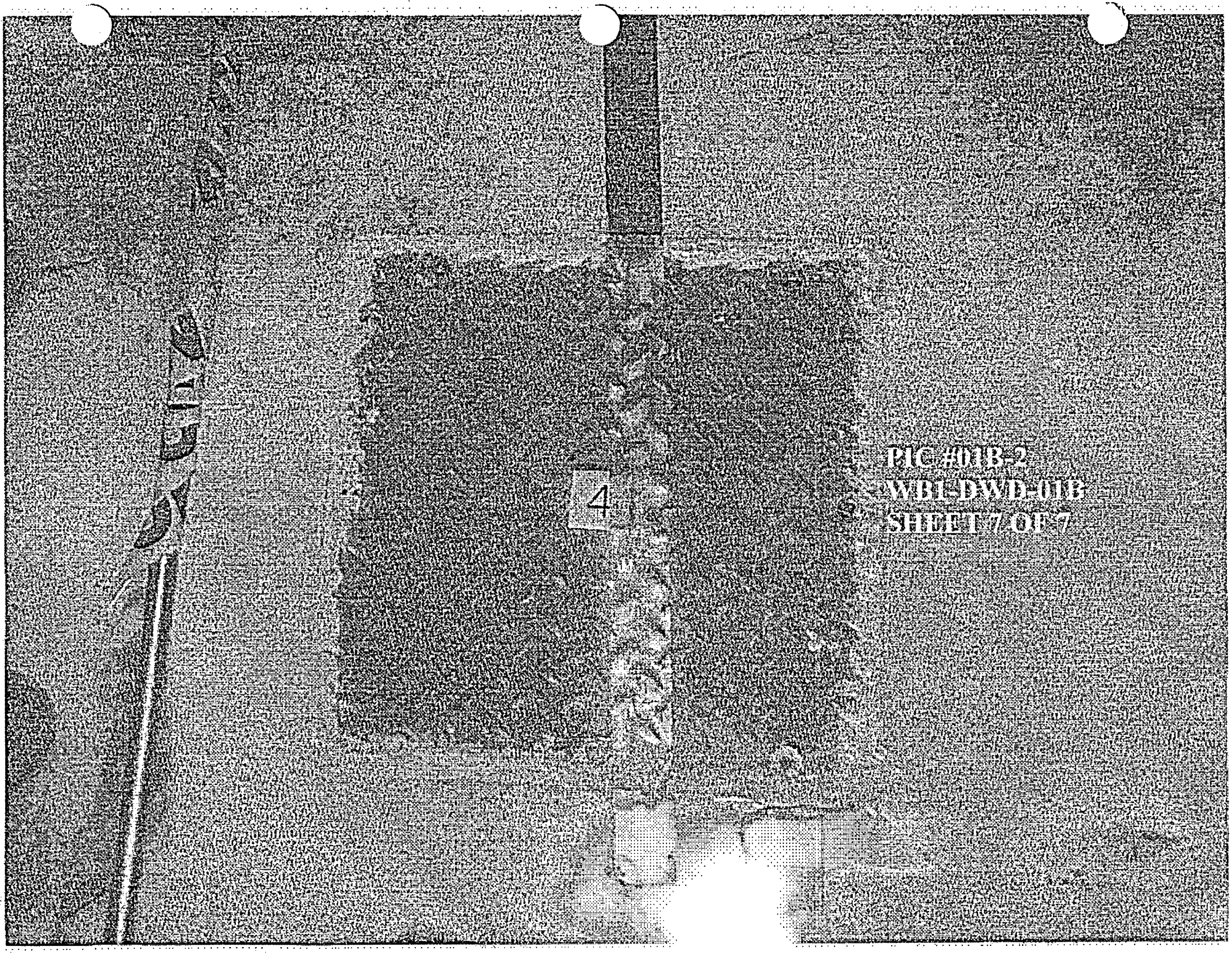
WB1-DWD-01B
SHEET 6 OF 7
6



4
PIC #01B-2
WB1-DWD-01B
SHEET 7 OF 7

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001C SHEET 1 OF 13

DATE:	10/23/2003	AREA:	Raceway	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	47W2500-1	
Tools:	47W2500-2	
Drawings	47W2500-3	
Flashlights	47W2500-4	
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location and band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	MIRROR REFLECTIVE INSULATIONS

Prepared By: FRANK C YAO Date: 10/23/03

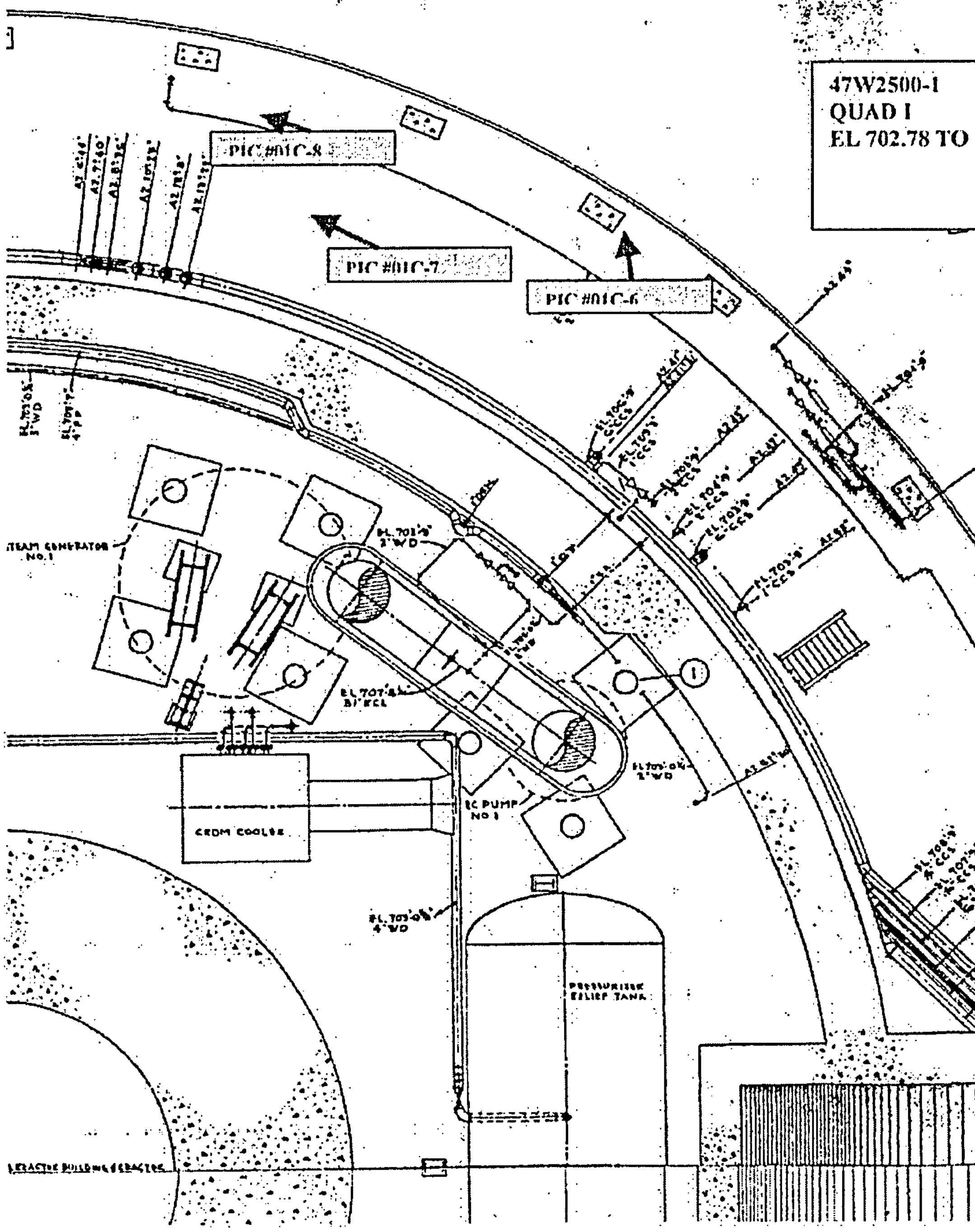
Checked By: MIKE CALDWELL Date: 10/23/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001C SHEET 2 OF 13

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	RACEWAY	702	1	MIRROR REFLECTIVE INSULATION	NA	NA	NA	SEE CALC WB1-DWD-001G	NA	NA	NA	NA	MRI (LETDOWN LINES)

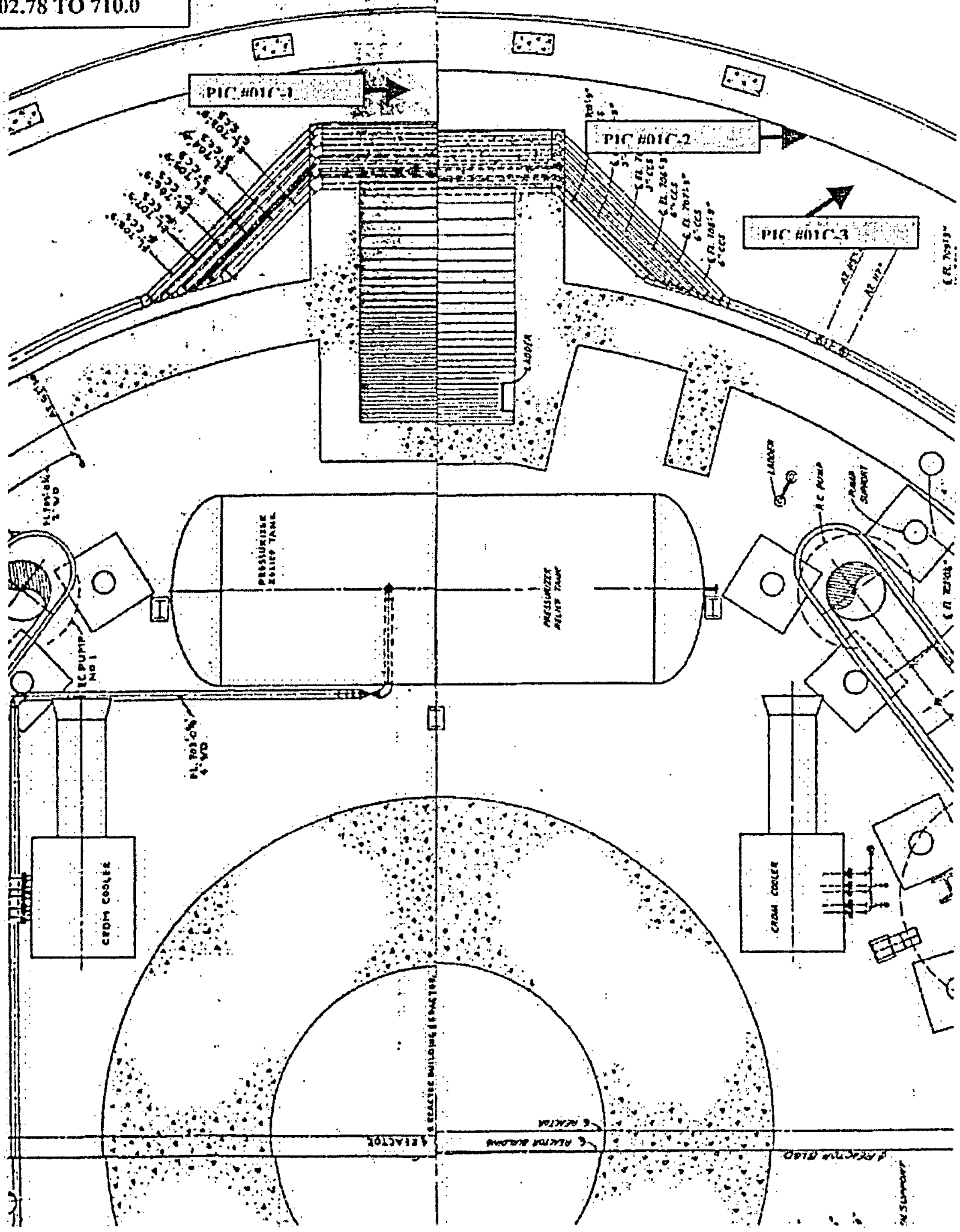
47W2500-1
QUAD I
EL 702.78 TO 710.0

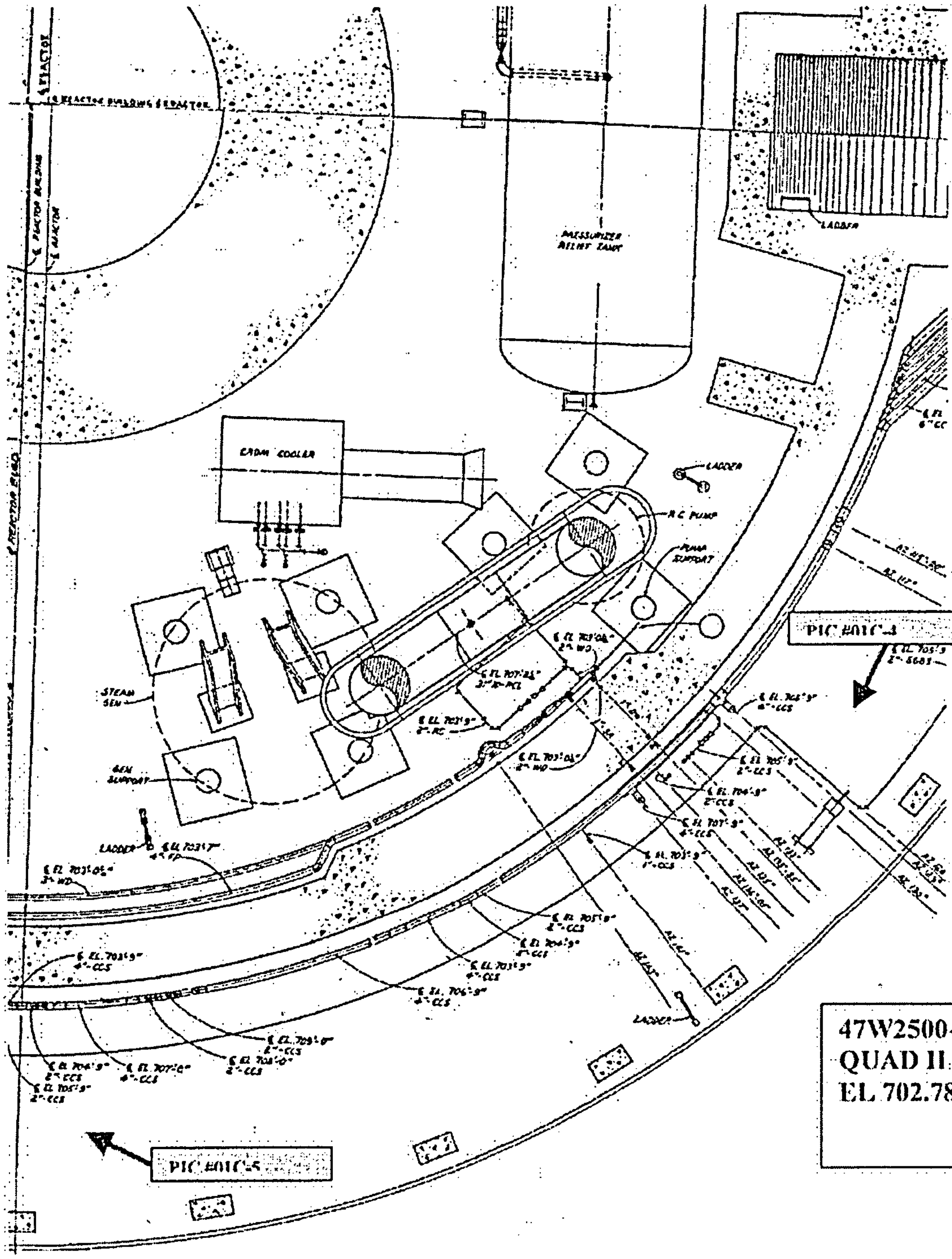


47W2500-2
QUAD II
EL 702.78 TO 710.0

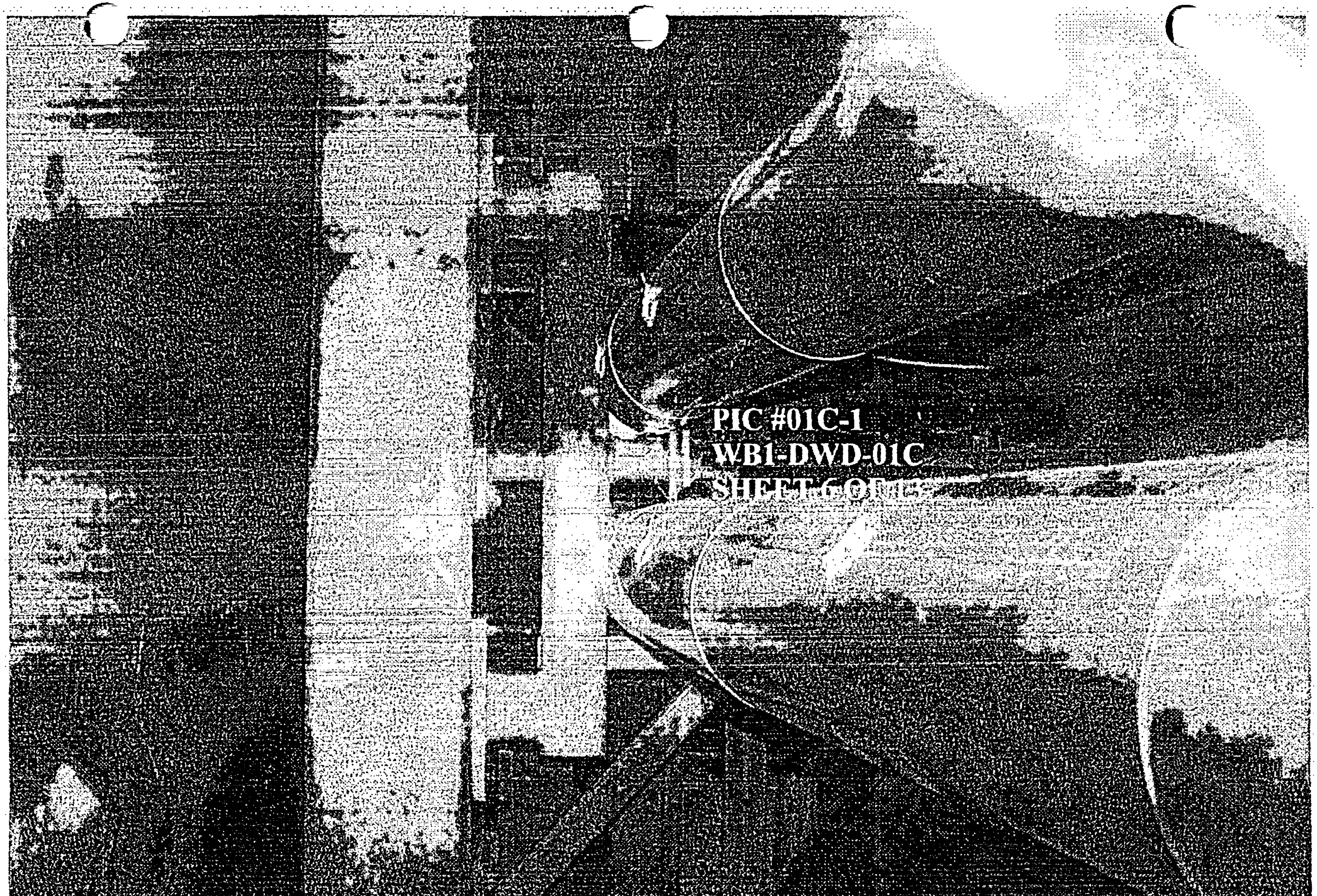
47W2500-1
QUAD I
EL 702.78 TO 710.0

WB1-DWD-01C





47W2500-2
QUAD II
EL 702.78 TO 710.0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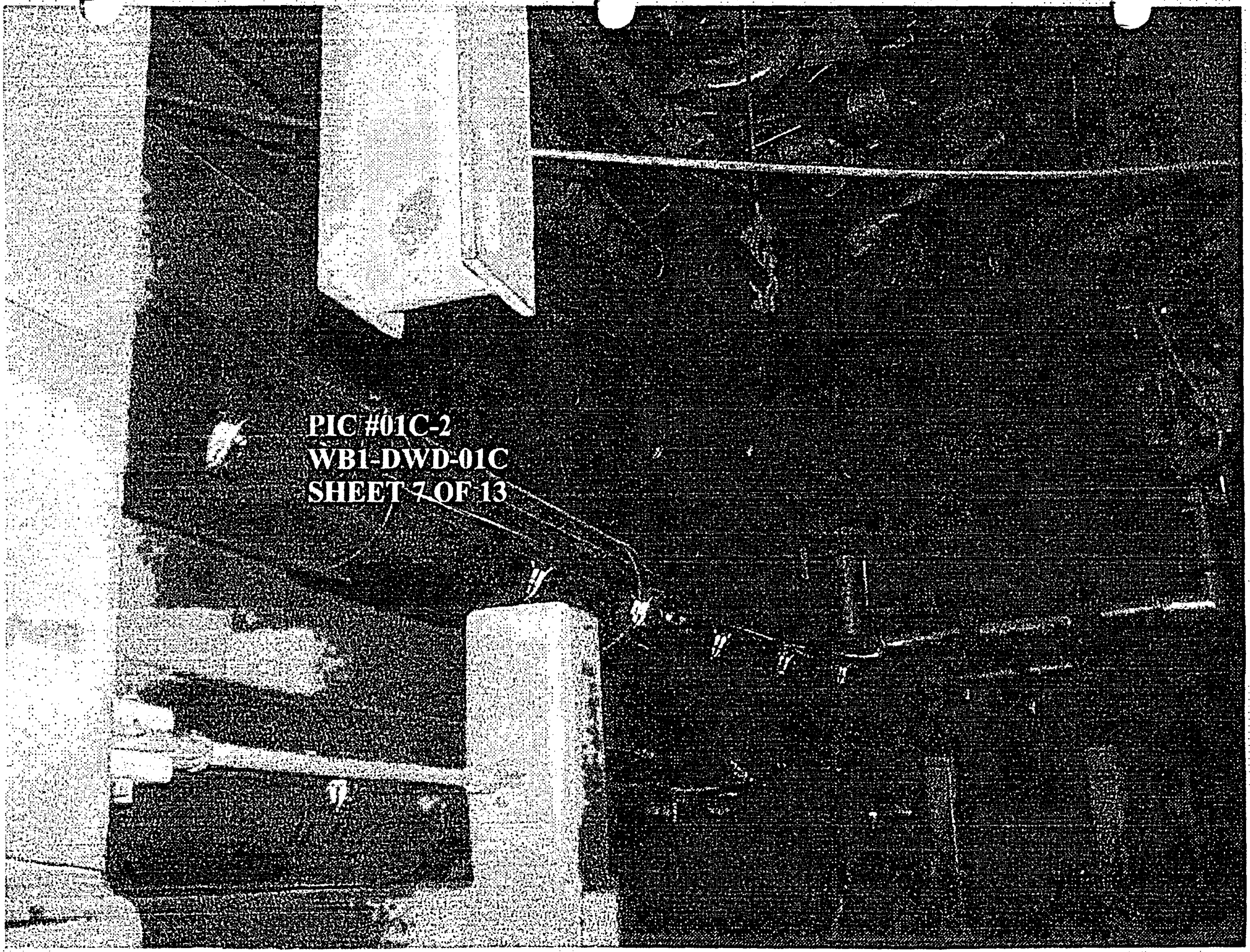
WB1-DWD-01C
SHEET 6 OF 13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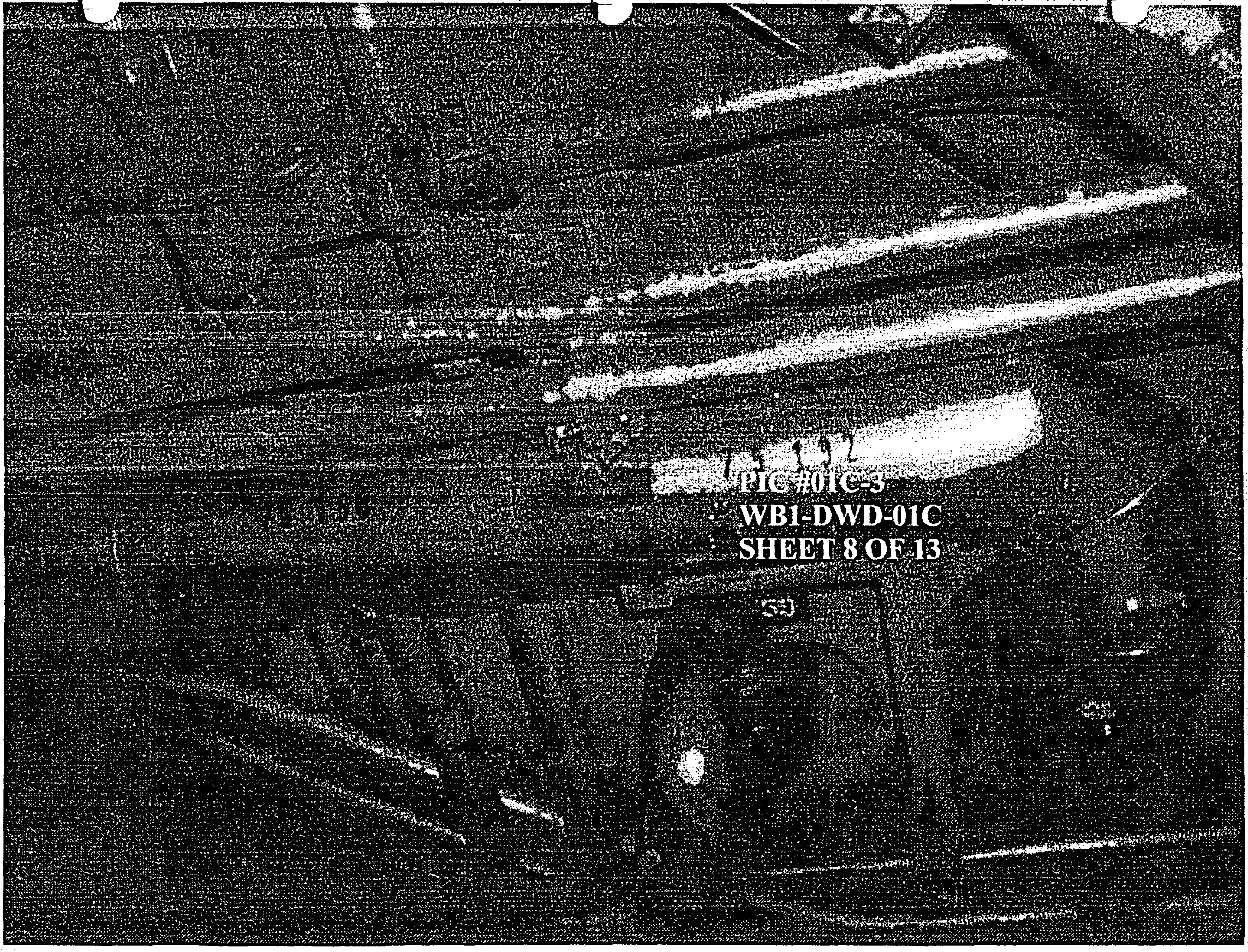
WB1-DWD-01C
SHEET 7 OF 13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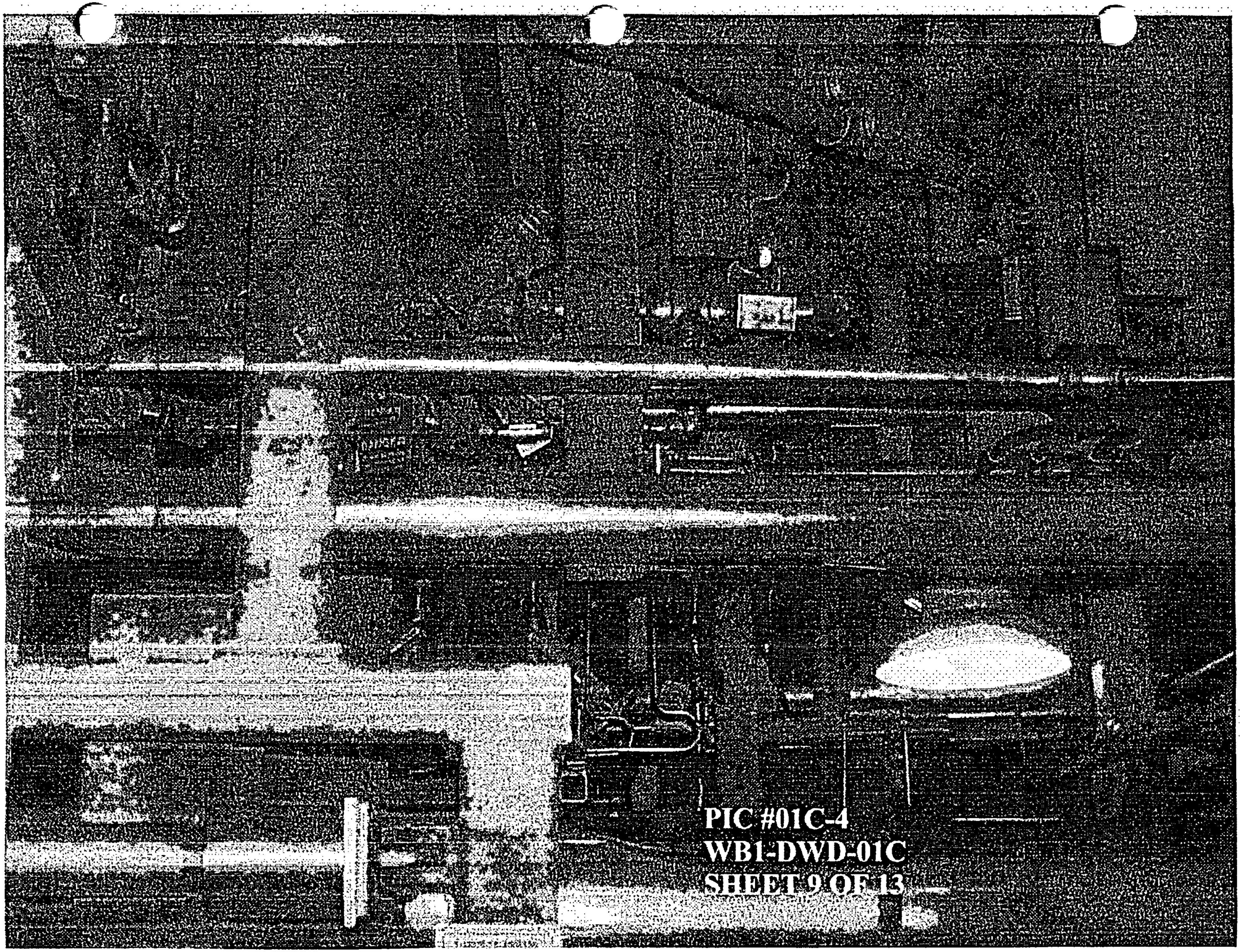
WB1-DWD-01C
SHEET 8 OF 13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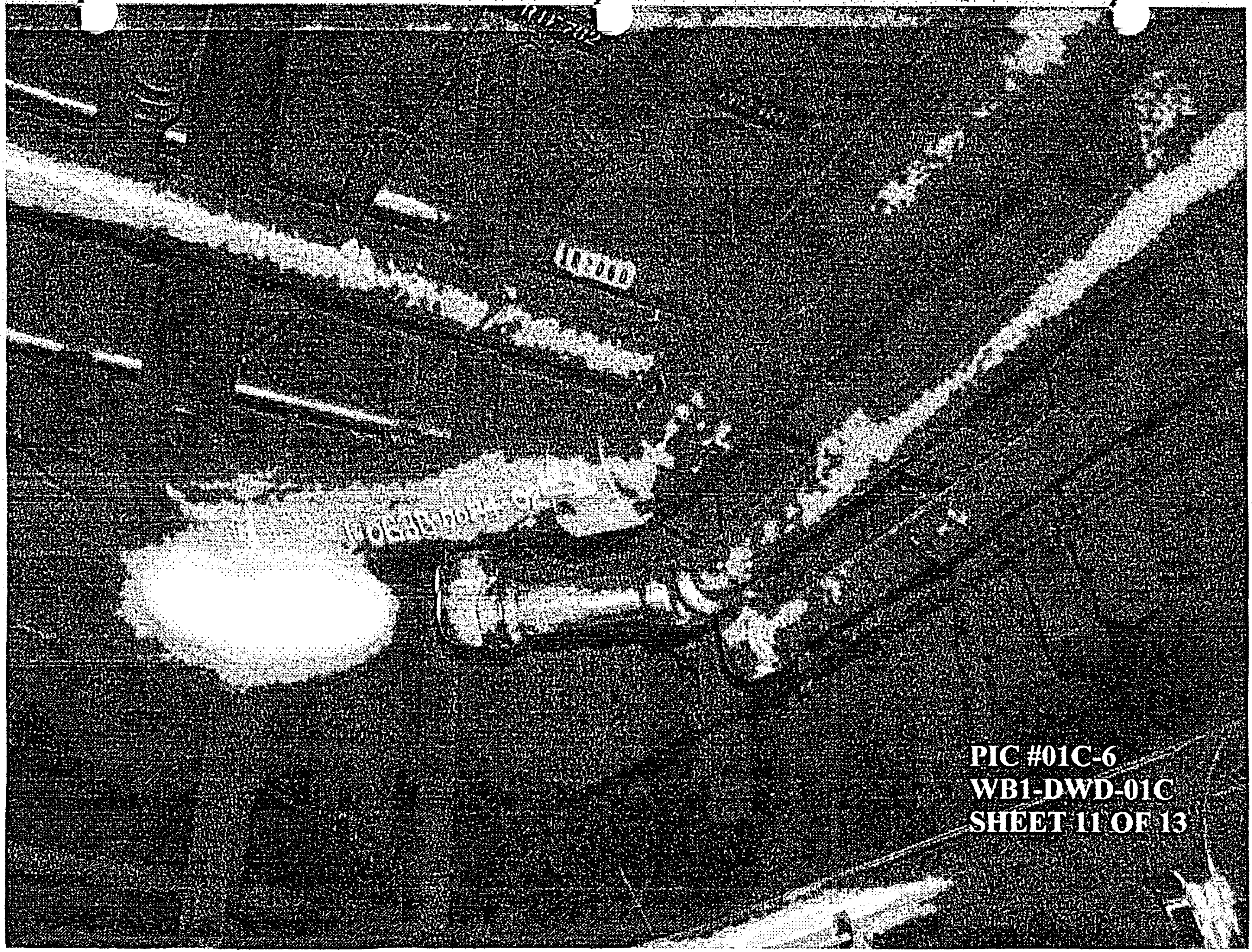
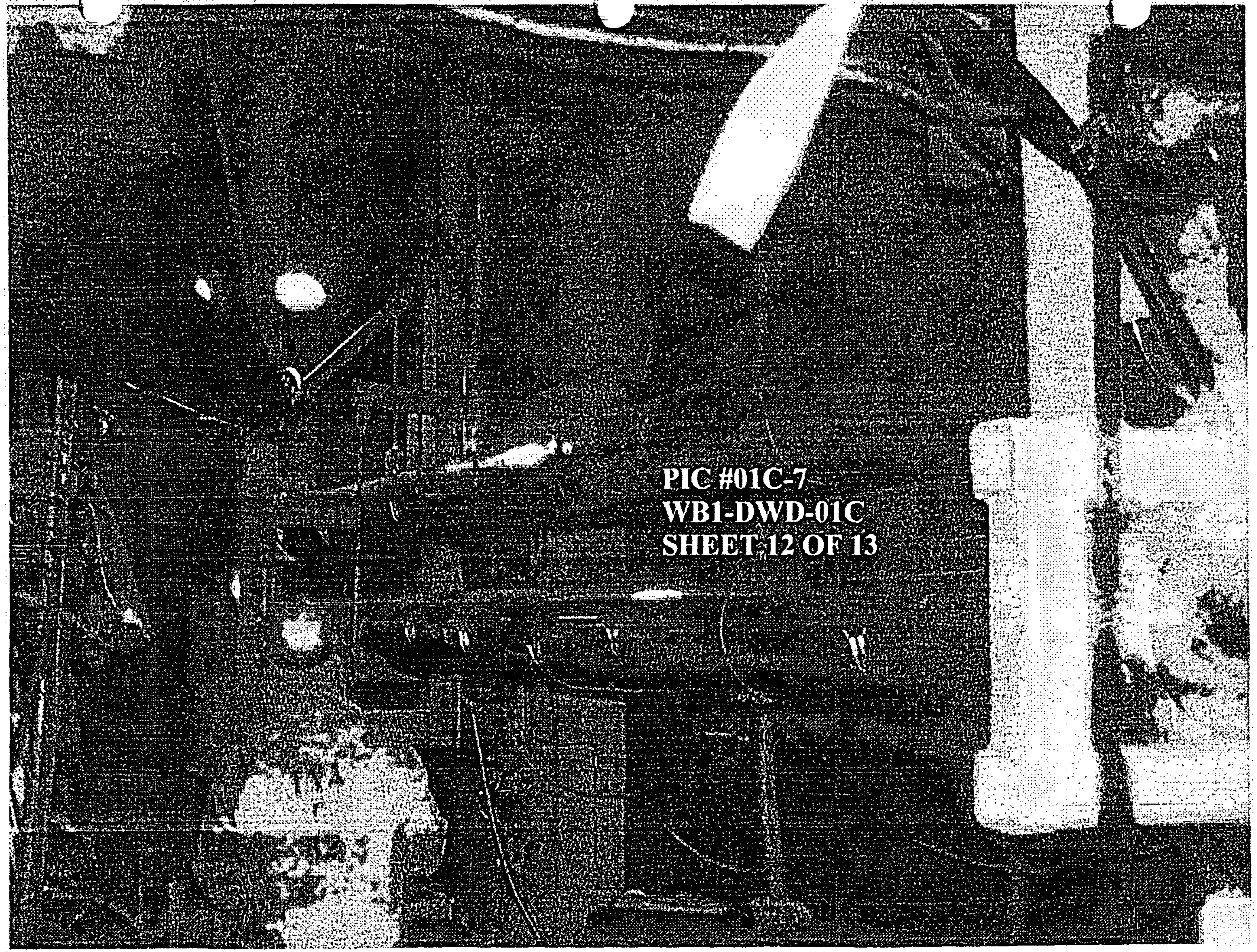
WB1-DWD-01C
SHEET 9 OF 13


PIC #01C-5
WB1-DWD-01C
SHEET 10 OF 1



PIC #01C-6
WB1-DWD-01C
SHEET 11 OF 13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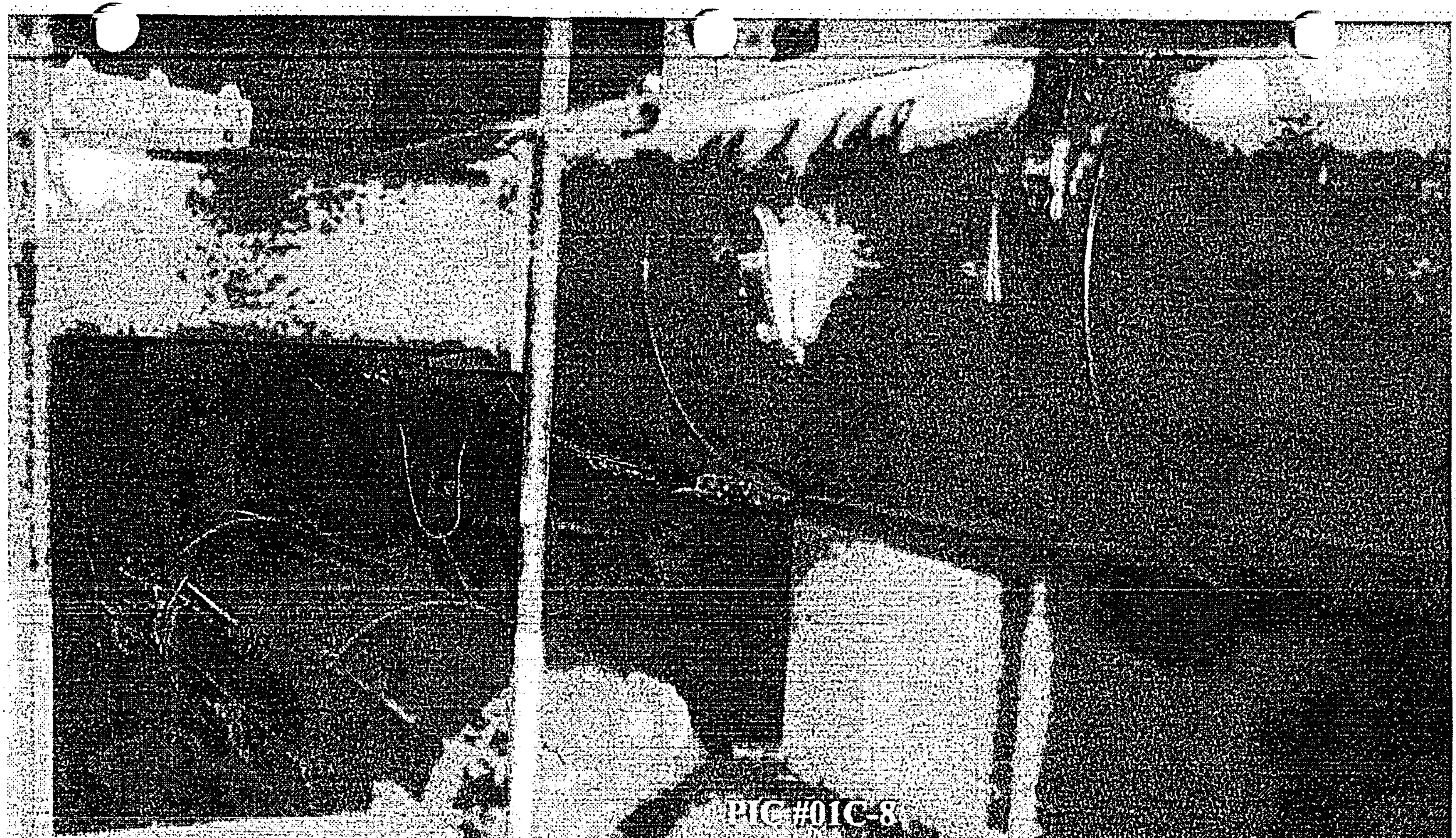
WB1-DWD-01C
SHEET 12 OF 13


PIC #01C-8
WB1 DWD-01C
SHEET 13 OF 13

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001D SHEET 1 OF 27

DATE:	10/23/2003	AREA:	Raceway	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	47W2500-1	
Tools:	47W2500-2	
Drawings	47W2500-3	
Flashlights	47W2500-4	
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify installation of insulation as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any undocumented insulation.
3	Inspect and determine longitudinal seam location and band spacing if necessary.
4	Document any irregularities of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any undocumented fibrous insulation (e.g., within rupture restraints).
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal).
7	Inspect the area for any weak components that could be dislodged by jet and that could be transported to sump.
8	Inspect any equipment insulation in the area.
9	Inspect and document the general cleanliness of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	LABELS, SIGNS, & PENETRATION NUMBERS, ETC

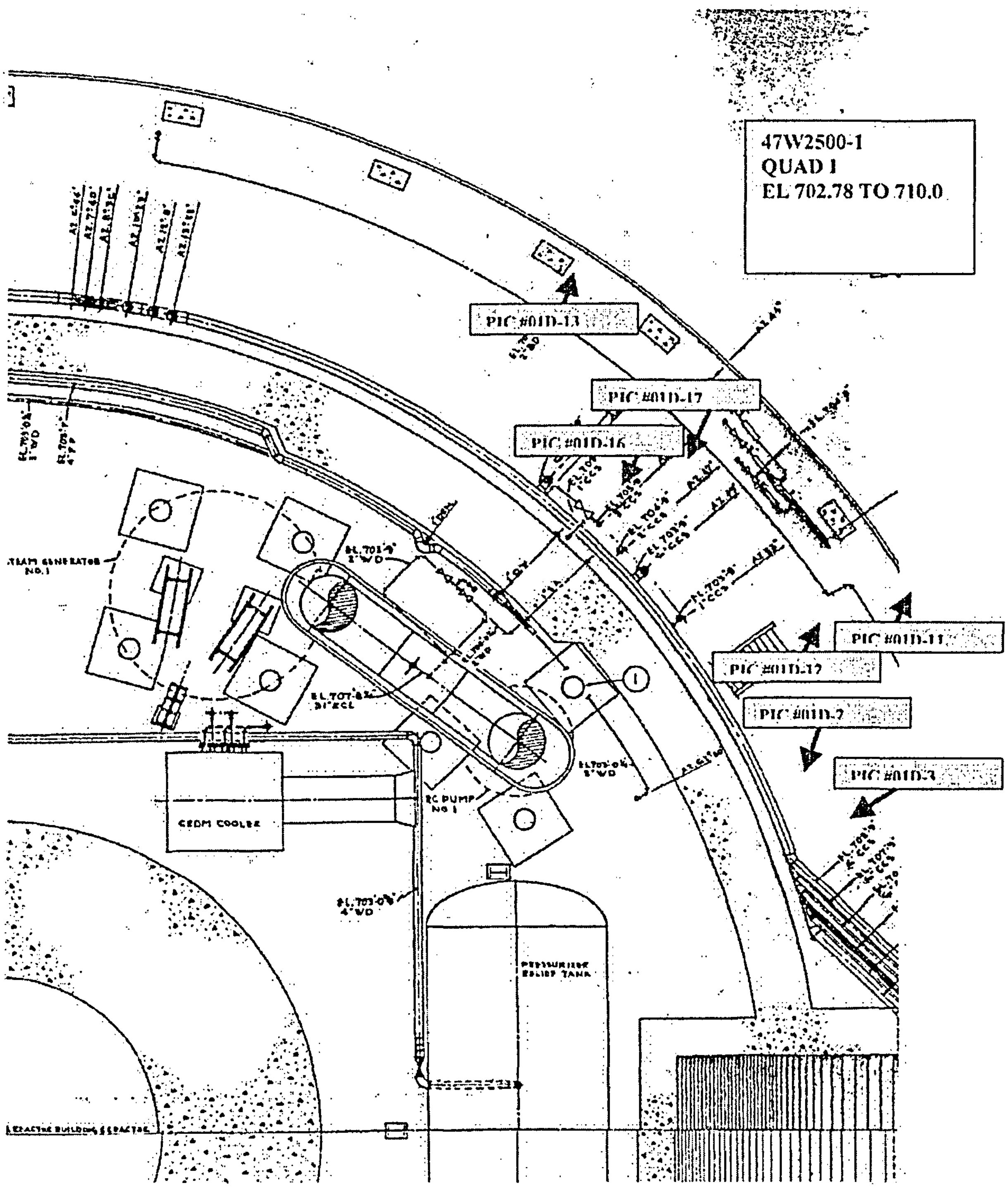
Prepared By: FRANK C YAO [signature] Date: 10/23/03

Checked By: MIKE CALDWELL [signature] Date: 10/23/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

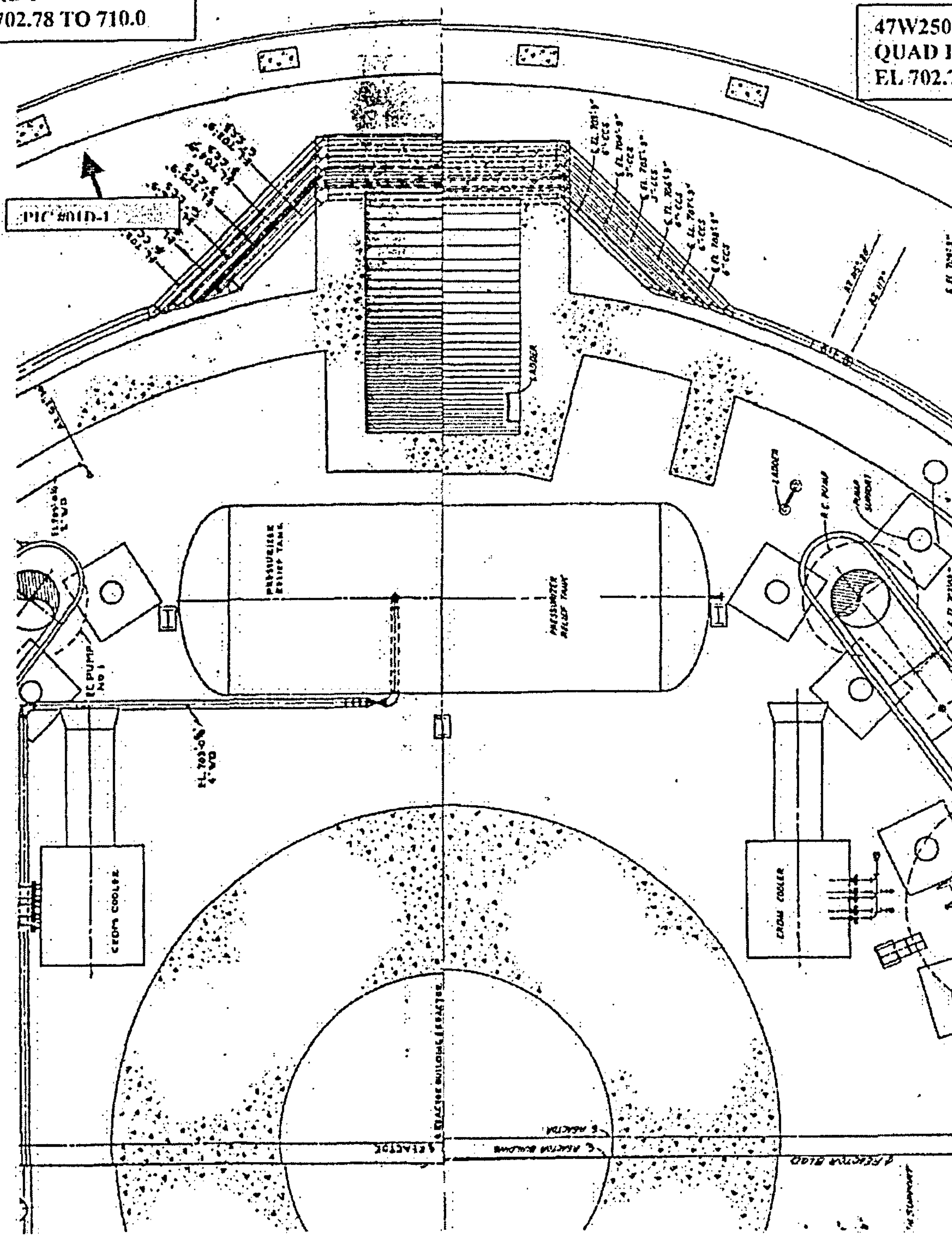
WALKDOWN PACKAGE#: WB1-DWD-001D SHEET 2 OF 27

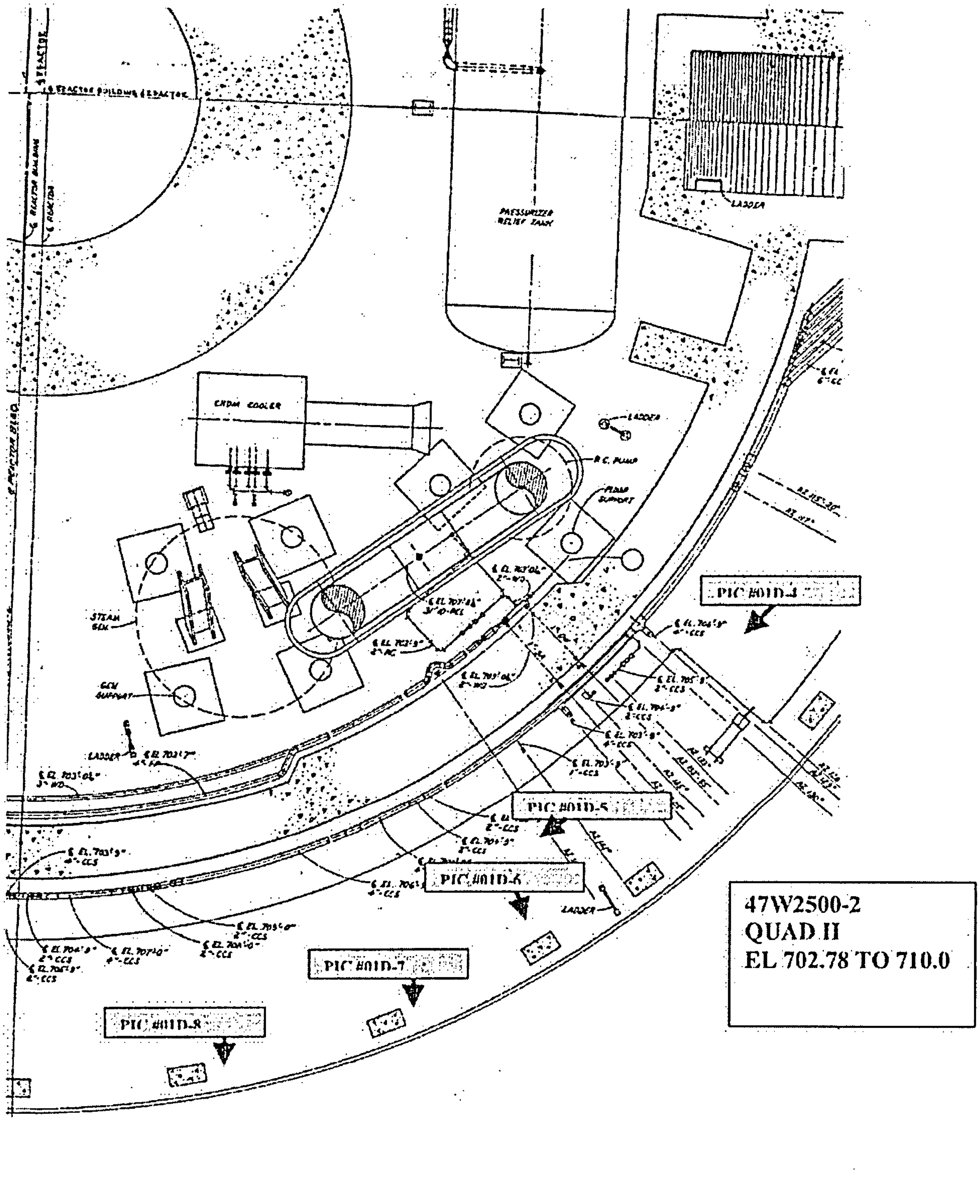
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	RACEWAY	702	1	LABELS, SIGNS, & PENETRATION NO	NA	NA	NA	NA	0.00	NA	NA	NA	SEE REPORT FOR COMMENTS

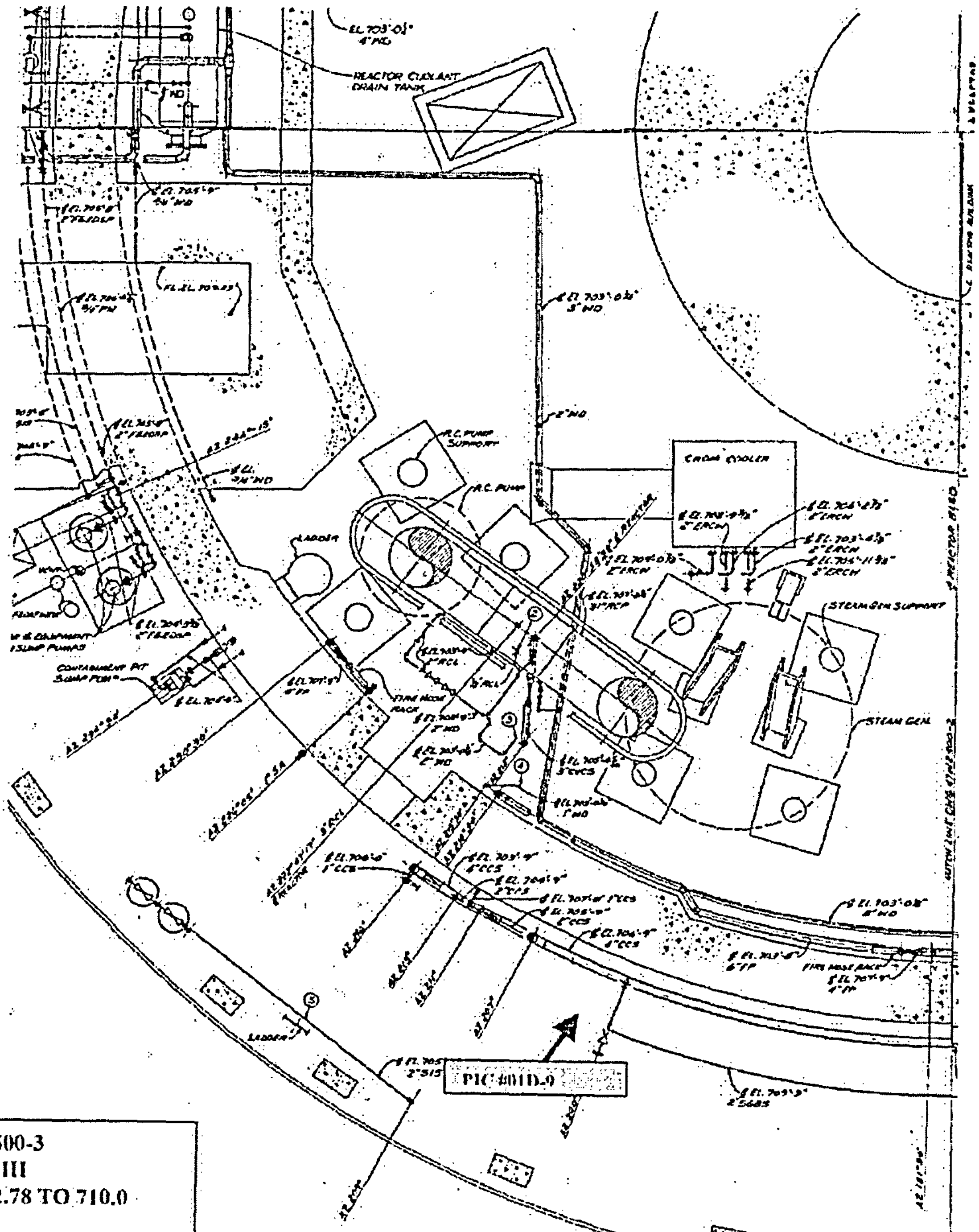

47W2500-1
QUAD I
EL 702.78 TO 710.0
PIC #01D-13
PIC #01D-17
PIC #01D-16
PIC #01D-11
PIC #01D-12
PIC #01D-2
PIC #01D-3
CEDM COOLER
PRESSURIZER RELIEF TANK

47W2500-1
QUAD I
EL 702.78 TO 710.0

47W2500-2
QUAD II
EL 702.78 TO 710.0

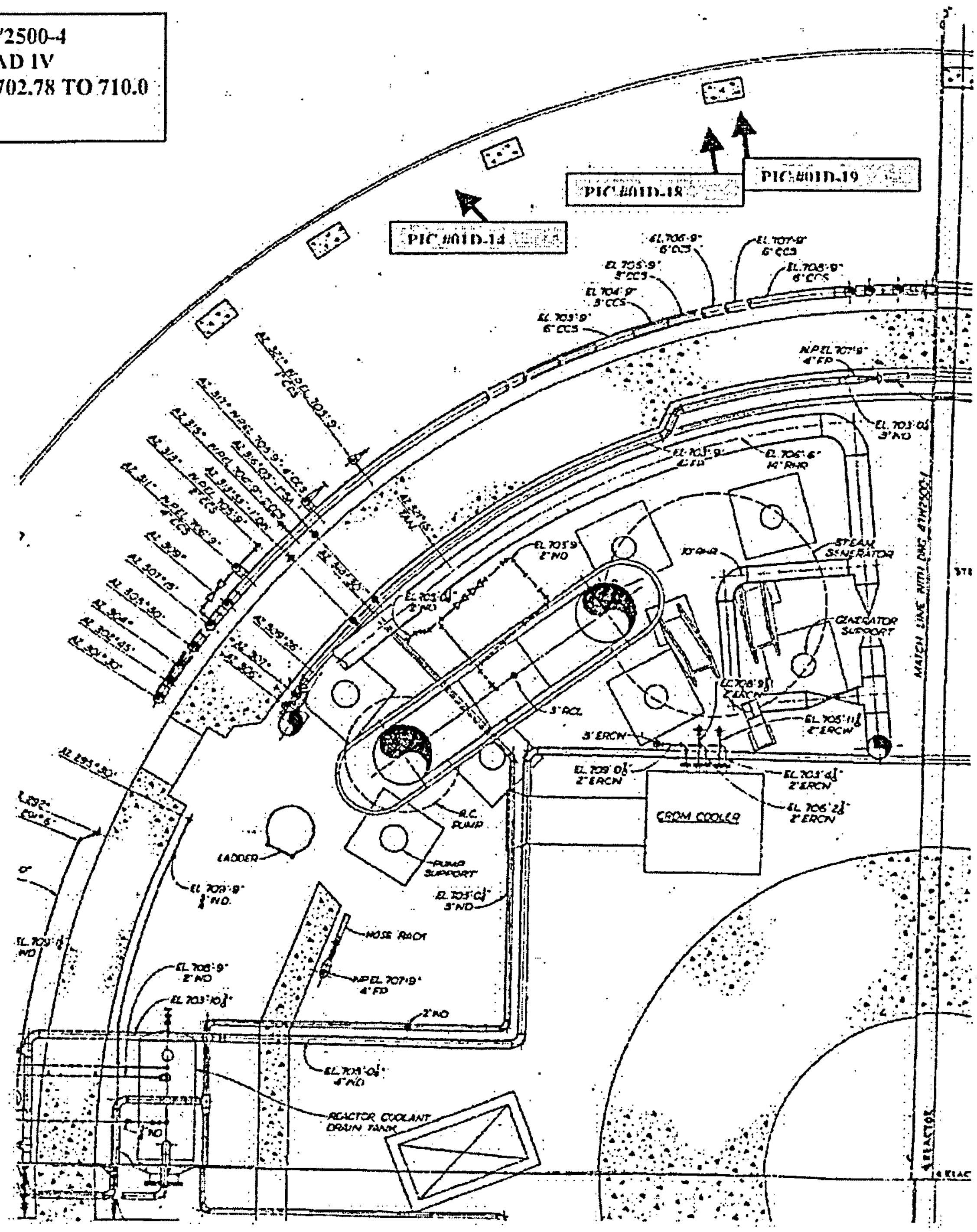


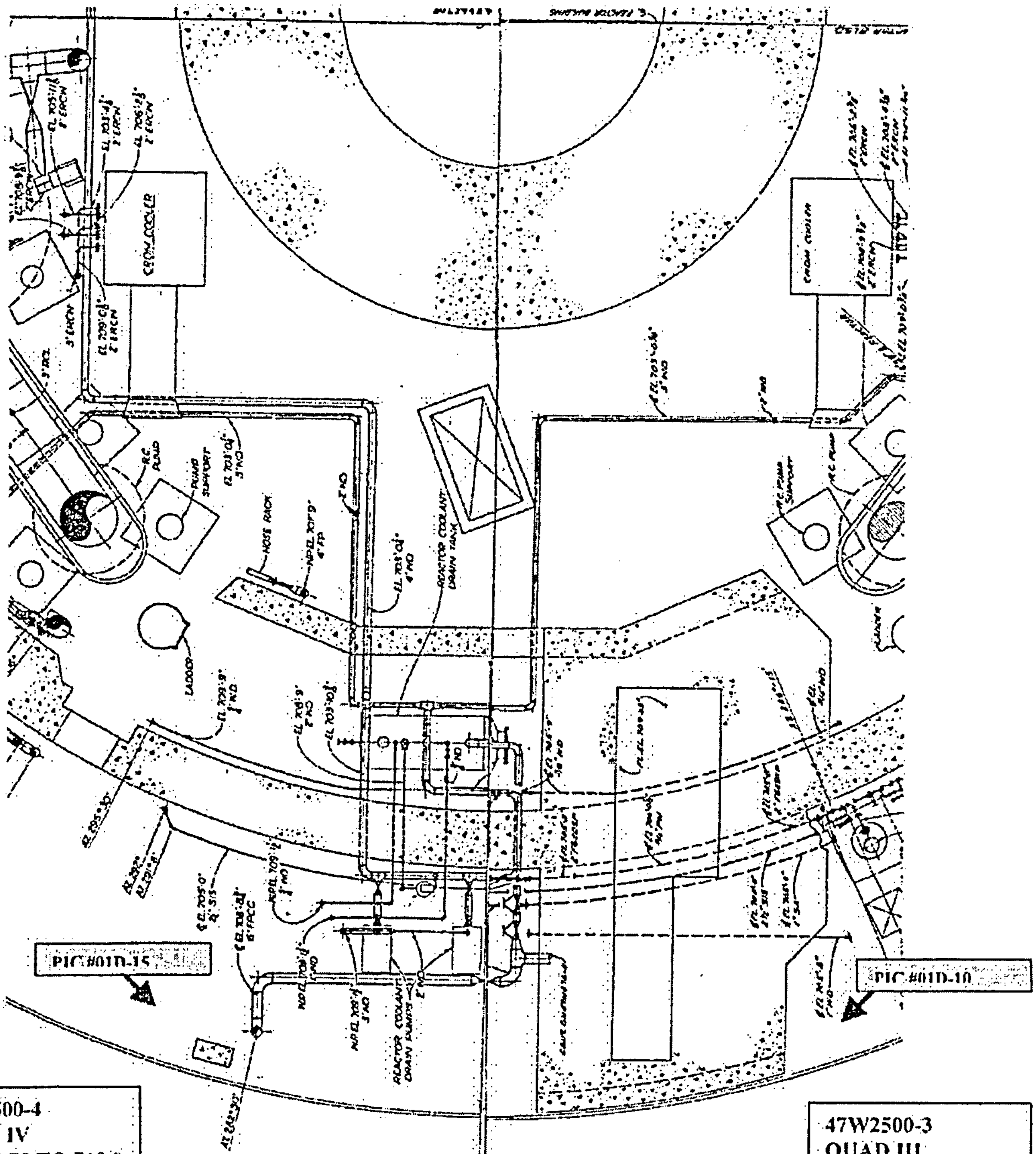

PRESSURIZER RELIEF TANK
LADDER
R.C. PUMP
PUMP SUPPORT
STEAM GEN.
GEN. SUPPORT
PIC #01D-4
PIC #01D-5
PIC #01D-6
PIC #01D-7
PIC #01D-8
47W2500-2
QUAD II
EL 702.78 TO 710.0



47W2500-3
QUADIII
EL 702.78 TO 710.0

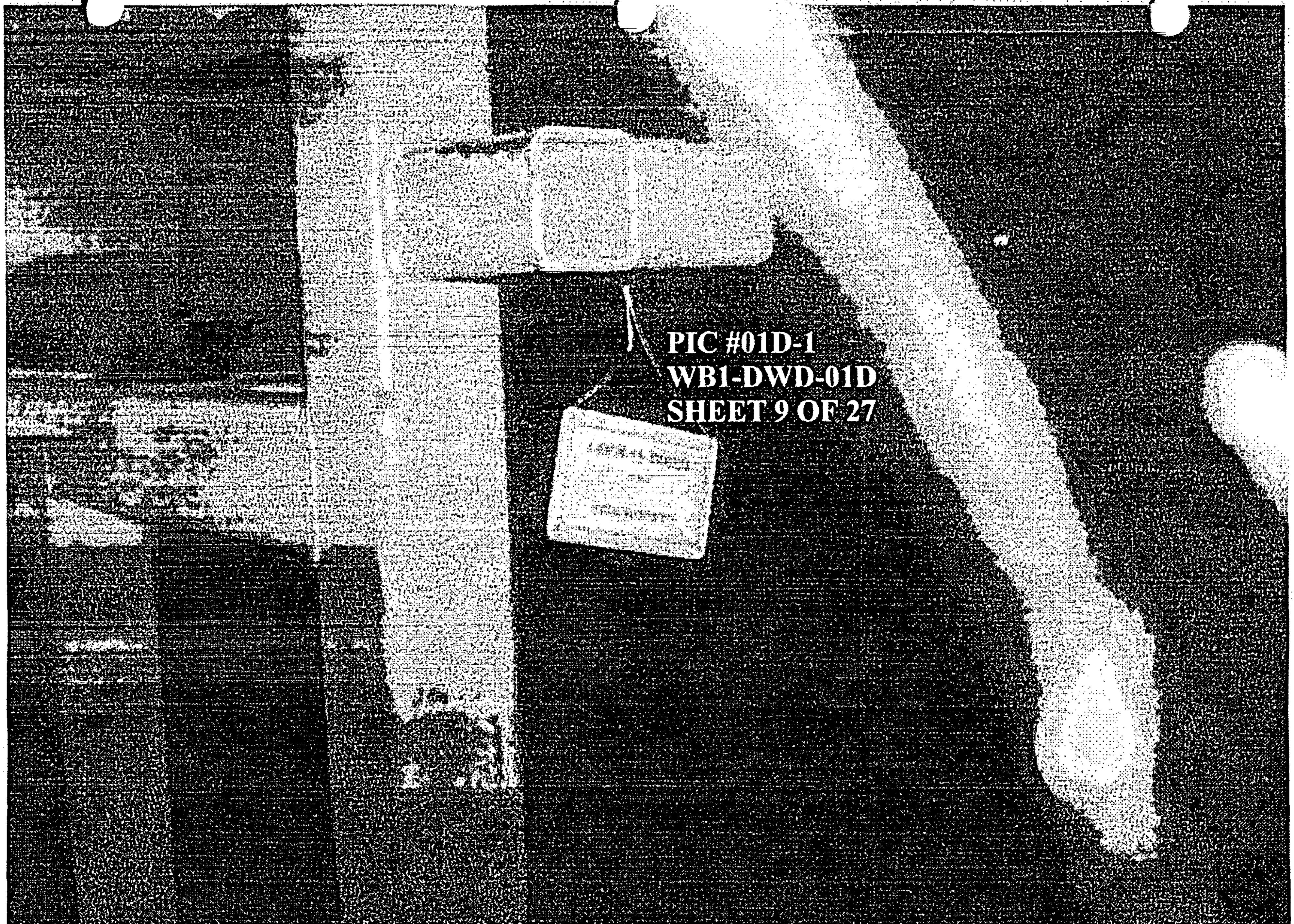
47W2500-4
QUAD IV
EL 702.78 TO 710.0





47W2500-4
QUAD IV
EL 702.78 TO 710.0

47W2500-3
QUAD III
EL 702.78 TO 710.0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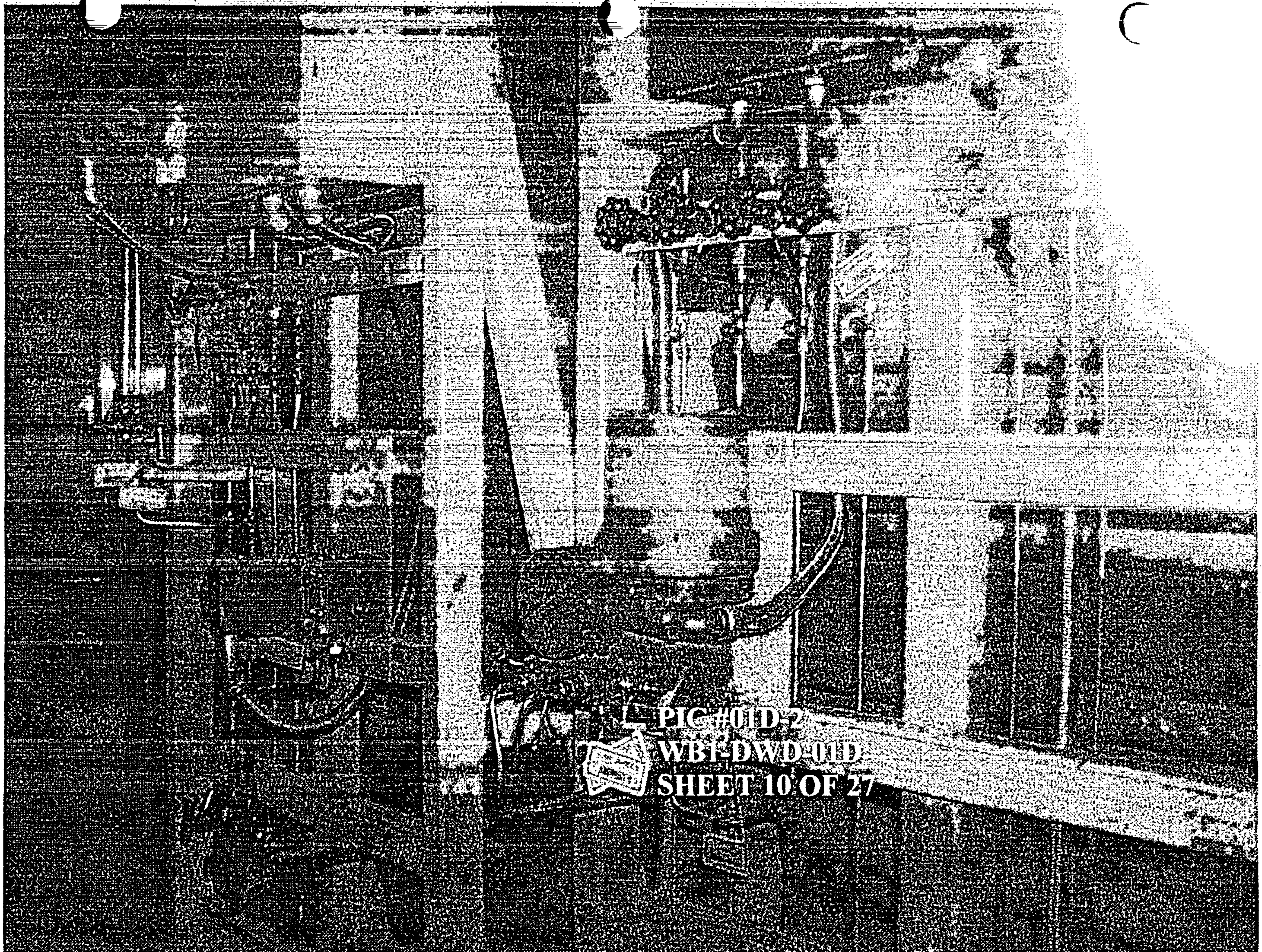
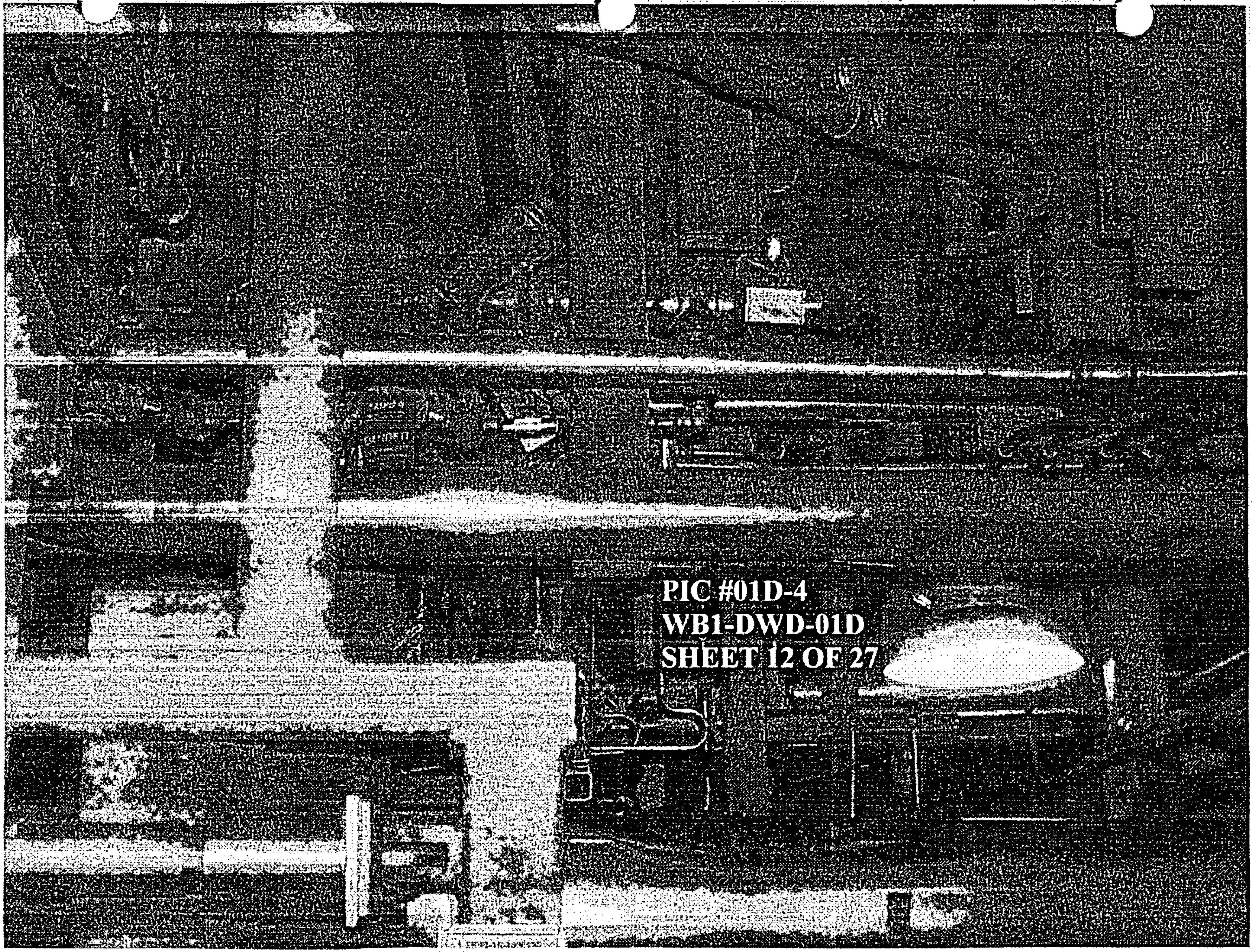
WB1-DWD-01D
SHEET 9 OF 27


PIC #01D-2
WB1-DWD-01D
SHEET 10 OF 27


PIC #01D-3
WB1-DWD-01D
SHEET 11 OF 2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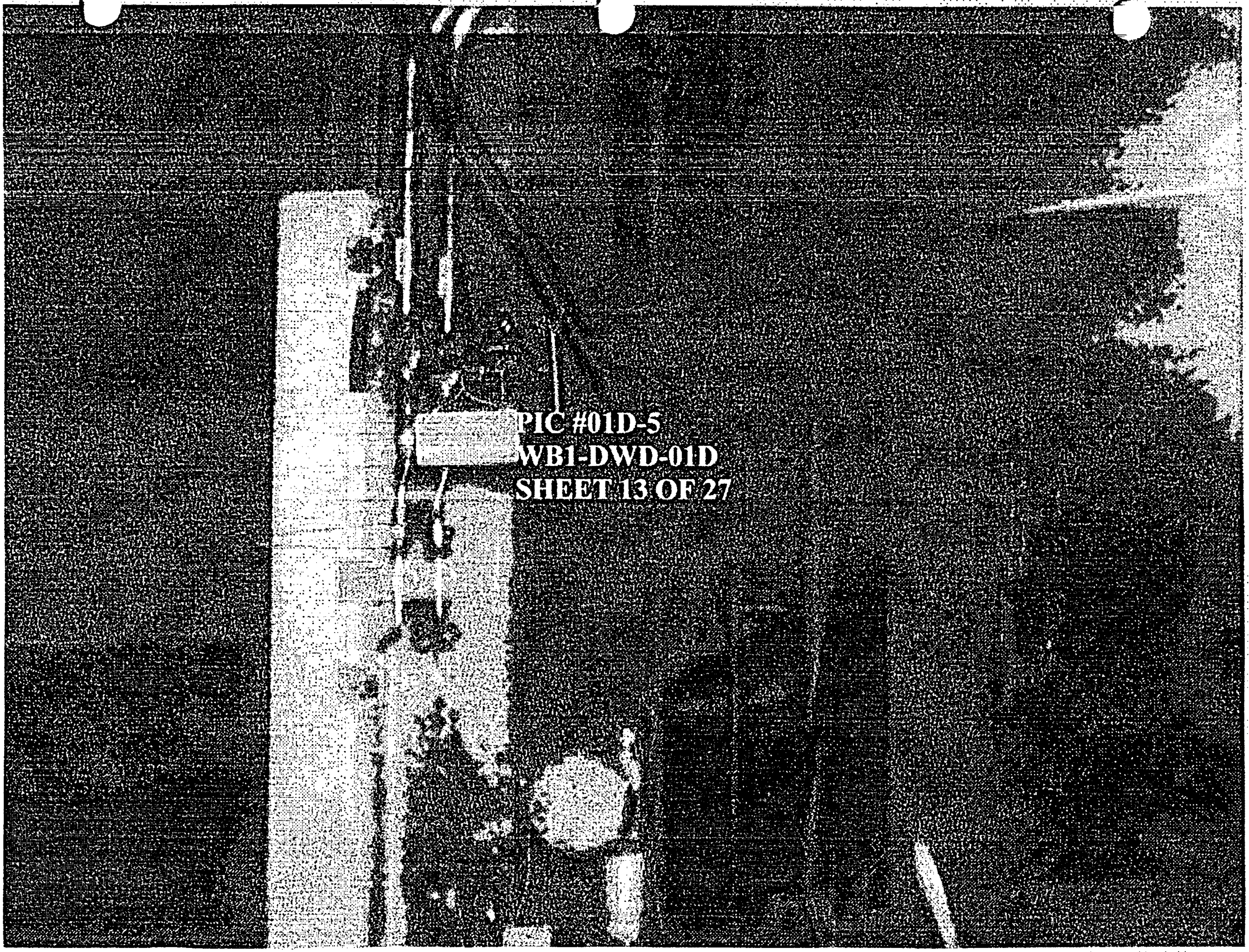
WB1-DWD-01D
SHEET 12 OF 27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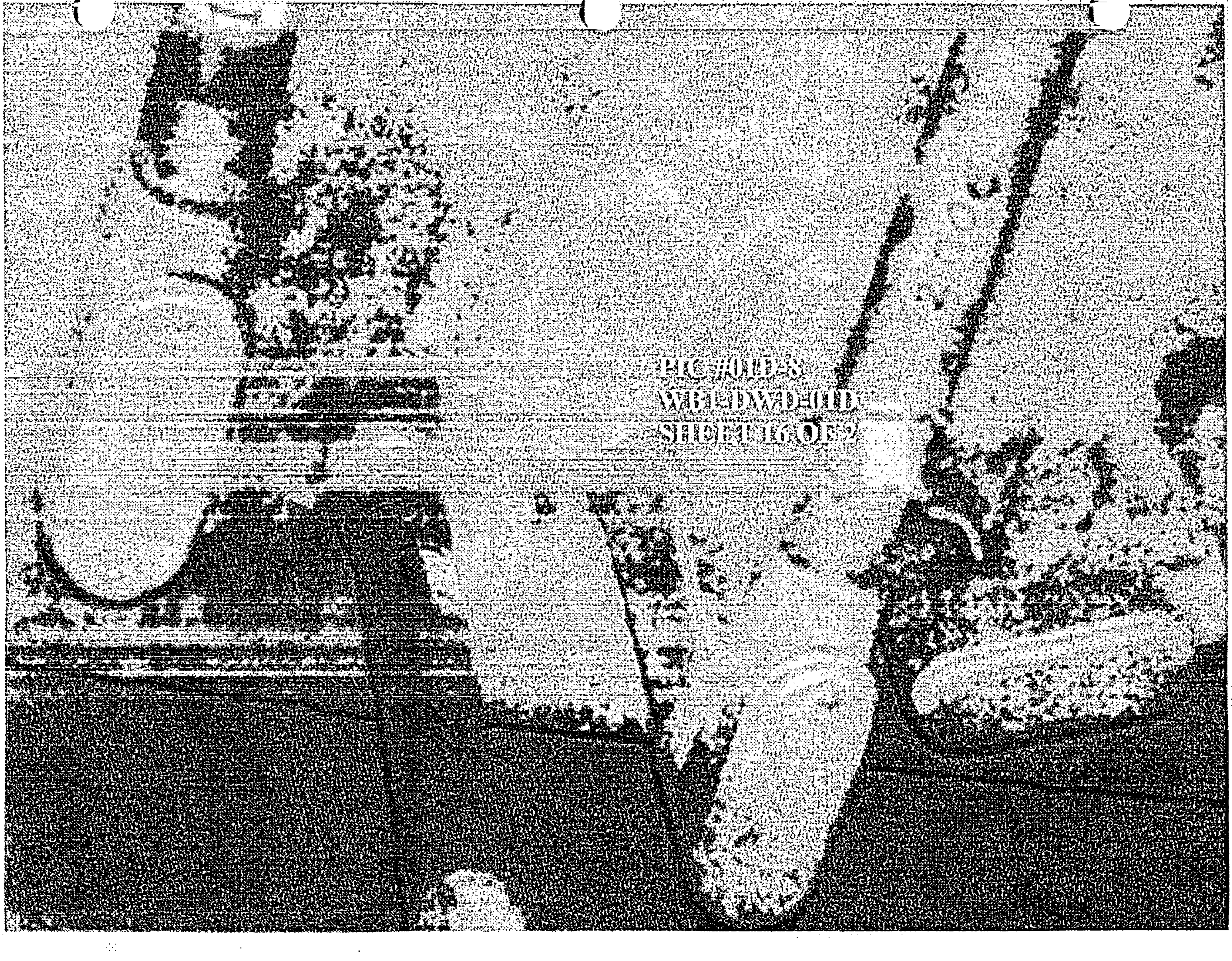
WB1-DWD-01D
SHEET 13 OF 27


PIC #01D-6
WB1-DWD-01D
SHEET 14 OF 27
L-228


PIC #01D-7
WB1-DWD-01D
SHEET 15 OF 27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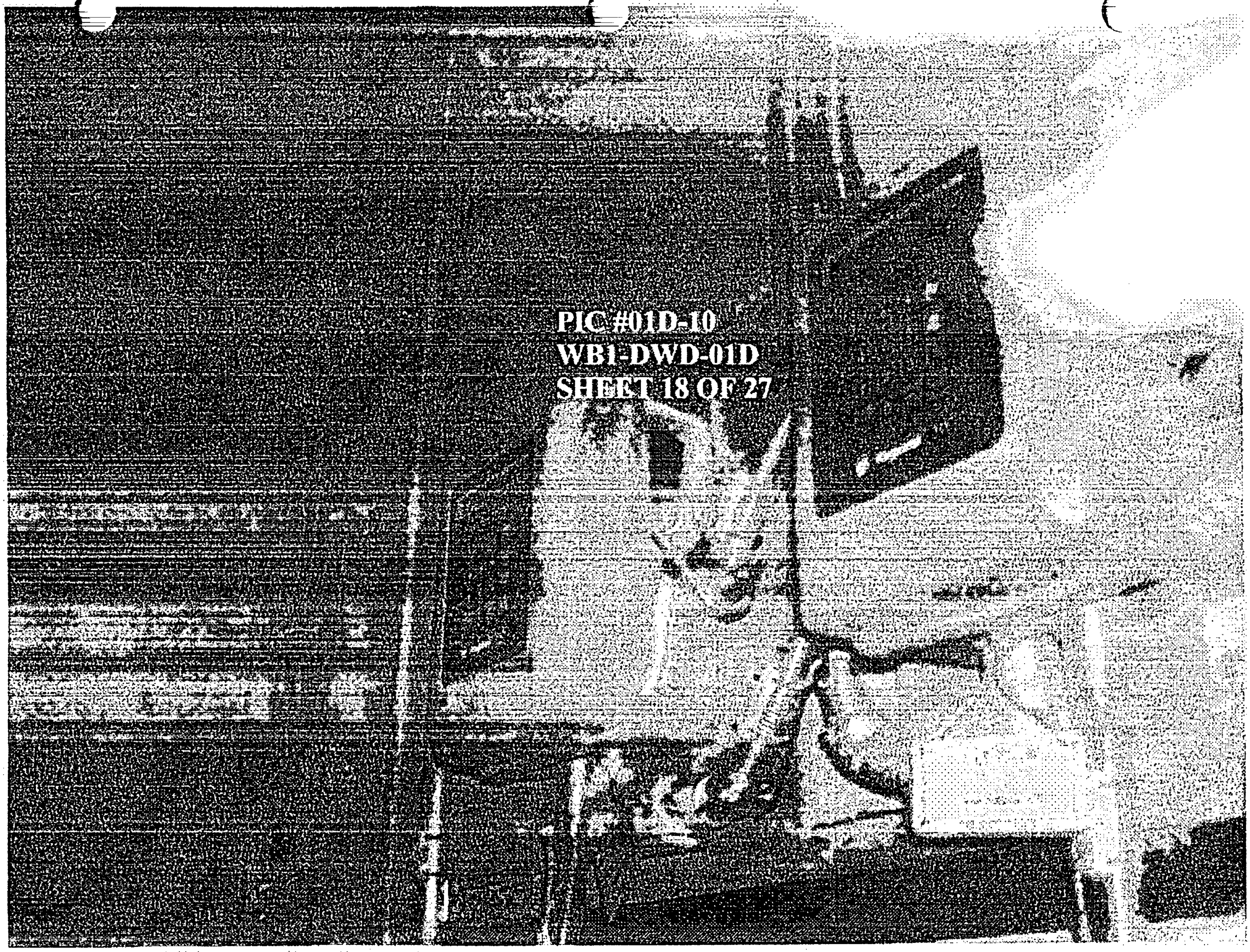
WB1-DWD-01D
SHEET 16 OF 2


PIC #01D-9
WB1-DWD-01D
SHEET 17 OF 27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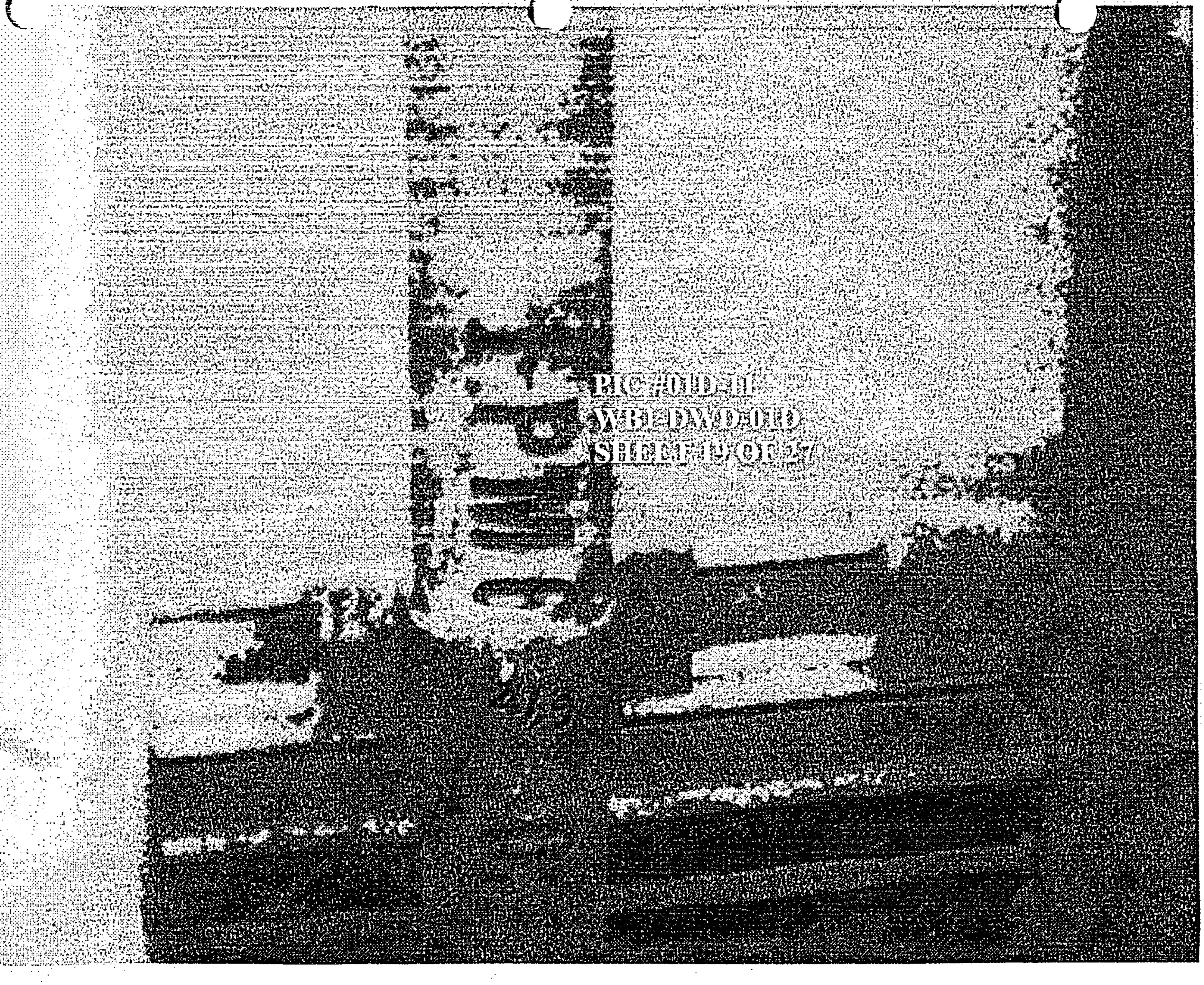
WB1-DWD-01D
SHEET 18 OF 27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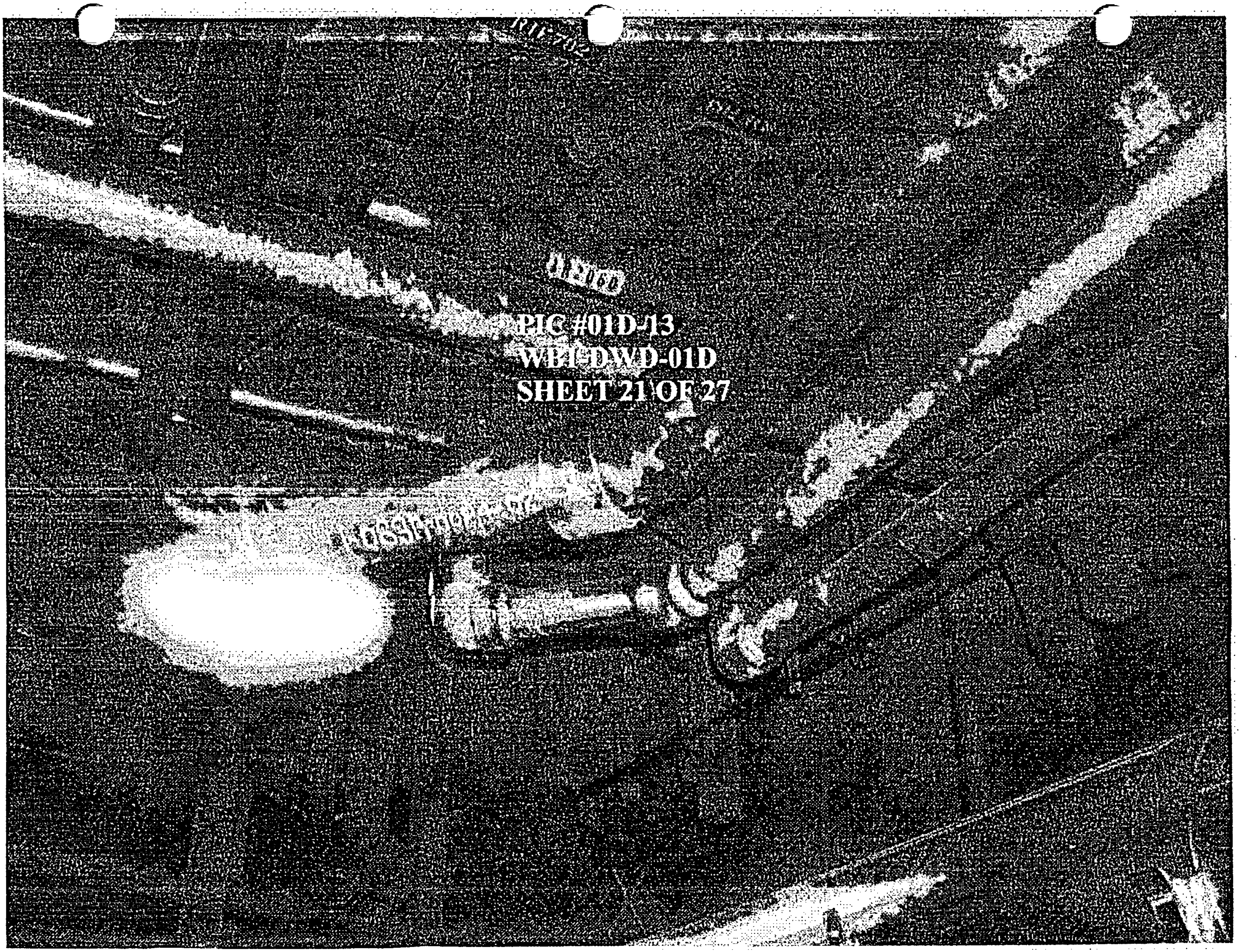
WB1-DWD-01D
SHEET 19 OF 27


1-PENT-293-1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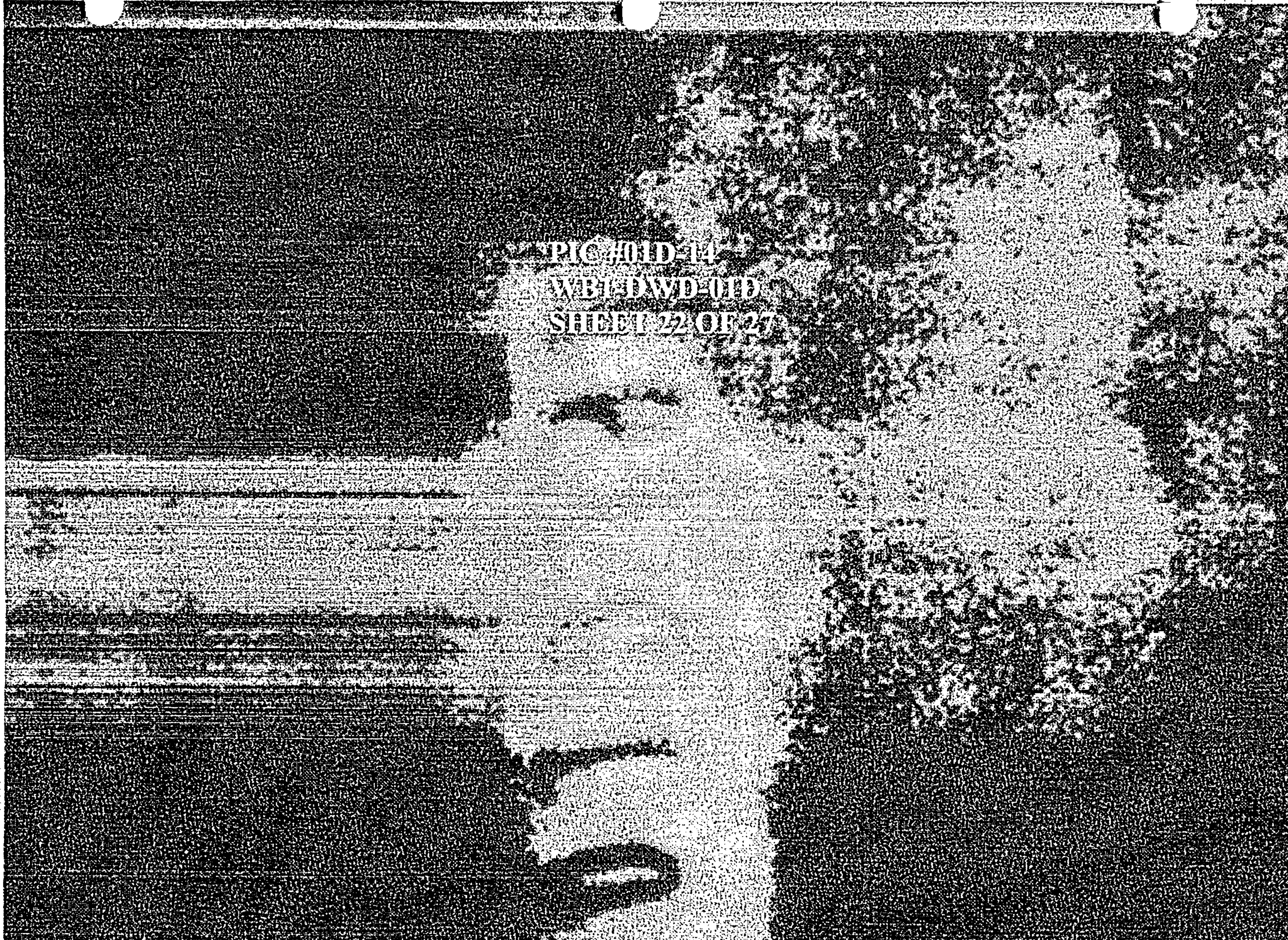
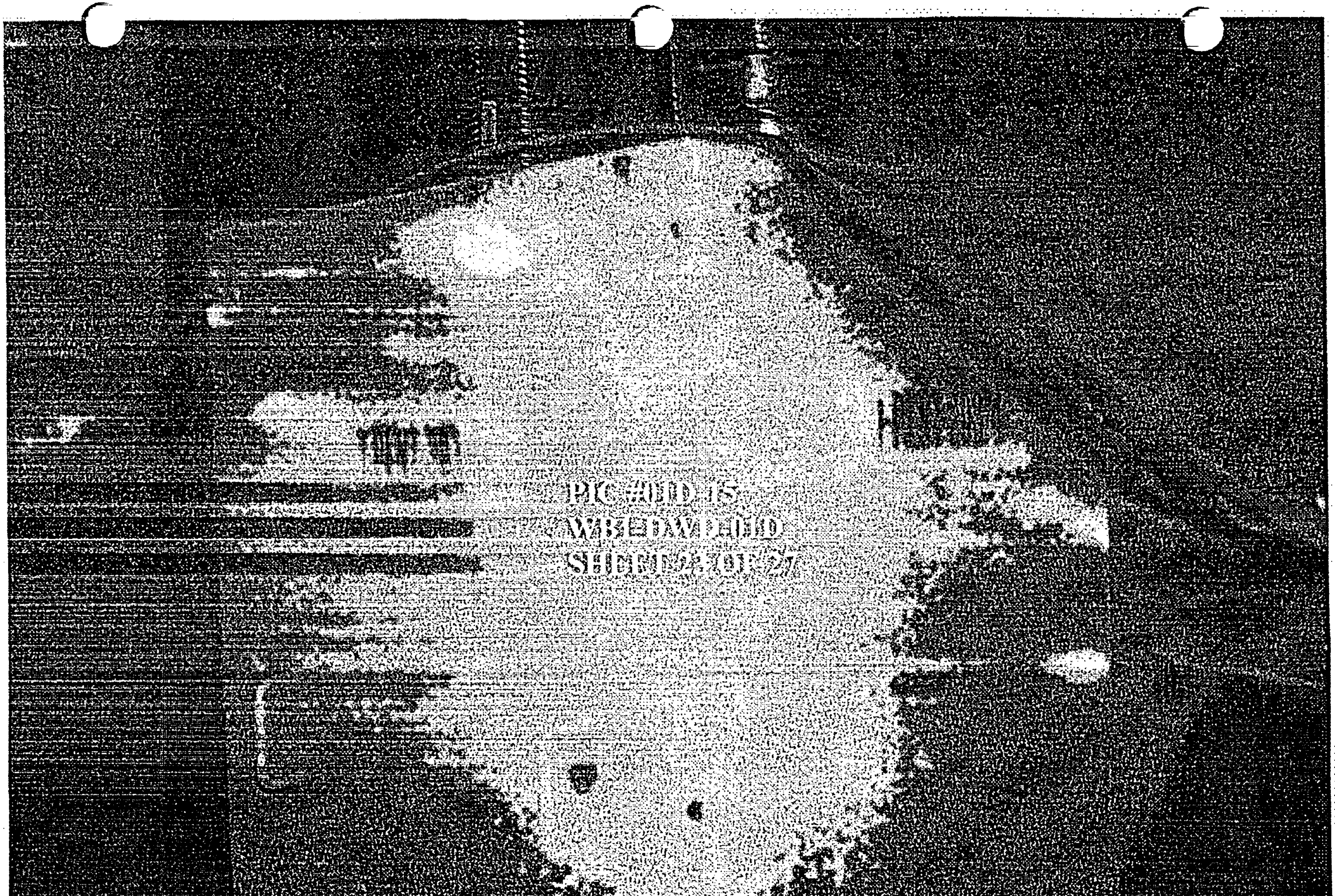
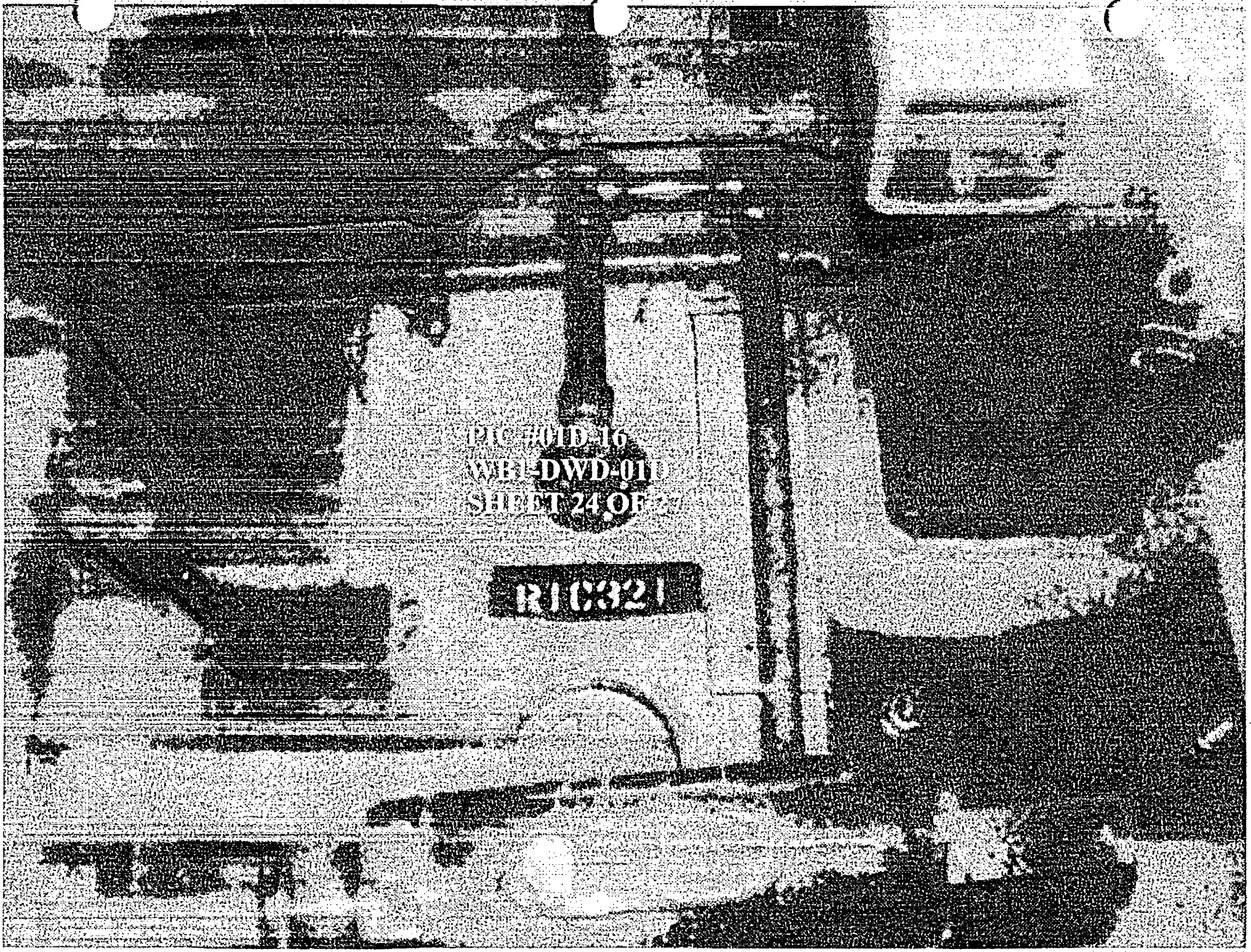
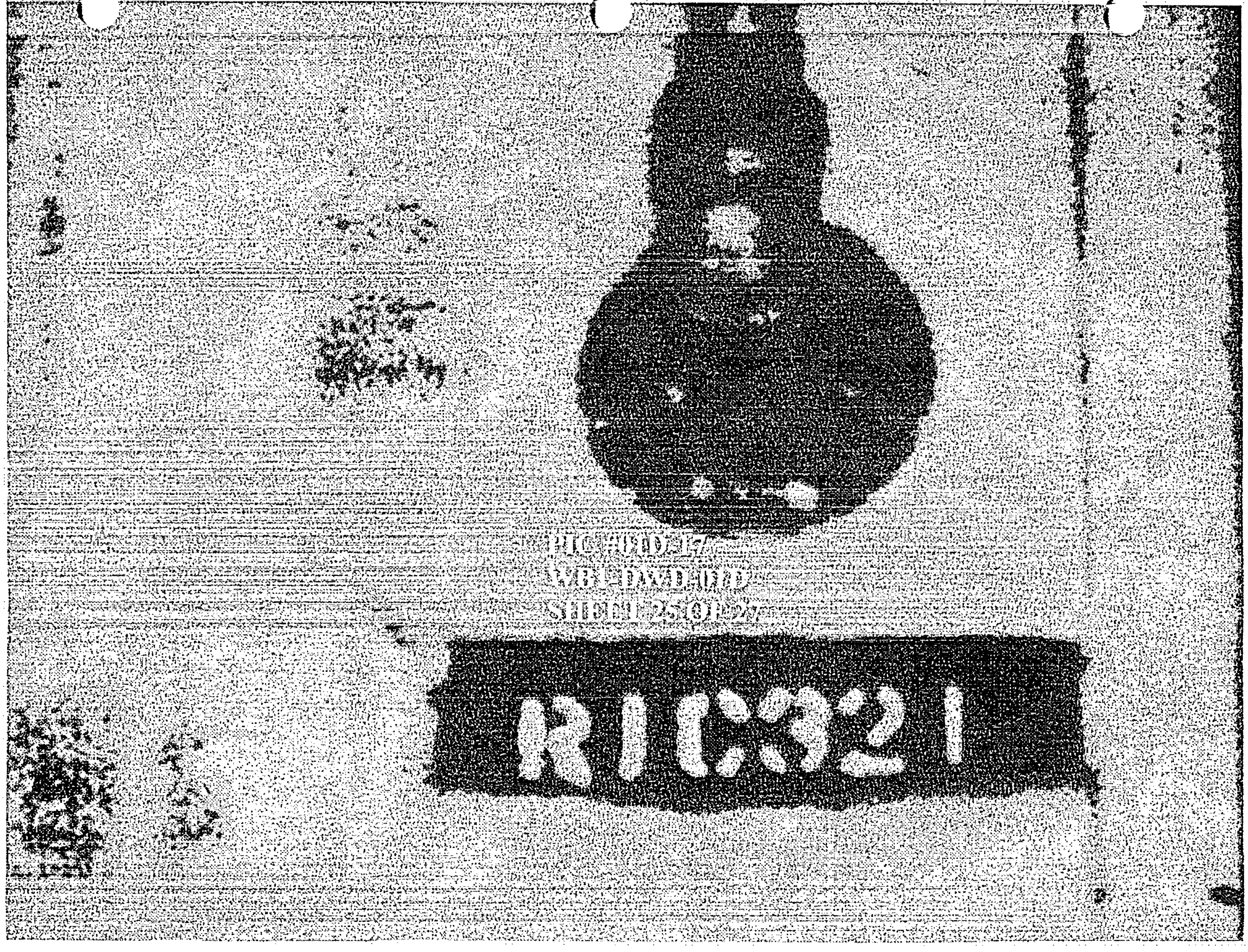
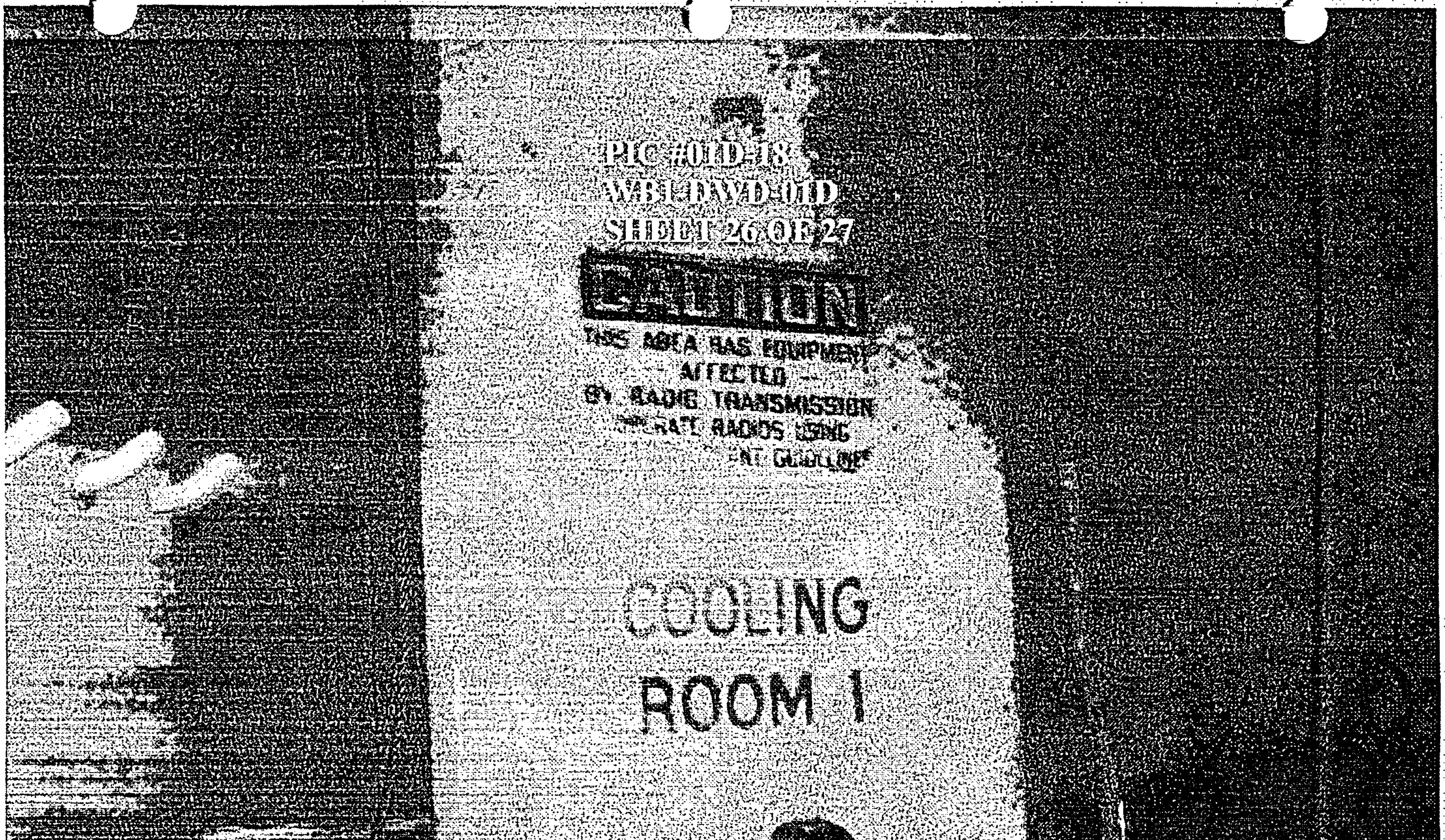
WBT-DWD-01D
SHEET 21 OF 27


PIC #01D-14
WB1-DWD-01D
SHEET 22 OF 27


PIC #01D.15
WBL-DWD.01D
SHEET 24 OF 27


PIC #01D-16
WB1-DWD-01D
SHEET 24 OF 27
R1C321


SHEET 25 OF 27
R1C321


PIC #01D-18
WB1-DWD-01D
SHEET 26 OF 27
THIS AREA HAS EQUIPMENT
AFFECTED
BY RADIO TRANSMISSION
COOLING
ROOM 1

PIC #01D-19
WB1-DWD-01D
SHEET 27 OF 27

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001E SHEET 1 OF 6

DATE:	10/23/2003	AREA:	Raceway	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	47W2500-1	
Tools:	47W2500-2	
Drawings	47W2500-3	
Flashlights	47W2500-4	
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify installation of insulation as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any undocumented insulation.
3	Inspect and determine longitudinal seam location and band spacing if necessary.
4	Document any irregularities of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any undocumented fibrous insulation (e.g., within rupture restraints).
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal).
7	Inspect the area for any weak components that could be dislodged by jet and that could be transported to sump.
8	Inspect any equipment insulation in the area.
9	Inspect and document the general cleanliness of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	TIE WRAPS BLUE/AQUA IN COLOR
	TEFZEL
	TYPICAL OF CONDUIT TAGGING AND GROUND WIRE MOUNTING THROUGHOUT CONTAINMENT.

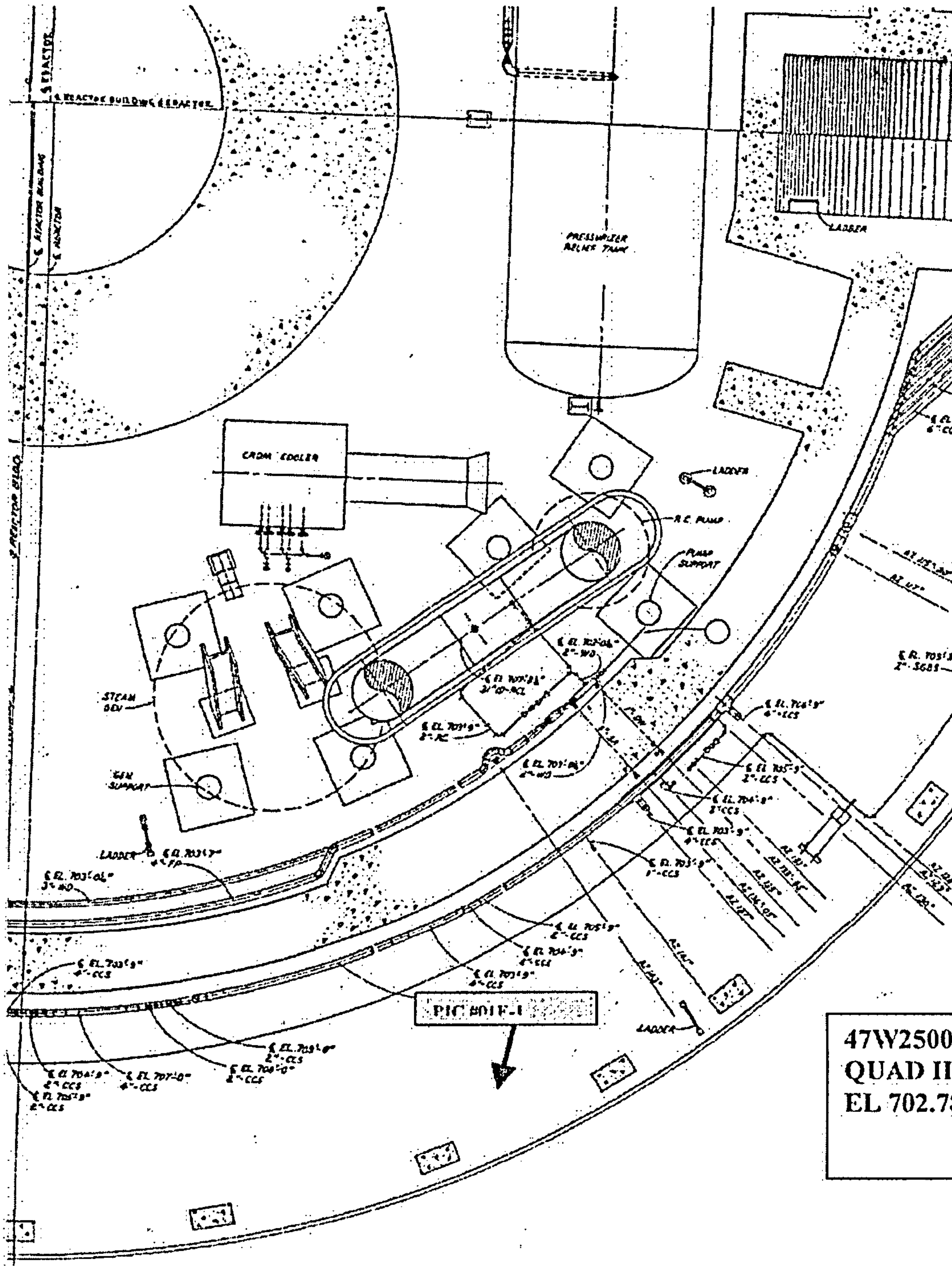
Prepared By: FRANK C YAO [signature] Date: 10/23/03

Checked By: MIKE CALDWELL [signature] Date: 10/23/03

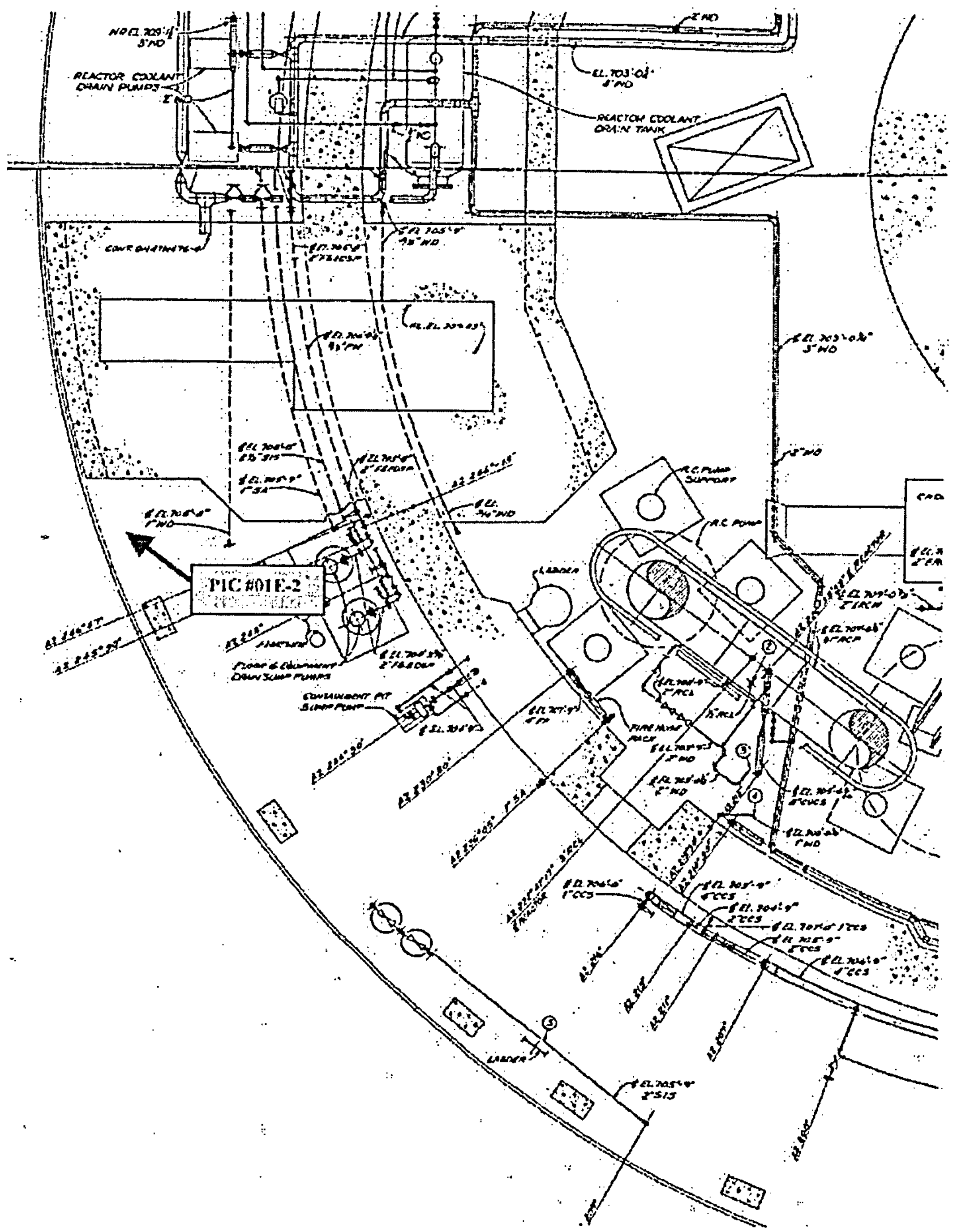
WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001E SHEET 2 OF 6

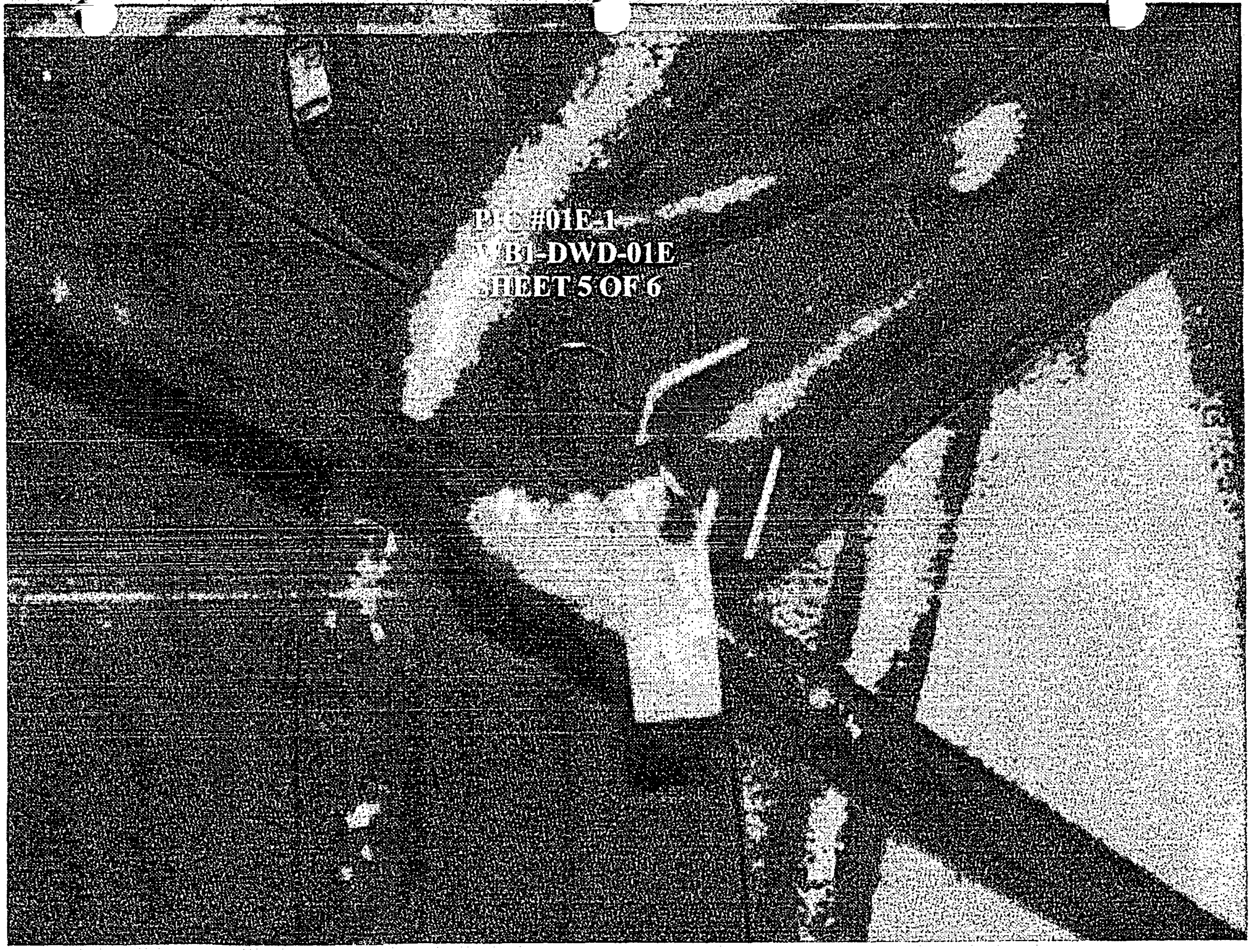
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	RACEWAY	702	1	TIE WRAPS	NA	NA	NA	NA	NA	NA	NA	NA	SEE REPORT COMMENTS



47W2500-2
QUAD II
EL 702.78 TO 710.0



47W2500-3
QUADIII
EL 702.78 TO 710.0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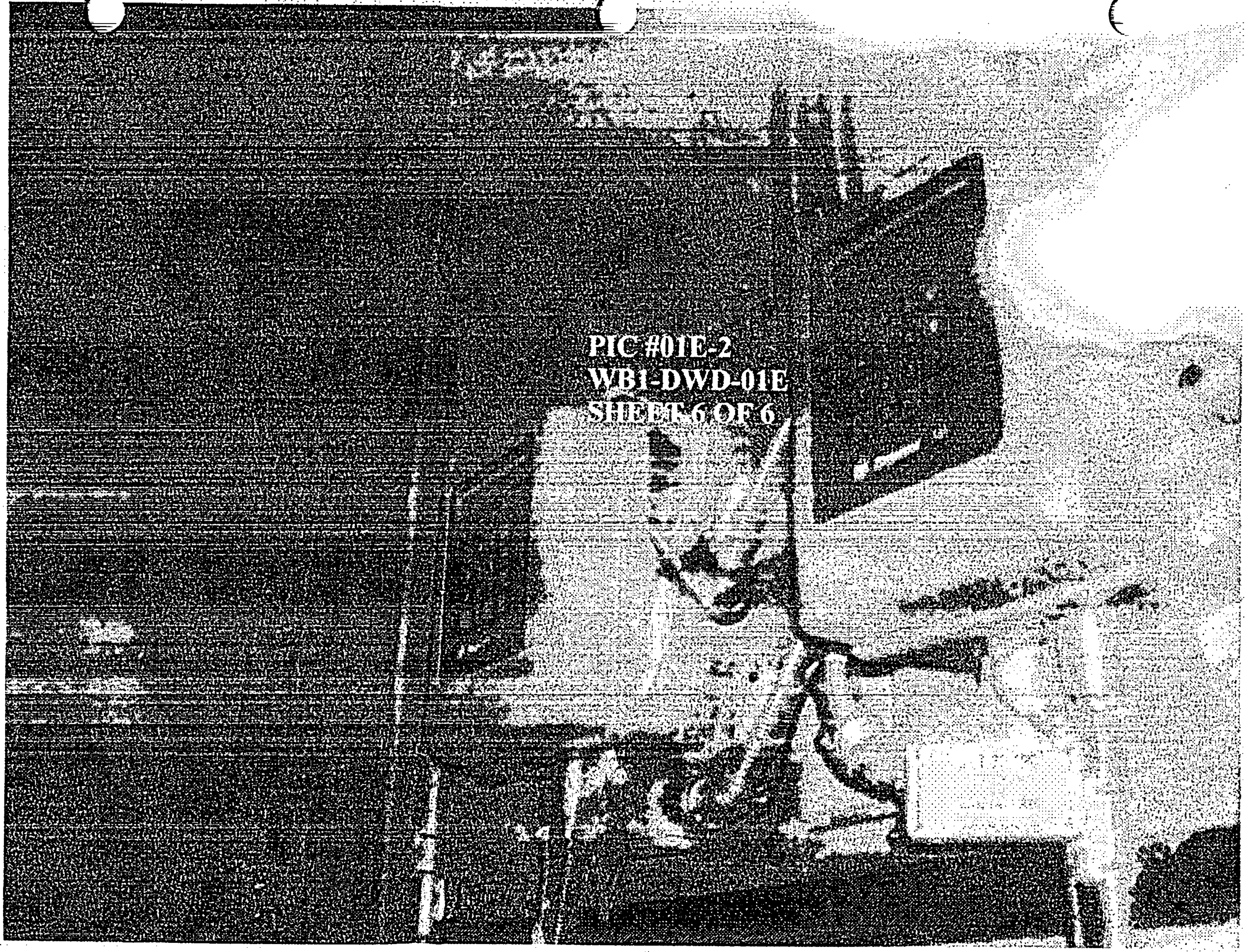
B1-DWD-01E
HEET 5 OF 6


PIC #01E-2
WB1-DWD-01E
SHEET 6 OF 6

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001F SHEET 1 OF 7

DATE:	10/23/2003	AREA:	Raceway	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	47W2500-3	
Tools:	47W331-1	
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify installation of insulation as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any undocumented insulation.
3	Inspect and determine longitudinal seam location and band spacing if necessary.
4	Document any irregularities of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any undocumented fibrous insulation (e.g., within rupture restraints)
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal).
7	Inspect the area for any weak components that could be dislodged by jet and that could be transported to sump.
8	Inspect any equipment insulation in the area.
9	Inspect and document the general cleanliness of the area
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	SEAL AROUND PENETRATIONS
	PICTURE 027A – 8" DIAMETER
	PICTURE 030A – 12" DIAMETER
	PICTURE 031A – 12" DIAMETER
	Spare penetrations. MC

Prepared By: FRANK C YAO Date: 10/23/03

Checked By: MIKE CALDWELL Date: 10/23/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001F SHEET 2 OF 7

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	RACEWAY	782	1	SEAL AROUND PENETRATION PIPE	NA	NA	RTV	SEE CALC	0.003	NA	NA	NA	
N/A	RACEWAY	782	1	FOAM IN PENETRATION	NA	NA	FOAM	SEE CALC	3.18	NA	NA	NA	

WB1-DWD-001F
CALCULATION

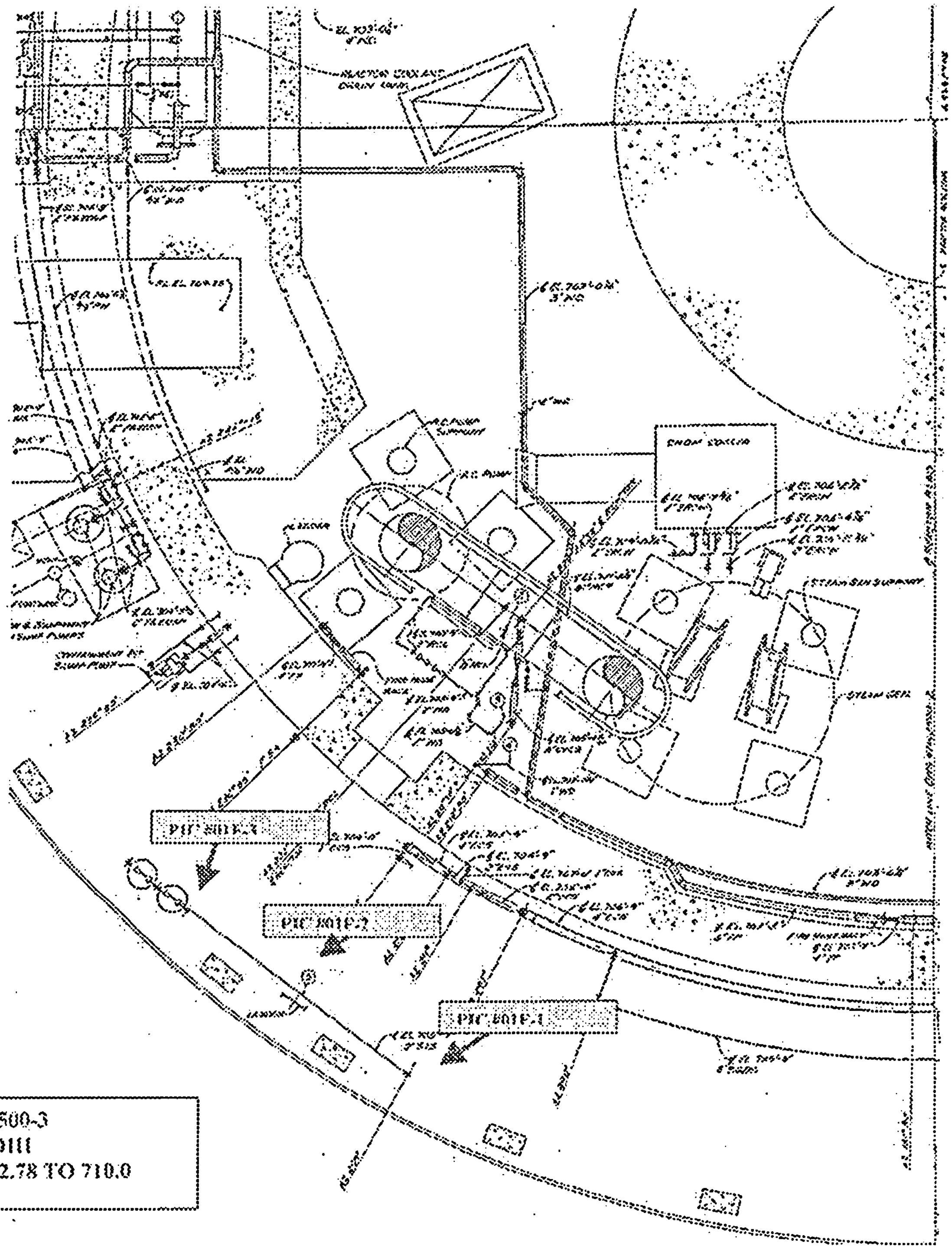
SEALANT CROSS SECTION = 0.25"X0.25" RIGHT ANGLE SHAPE
THIS APPLPIED ALL AROUND PIPE

PICTURE 027A	8" DIA
PICTURE 030A	12" DIA
PICTURE 031A	12" DIA

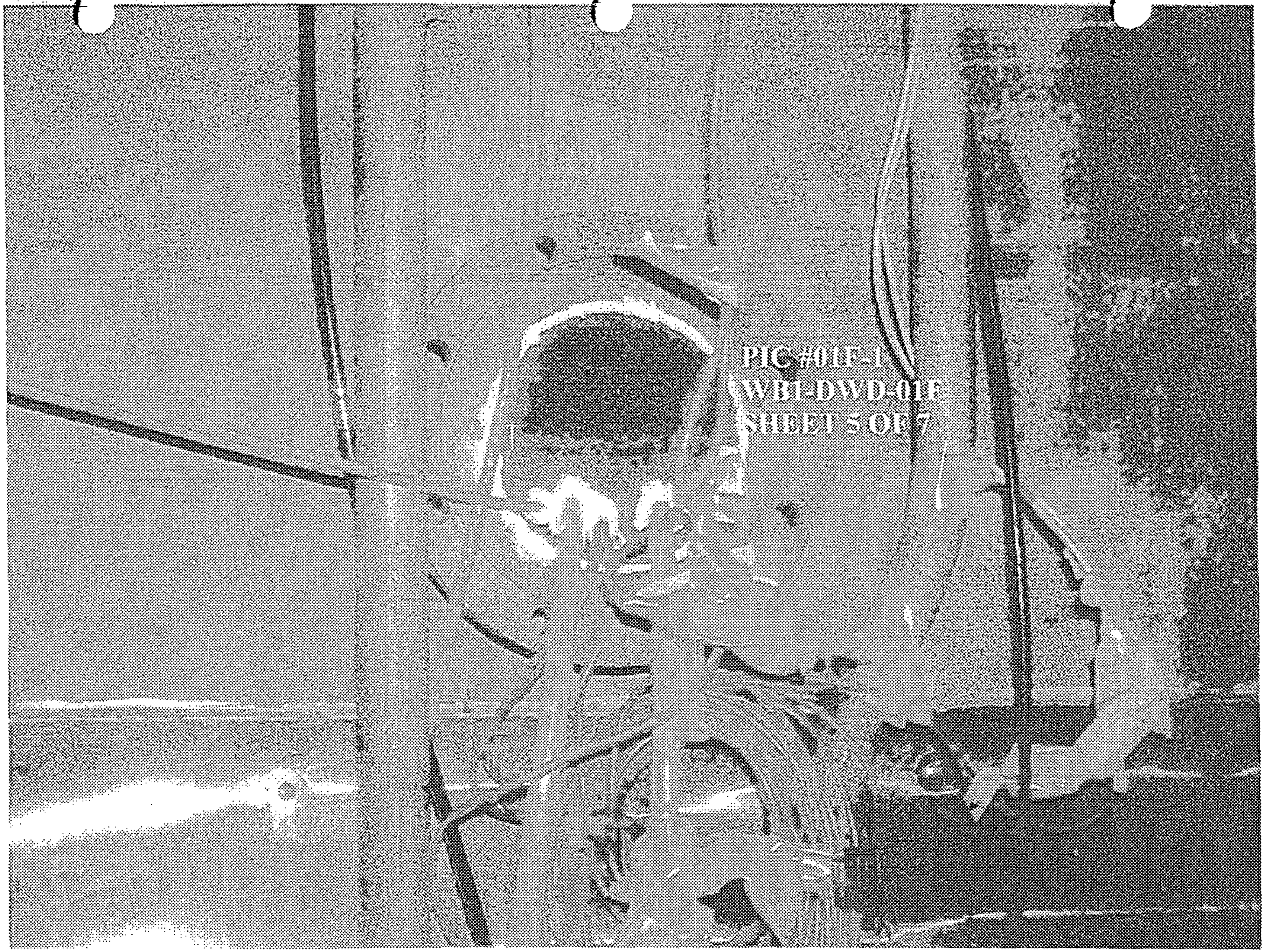
R (IN)	PI	PERIMETER(IN)	IN CU IN(0.25X0.25X0.5)	TOTAL CU IN	TOTAL CU FT
4.375	3.1416	27.49	0.03125	10	0.006
6.375	3.1416	40.06	0.03125	15	0.009
6.375	3.1416	40.06	0.03125	15	0.009
				TOTAL	0.023

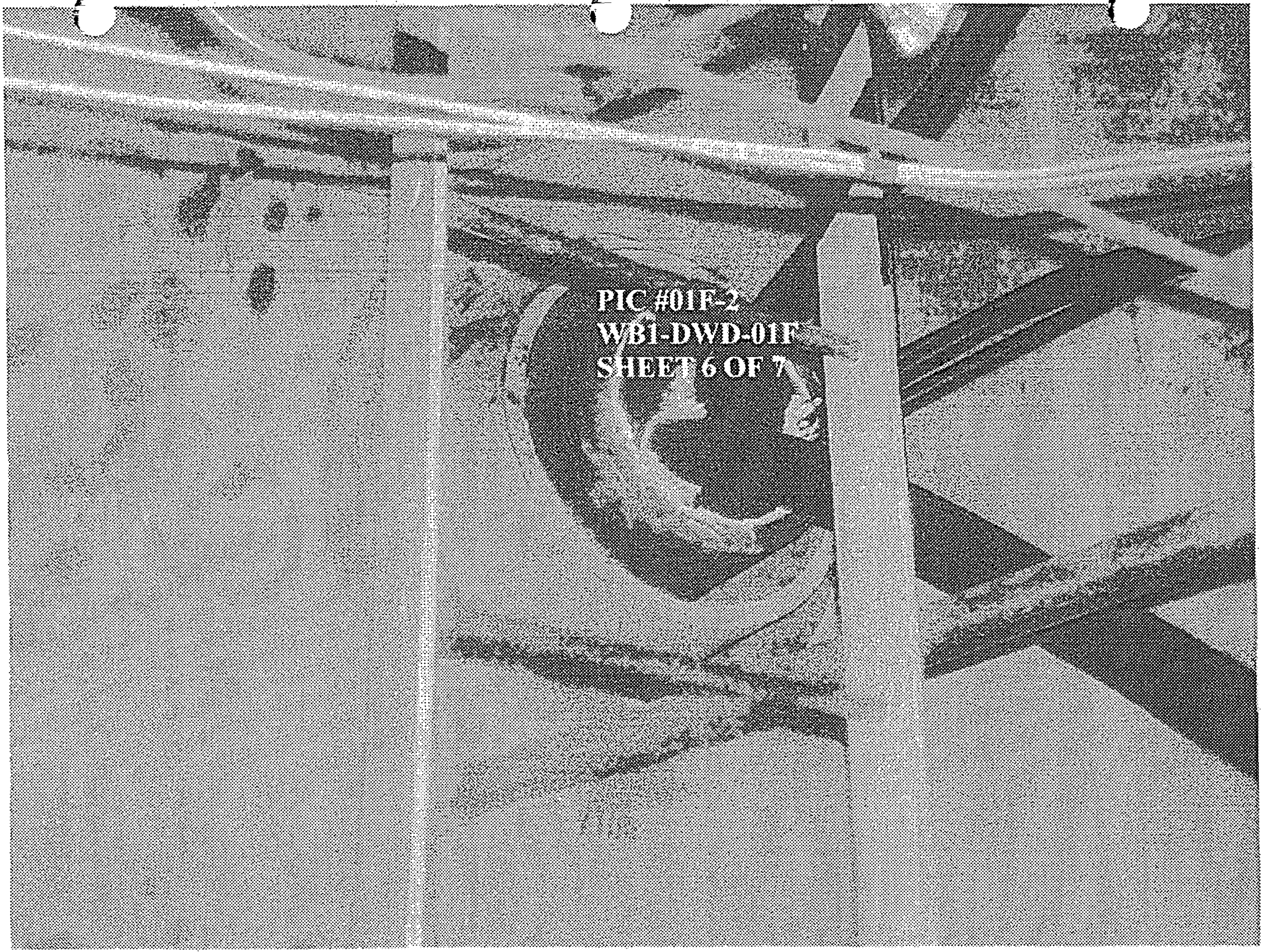
FOAM MATERIAL- ASSUME SOLID WITH 18" LONG

DIA	INSIDE DIA	CROSS SEC A	LENGTH (IN)	VOL. (CU IN)	VOL. (CU FT)
8" DIA	10.02	78.85	18	1419.381	0.821
12" DIA	12	113.10	18	2035.757	1.178
12" DIA	12	113.10	18	2035.757	1.178
TOTAL=					3.178



47W2500-3
QUADIII
EL 702.78 TO 710.0


PIC #01F-1
WB1-DWD-01F
SHEET 5 OF 7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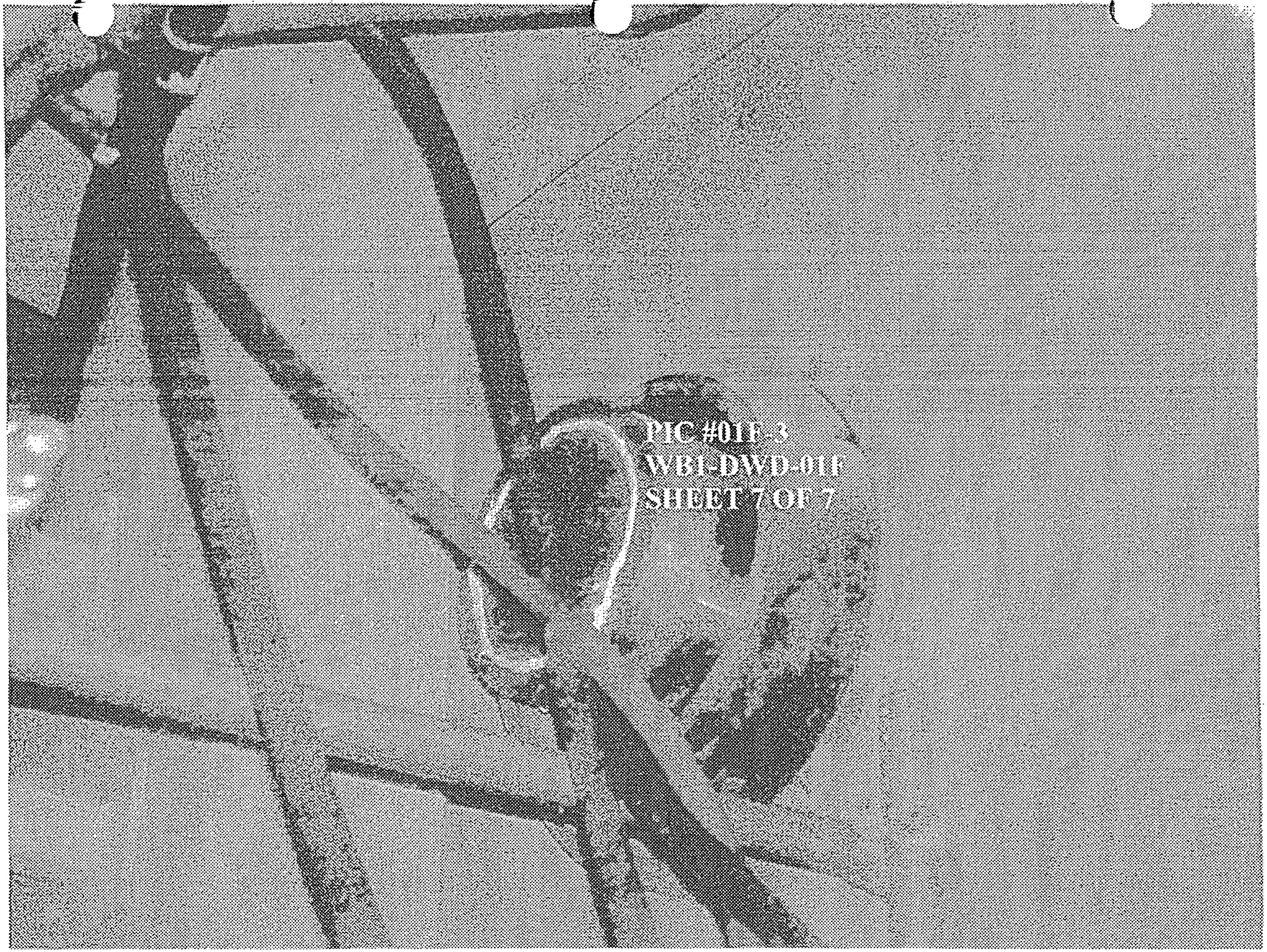
WB1-DWD-01F
SHEET 6 OF 7


PIC #01F-3
WB1-DWD-01F
SHEET 7 OF 7

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001G SHEET 1 OF 46 CGW 10/28/03

DATE:	10/28/2003	AREA:	RACEWAY	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-075C, SH. 1, REV. C *	
Tools:	590955-075C, SH. 2, REV. C *	
Drawings	590955-075C, SH. 3, REV. C *	
Flashlights	590955-075C, SH. 4, REV. B *	
Ladders	590955-075C, SH. 5, REV. B *	
Cameras	47W406-320, REV. F	
Binoculars	1-47W406-320A, REV. 0	
Tape measure	1-47W406-320B, REV. 0	
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify **installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	2"/3" LETDOWN LINES FROM REGENERATIVE HEAT EXCHANGER TO PEN. X15
	CONTINUED TO WALKDOWN PACKAGE NO's WB1-DWD-024C & -019E.
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS [signature] Date: 10/28/03

Checked By: MIKE SOLLIE [signature] Date: 11/9/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001G SHEET 2 OF 6

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	3.50	64.75	RMI	1.75	12.93	S.S.	STD	N/A	7" OD INSULATION
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	2.38	130.34	RMI	1.81	21.57	S.S.	STD	N/A	6" OD INSULATION
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	2.26	5.34	RMI	4.31	3.31	S.S.	STD	N/A	11" OD INSULATION
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	2.38	4.36	RMI	0.81	0.25	S.S.	STD	N/A	4" OD INSULATION
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	2.38	2.70	RMI	1.31	0.28	S.S.	STD	N/A	5" OD INSULATION (2.38" OD PIPING)
0600200-08-09	RACEWAY	702'	1	LETDOWN LINE	1.06	0.80	RMI	1.97	0.10	S.S.	STD	N/A	5" OD INSULATION (1.06" OD PIPING)

APPROXIMATE INSULATION LENGTH:

START FROM INSTRUMENT RM TO ACCUMULATOR RM #4:

AT 7" OD INSULATION (3.5" OD PIPING):

LENGTH = $\pi(4.5)(90°/180°) + 2.75 + 3[\pi(4.5)(90°/180°)] + 5.88 + (112.25 - 6)$

$+ \pi(4.5)(90°/180°) + 16.5 + \pi(4.5)(90°/180°) + (121.28 - 6) + (61.47 - 7)$

$+ \pi(4.5)(90°/180°) + 6 + \pi(4.5)(90°/180°) + 29.97 + (89.9 - 2.5) + (172.25 - 5)$

$+ \pi(4.5)(90°/180°) + 5.88 + \pi(4.5)(90°/180°) + (85.88 - 9) + 10.38 + 11.38 + 9.38$

$= 777(1/12) = 64.75$FT

AT 6" OD INSULATION (2.38" OD PIPING):

LENGTH = 20.25 + 5.25 + 3.5 + 22.5 + 15.38 + 26.5 + 7.5 + 10.5 + 36.03 + 22.63 + 3.5

+ (10.25 + 6 + 4.57)SECT. G-G & H-H + 10.75 + 16.22 + 8.89 + 14.81 + 3.12 + 8.5

+ (109 - 5.25) + (111.75 - 7.375) + (114.38 - 7.38) + (116.38 - 7.38) + (110.25 - 5.19)

+ 25.5 + 27.81 + 27.47 + 3.75 + 2.75 + 4.62 + (113.25 - 5.75) + 29.28 + 28.03

+ 28.88 + 13.88 + 26.25 + 7.75 + 6.03 + 9 + 12 + 10.59 + 36.03 + 7.25 + 19.88

+ 36.03 + 7.12 + 7.75 + 46.41 + 5 + (84.5 - 4.5 - 7) + 5 + (93 - 5) + 3.88 + 5 + 16.62

+ 5.62 + 6 + 4.19 + 13.19 + 3.38 + 43.5 + 5 + 68 = 1564(1/12) = 130.34FT

AT 11" OD INSULATION (VALVES 8149B, 8149A, 662, 276, 1-FCV-62-74-A) (2.38 OD PIPING):

LENGTH = 13 + 13 + 12 + 13 + 13 = 64(1/12) = 5.34FT

AT 4" OD INSULATION (2.38" OD PIPING): LENGTH = 33.28 + 3.5 + 5 + 10.5 = 52.28(1/12) = 4.36FT

AT 5" OD INSULATION (2.38" OD PIPING): LENGTH = 17.25 + 15.12 = 32.37(1/12) = 2.70FT

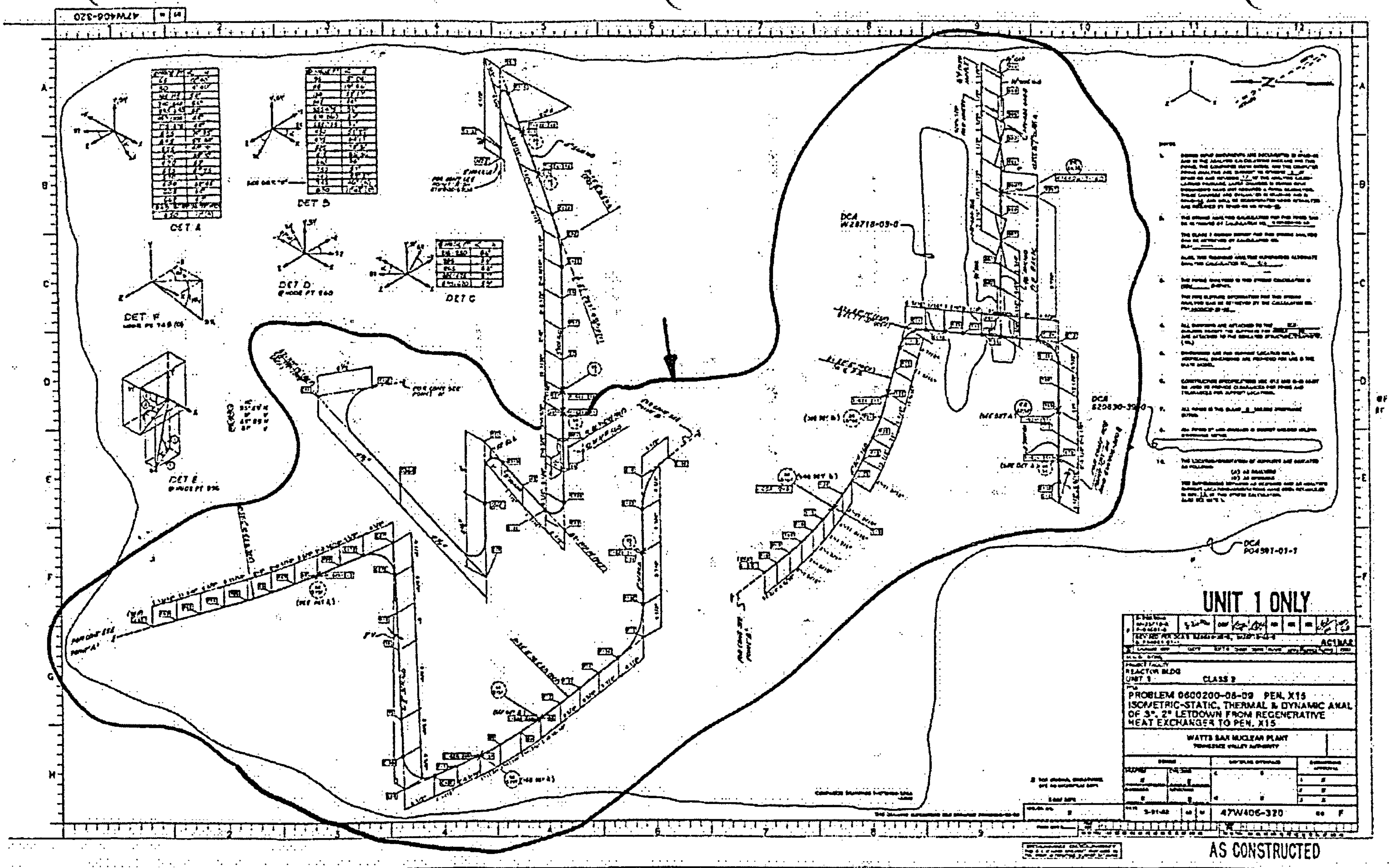
AT 5" OD INSULATION (1.06" OD PIPING): LENGTH = 9.5(1/12) = 0.80FT

AT DRAIN VALVE 1-DRV-62A-721: (7" OD INSULATIONI, 1.05" OD PIPING)

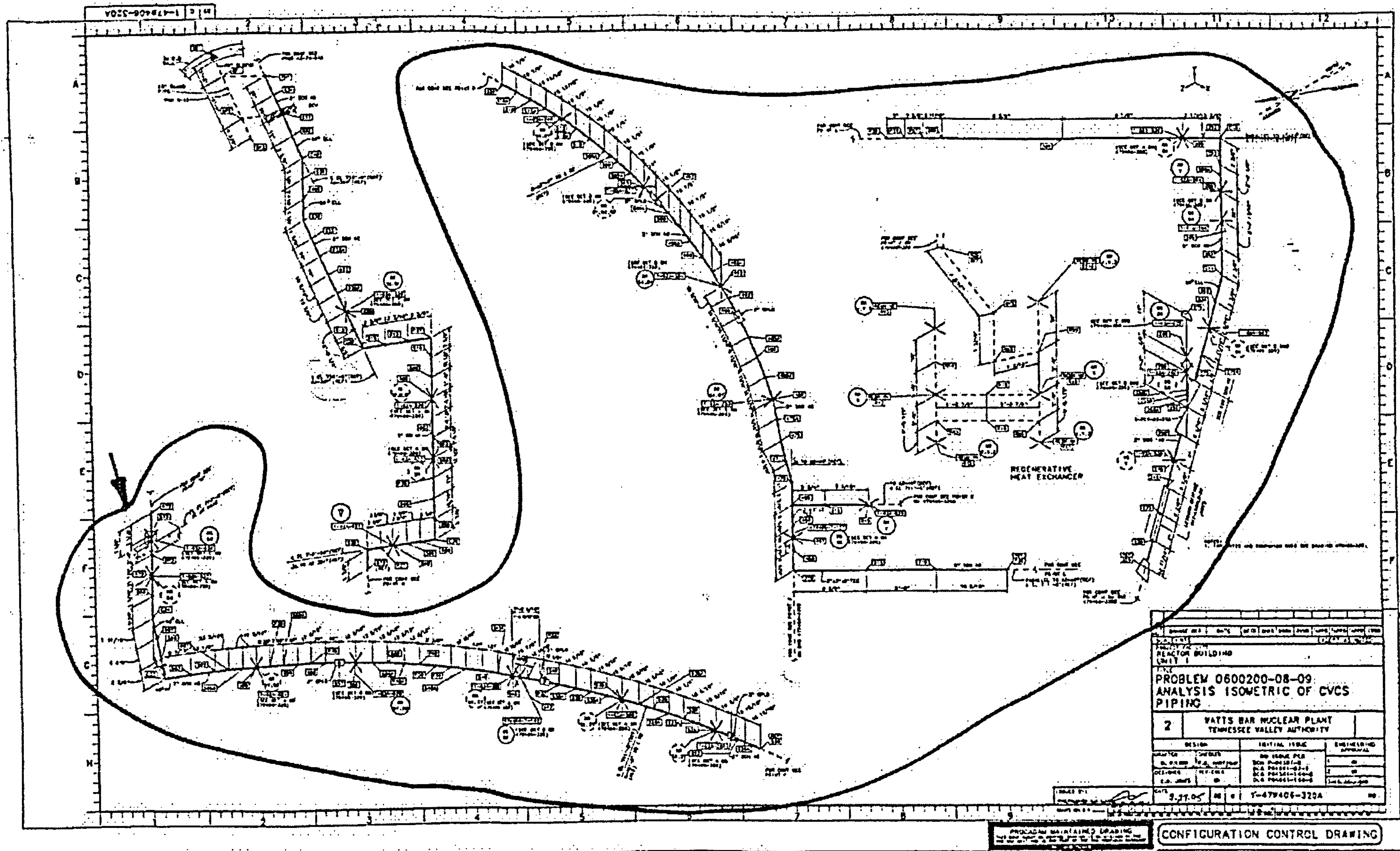
LENGTH = 7.25 + 7.5 = 14.75(1/12) = 1.23FT

AT DRAIN VALVE 1-TV-62A-708: (6" OD INSULATIONI, 1.05" OD PIPING)

LENGTH = 6(1/12) = 0.50FT



WBI-DWD-001G
PG 5 OF 6



WBI-DWD-001G
PG 6 OF 6

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001J SHEET 1 OF 3

DATE:	11/18/2003	AREA:	RACEWAY	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, FRNAK C. YAO

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-077C, SH. 1, REV. B *	
Tools:	590955-077C, SH. 5, REV. C *	
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location and band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints).**
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	1" EXCESS LETDOWN LINE
	(FROM EXCESS LETDOWN HEAT EXCHANGER TO 4" SEAL WATER RETURN LINE)
	CONTINUED ON WALKDOWN PACKAGE NO. WB1-DWD-024K.
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS [signature] Date: 11/18/03

Checked By: FRANK C. YAO [signature] Date: 11/18/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001J SHEET 2 OF 3

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	RACEWAY	702'	1	EXCESS LETDOWN	1.32	7.46	RMI	2.34	1.39	S.S.	STD	N/A	6" OD INSULATION
N/A	RACEWAY	702'	1	EXCESS LETDOWN	1.32	3.44	RMI	1.84	0.44	S.S.	STD	N/A	5" OD INSULATION
N/A	RACEWAY	702'	1	EXCESS LETDOWN	1.32	1.00	RMI	3.84	0.43	S.S.	STD	N/A	9" OD INSULATION

APPROXIMATE INSULATION LENGTH:

START FROM FLOOR SLEEVE:

AT 6" OD INSULATION:

LENGTH = 5.88 + 13.44 + 1.95 + 3.5 + 9.08 + 2.5 + 2.37 + 2.5 + 3.25 + 7.25 + 11 + 9.62 + 17.12 = 89.46(1/12) = 7.46FT

AT 5" OD INSULATION:

LENGTH = 7.25 + 8.06 + 3.25 + 14.62 + 8 = 41.18(1/12) = 3.44FT

AT 9" OD INSULATION:

LENGTH = 12(1/12) = 1.00FT

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001K SHEET 1 OF 10

DATE:	11/18/2003	AREA:	RACEWAY	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, FRANK C. YAO

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-083C, SH. 1, REV. B *	
Tools:	590955-083C, SH. 2, REV. B *	
Drawings	590955-083C, SH. 3, REV. A *	
Flashlights	590955-083C, SH. 4, REV. C *	
Ladders	590955-083C, SH. 5, REV. C *	
Cameras	1-47W406-335A, REV. 0	
Binoculars	1-47W406-336A, REV. 0	
Tape measure	1-47W406-338A, REV. 0	
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location and band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints).**
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	*Inspect and verify any fibrous materials inside electrical components and cabinets*

	COMMENTS
	3"/4" SEAL WATER RETURN LINE
	CONTINUED ON WALKDOWN PACKAGE NO. WB1-DWD-019K.
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS *[signature]* Date: 11/18/03

Checked By: FRANK C. YAO *[signature]* Date: 11/18/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001K SHEET 2 OF 10

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	160.00	RMI	1.75	38.18	S.S.	STD	N/A	8" OD INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	2.05	MIN-K	0.75	0.18	N/A	N/A	N/A	6" OD MIN-K INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	3.79	RMI	1.25	0.59	S.S.	STD	N/A	7" OD INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	1.58	MIN-K	0.5	0.09	N/A	N/A	N/A	5.5" OD MIN-K INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	1.52	MIN-K	0.5	0.08	N/A	N/A	N/A	6.12" OD MIN-K INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	4.50	0.94	RMI	1.625	0.20	S.S.	STD	N/A	7.75" OD INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	3.50	17.54	RMI	1.75	3.52	S.S.	STD	N/A	7" OD INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	3.50	1.00	MIN-K	0.56	0.05	N/A	N/A	N/A	4.62" OD MIN-K INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	3.50	2.74	RMI	1.25	0.35	S.S.	STD	N/A	6" OD INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	1.06	6.87	RMI	1.47	0.56	S.S.	STD	N/A	4" OD INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	1.06	1.37	MIN-K	1.47	0.11	S.S.	STD	N/A	4" OD MIN-K INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	1.06	0.92	RMI	3.97	0.40	S.S.	STD	N/A	9" OD INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	2.38	2.76	RMI	1.31	0.29	S.S.	STD	N/A	5" OD INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	2.38	0.65	RMI	1.81	0.11	S.S.	STD	N/A	6" OD INSULATION
0600200-08-06, -07, -13	RACEWAY	702'	1	SEAL WATER RETURN LINE	2.38	2.34	RMI	2.31	0.55	S.S.	STD	N/A	7" OD INSULATION

APPROXIMATE INSULATION LENGTH:

START FROM FLOOR SLEEVE:

AT 8" OD INSULATION (4" PIPING):

LENGTH = 17.23 + 7[π(6)(90°/180°)] + 103.38 + 42.25 + 17.59 + 16.59
+ 28.83 + 30.78 + 28.83 + 28.83 + 30.92 + 14.46 + 3.62 + 9.25 + 28.5 + 28.5
+ 28.5 + (218.75 - 1 - 6 - 6) + (224.38 - 2 - 9 - 7.5) + (213.75 - 1- 8.5 - 1)
+ 21.12 + 21.63 + 10.25 + 19.26 + 27.7 + 27.7 + 0.48 + 3 + 19 + 41.78 + 3.25
+ 30 + 30.23 + 30.23 + 30 + 4.75 + 29.53 + 31.4 + 31.4 + 31.4 + 30 + 35.06
+ (178.5 - 6 - 5) + 28.63 + 28.89 + 28.89 + 12 = 1920(1/12) = 160.00FT

AT 6" OD MIN-K INSULATION (4" PIPING) : LENGTH = 12.25 + 12.25 = 24.5(1/12) = 2.05FT

AT 7" OD INSULATION (4" PIPING): LENGTH = 14.46 + 30.92 = 45.38(1/12) = 3.79FT

AT 5.5" OD MIN-K INSULATION (4" PIPING):

LENGTH = 2[π(6)(90°/180°)] = 18.85(1/12) = 1.58FT

AT 6.12 OD MIN-K INSULATION (4" PIPING): LENGTH = 18.14(1/12) =1.52 FT

AT 7.75" OD INSULATION (4" PIPING): LENGTH = 11.24(1/12) = 0.94FT

AT 7" OD INSULATION (3" PIPING):

LENGTH = 30.17 + 30.17 + 30.51 + 29.19 + 32.87 + 32.85 + .75 + 2[π(4.5)(90°/180°)]
+ 9.75 = 211(1/12) = 17.54FT

AT 4.62" OD MIN-K INSULATION (3" PIPING): LENGTH = 12(1/12) = 1.00FT

AT 6" OD INSULATION (3" PIPING): LENGTH = 32.87(1/12) = 2.74FT

AT 4" OD INSULATION (3/4" PIPING):

LENGTH = 16.5 + 19.5 + 1.25 + 3 + 1.25 + 25.25 + 3 + 1 + 6 + 5.62

= 82.37(1/12) = 6.87FT

AT 4" OD MIN-K INSULATION (3/4" PIPING): LENGTH = 16.37(1/12) = 1.37FT

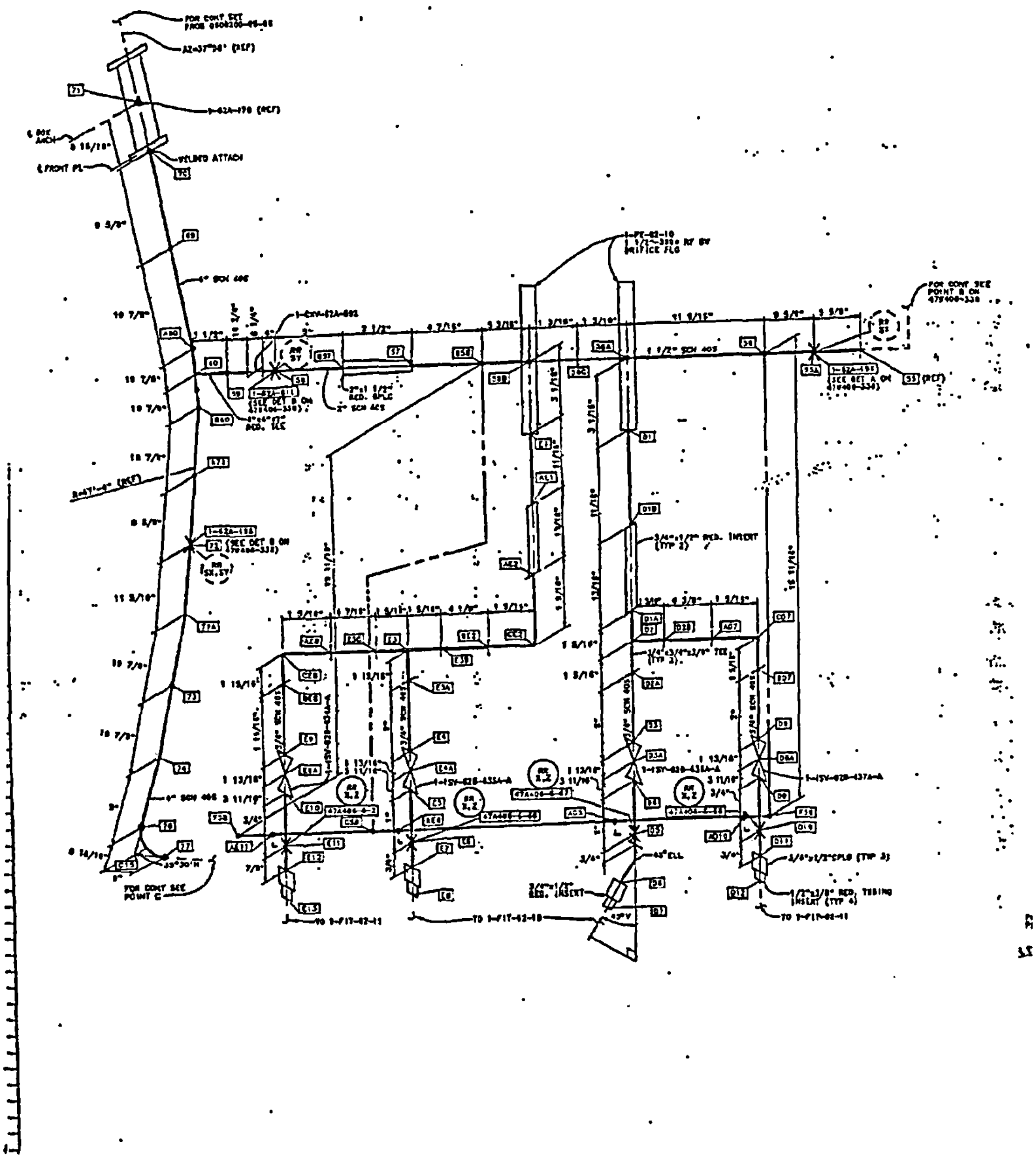
AT 9" OD INSULATION (3/4" PIPING): LENGTH = 11(1/12) = 0.92FT

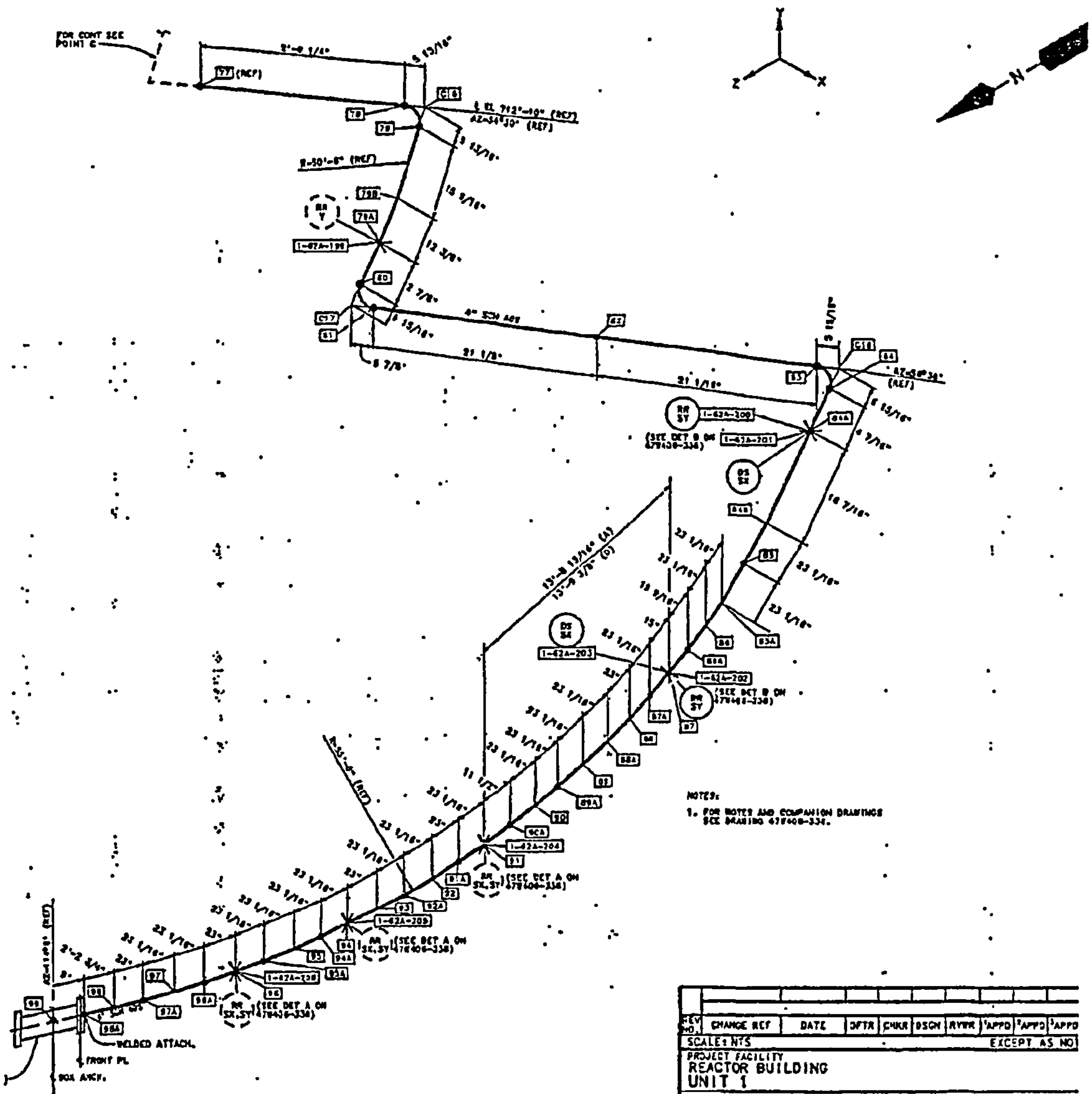
AT 5" OD INSULATION (2" PIPING):

LENGTH = 7.62 + 3.75 + 13 + 2.5 + 5 + 1.25 = 33.12(1/12) = 2.76FT

AT 6" OD INSULATION (2" PIPING): LENGTH = 3.75 + 4 = 7.75(1/12) = 0.65FT

AT 7" OD INSULAITON (2" PIPING): LENGTH = 8.75 + 10.25 + 9 = 28(1/12) = 2.34FT





NOTES:
1. FOR NOTES AND COMPANION DRAWINGS SEE DRAWING 47W406-338.

SCALE: NTS EXCEPT AS NOTED

PROJECT FACILITY
REACTOR BUILDING
UNIT 1

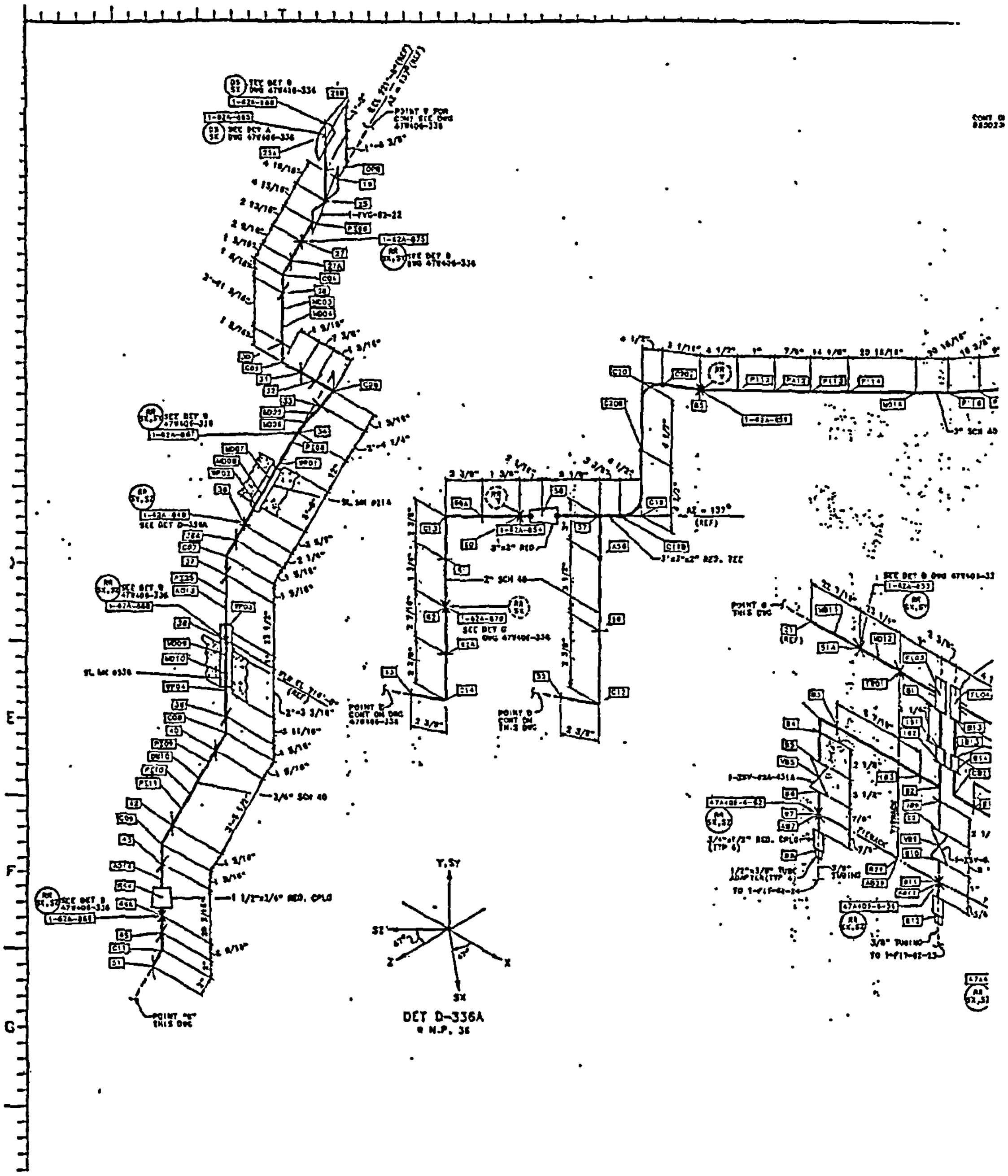
TITLE
PROBLEM 0600200-08-07
ANALYSIS ISOMETRIC OF CVCS PIPING

CONTAINMENT DEBRIS WALKDOWN PACKAGE

WATTS BAR N. P. UNIT 1

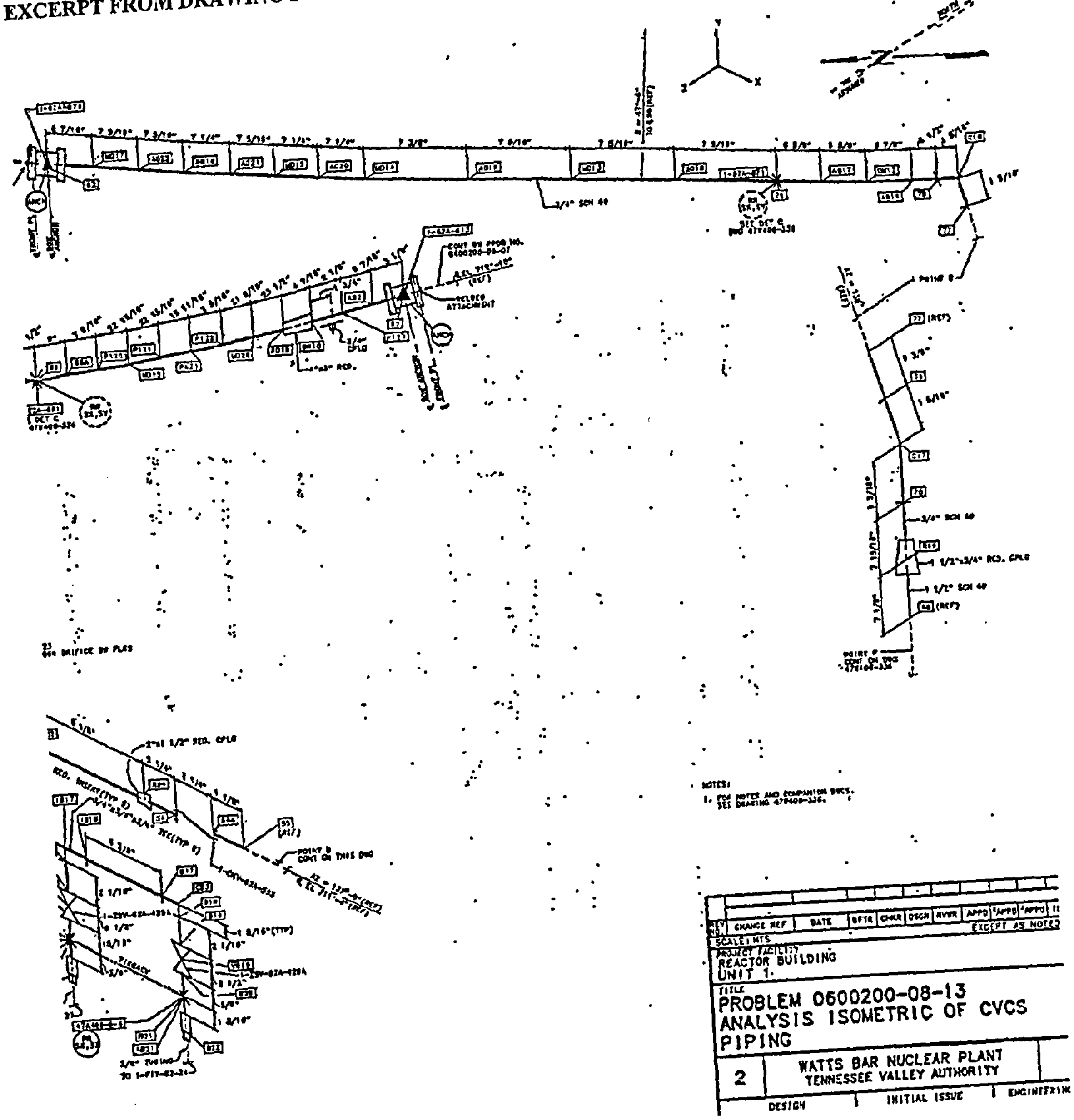
WALKDOWN PACKAGE NO. WB1-DWD-001K

EXCERPT FROM DRAWING 1-47W406-336A

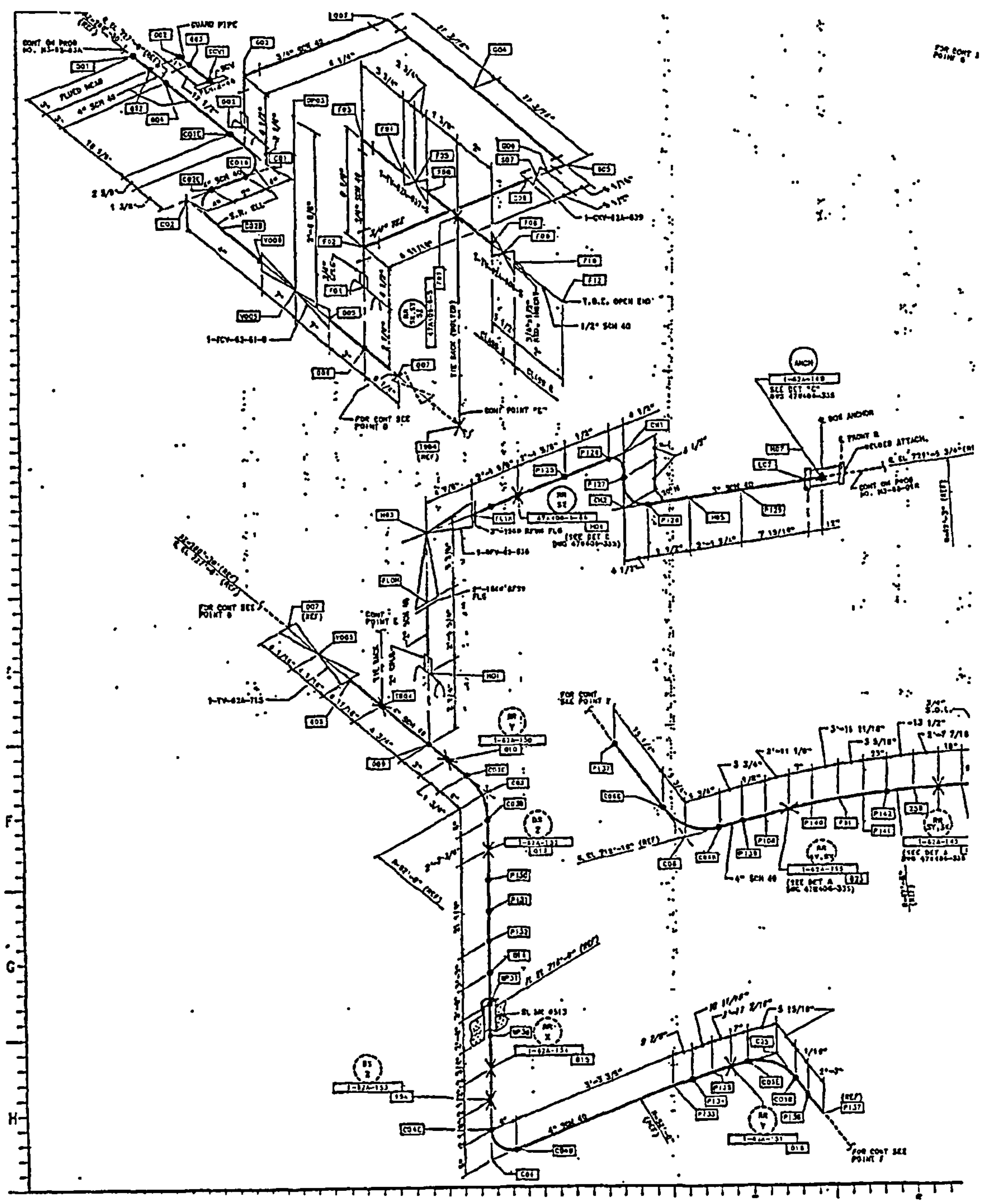


CONTAINMENT DEBRIS WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001K
EXCERPT FROM DRAWING 1-47W406-336A



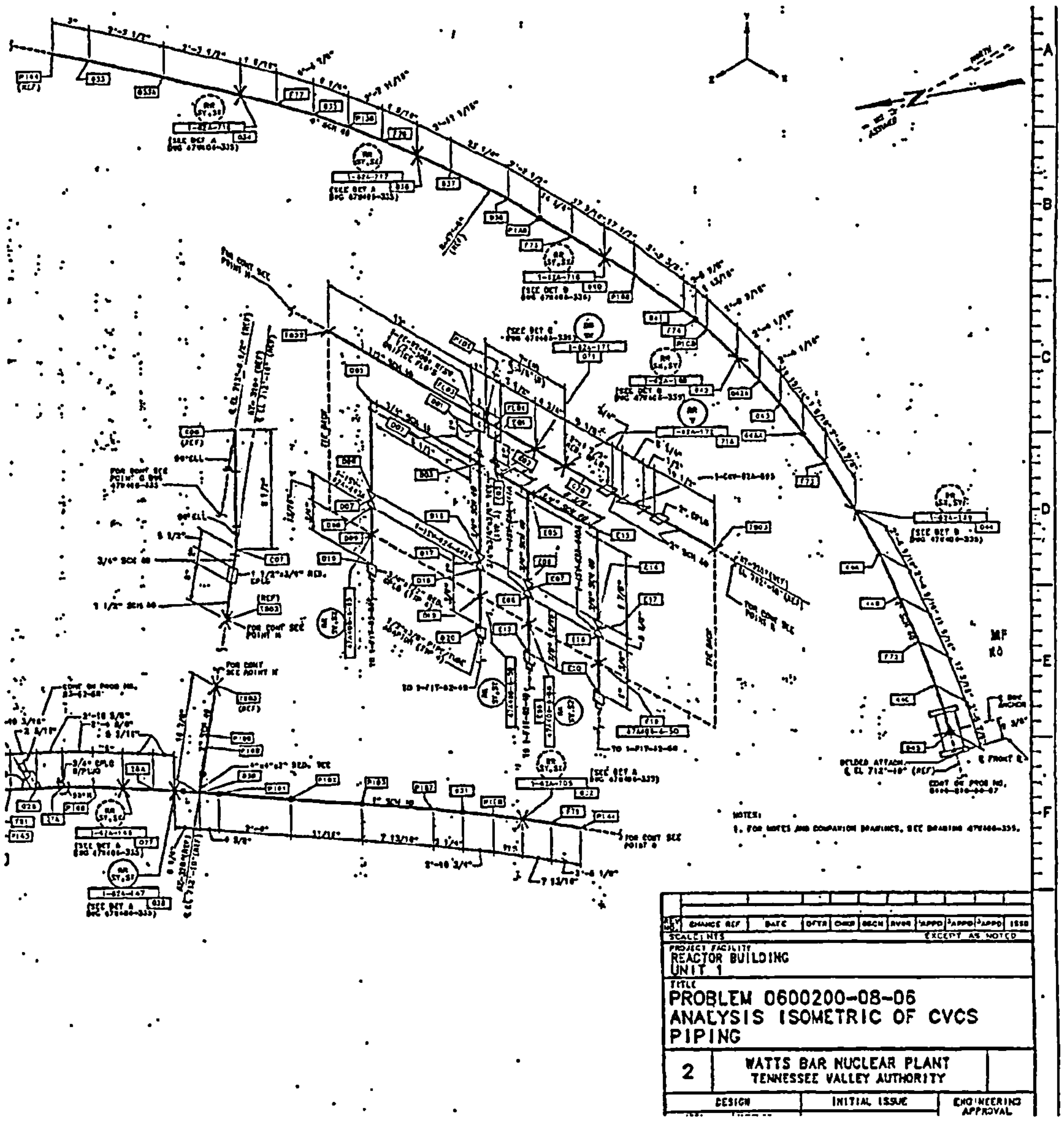
EXCERPT FROM DRAWING 1-47W406-335A



CONTAINMENT DEBRIS WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001K — SHEET 10 OF 10

EXCERPT FROM DRAWING 1-47W406-335A



CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001L SHEET 1 OF 5

DATE:	11/19/2003	AREA:	RACEWAY	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, FRANK C. YAO

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-088C, SH. 1, REV. B *	
Tools:	590955-088C, SH. 6, REV. B *	
Drawings	590955-088C, SH. 7, REV. B *	
Flashlights	590955-088C, SH. 8, REV. C *	
Ladders	590955-088C, SH. 9, REV. B *	
Cameras	1-47W400-209A, REV. 0	
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and detemine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

COMMENTS

1"/2"/3"/4" STEAM GENERATOR BLOWDOWN LINE (LOOP 2)

CONTINUED ON WALKDOWN PACKAGE NO's WB1-DWD-014Q & -015D.

* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS *CGWalls* Date: 11/19/03

Checked By: FRNAK C YAO *Frank C Yao* Date: 11/19/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001L SHEET 2 OF 5

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	149.59	RMI	2.25	49.57	S.S.	STD	N/A	9" OD INSULATION
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	2.57	RMI	1.75	0.61	S.S.	STD	N/A	8" OD INSULATION
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	1.52	MIN-K	1.375	0.27	S.S.	STD	N/A	7.25" OD INSULATION
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	2.38	1.54	RMI	2.31	0.36	S.S.	STD	N/A	7" OD INSULATION
0600200-07-02	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	2.38	1.72	RMI	2.81	0.55	S.S.	STD	N/A	8" OD INSULATION

APPROXIMATE INSULATION LENGTH:

START FROM PEN. MARK NO. 770:

AT 9" OD INSULATION (4" PIPING):

LENGTH = 17 + 28 + 9.5 + 9 + 20 + 7[π(6)(90°/180°)] + 89.5 + (112.5 - 4)

+ (88.75 - 4) + (69 - 7) + 135.75 + (145.12 - 6 - 2) + (90.12 - 6 - 4)

+ (118 - 4 - 4.25) + 13.25 + 13.25 + (112.5 - 6 - 4) + (125.25 - 3 - 5)

+ (22.5 - 3) + 15 + (39.5 - 2.5) + (57.5 - 3.12 - 3) + (122 - 3) + (124.5 - 3)

+ (124.62 - 3) + 25.75 + 15 + 3 + 9.19 + 17.25 + 9.31 + 8.34 + 18.81

= 1795(1/12) = 149.59FT

AT 8" OD INSULATION (4" PIPING):

LENGTH = 17.75 + 13 = 30.75(1/12) = 2.57FT

AT 7.25 OD MIN-K INSULATION (4" PIPING): LENGTH = 18.19(1/2) = 1.52FT

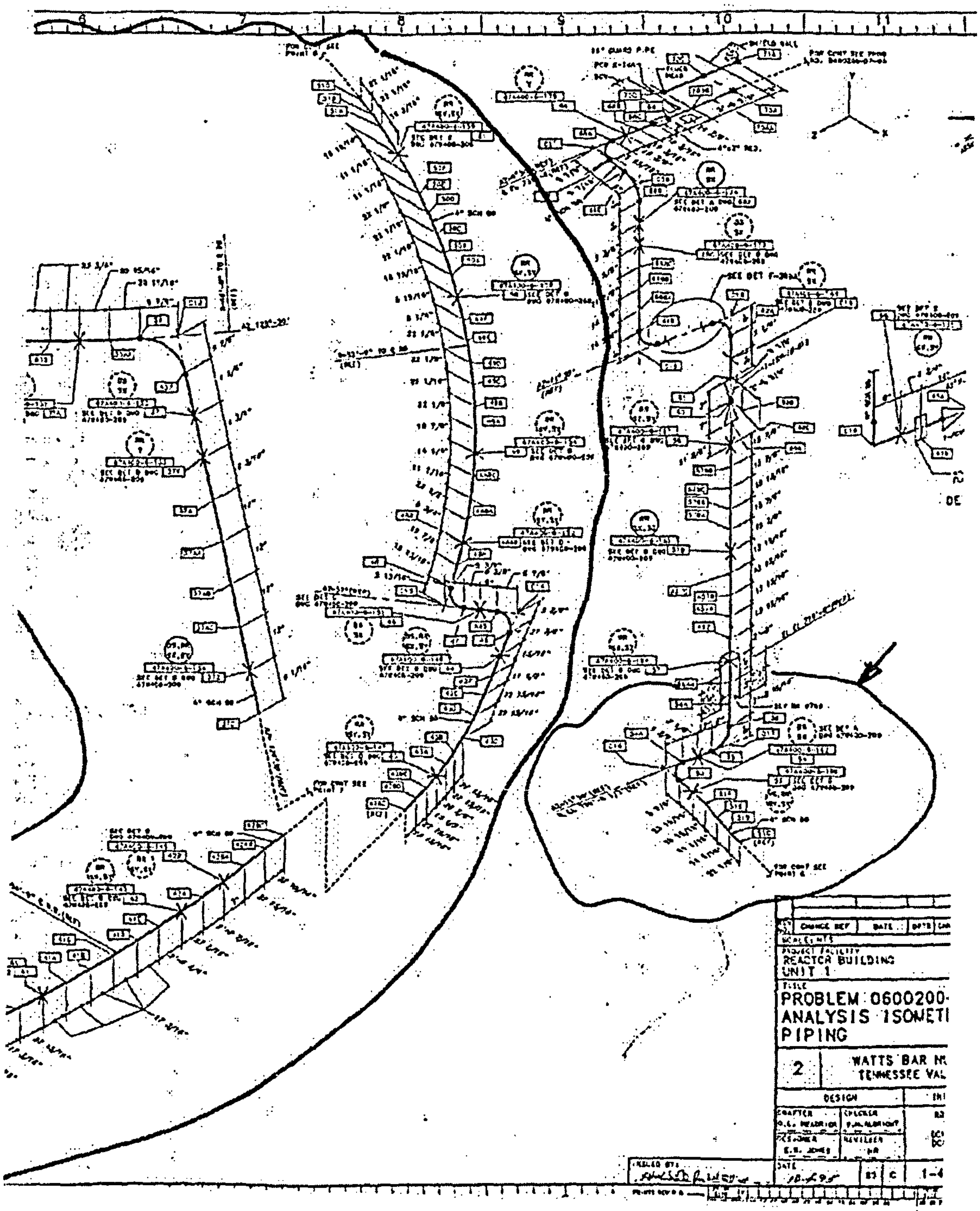
AT 7" OD INSULATION (2" PIPING): LENGTH = 9 + 2 + 5 + 2.37 = 18.37(1/12) = 1.54FT

AT 8" OD INSULATION (2" PIPING/VLV): LENGTH = 2(10.38)(1/12) = 1.73FT

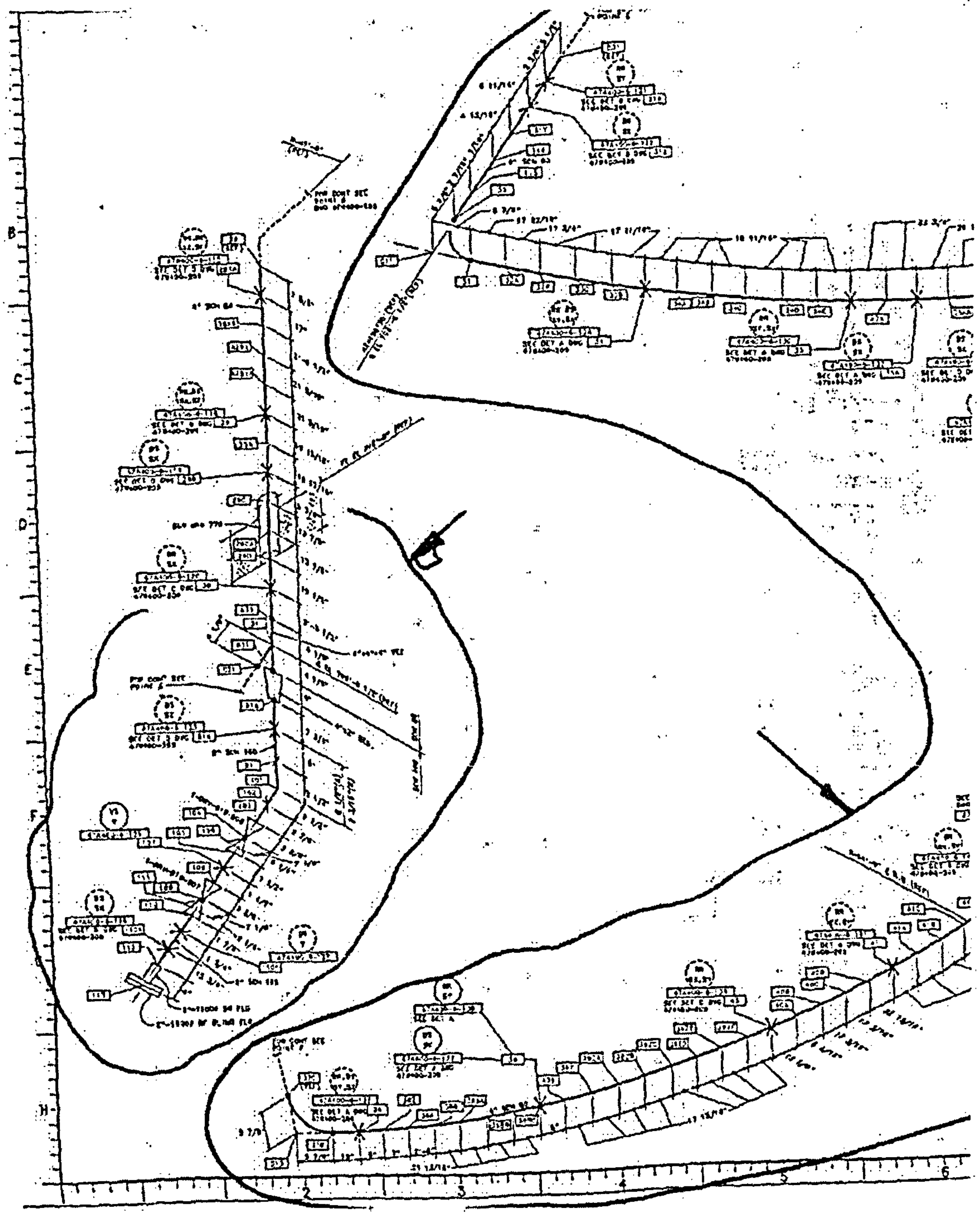
CONTAINMENT DEBRIS WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001L

EXCERPT FROM DRAWING 1-47W400-209A



EXCERPT FROM DRAWING 1-47W400-209A



CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001M SHEET 1 OF 5

DATE:	11/19/2003	AREA:	RACEWAY	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, FRANK C. YAO

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-088C, SH. 1, REV. B *	
Tools:	590955-088C, SH. 12, REV. C *	
Drawings	590955-088C, SH. 13, REV. B *	
Flashlights	590955-088C, SH. 14, REV. B *	
Ladders	590955-088C, SH. 15, REV. B *	
Cameras	590955-088C, SH. 16, REV. B *	
Binoculars	1-47W400-210A, REV. 0	
Tape measure	1-47W400-210B, LATEST REVISION	
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine **longitudinal seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	1"/2"/3"/4" STEAM GENERATOR BLOWDOWN LINE (LOOP 3)
	CONTINUED ON WALKDOWN PACKAGE NO's WB1-DWD-015E & -014R.
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS *C G Walls* Date: 11/19/03

Checked By: FRNAK C YAO *F C Yao* Date: 11/19/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-001M SHEET 2 OF 5

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	178.00	RMI	2.25	58.98	S.S.	STD	N/A	9" OD INSULATION
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	1.27	RMI	1.75	0.30	S.S.	STD	N/A	8" OD INSULATION
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	4.50	2.48	RMI	1.25	0.39	S.S.	STD	N/A	7" OD INSULATION
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	2.38	1.48	RMI	2.31	0.35	S.S.	STD	N/A	7" OD INSULATION
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	2.38	2.00	RMI	3.31	0.82	S.S.	STD	N/A	9" OD INSULATION
0600200-07-03	RACEWAY	702'	1	STEAM GENERATOR BLOWDOWN	8.62	0.73	RMI	2.19	0.38	S.S.	STD	N/A	13" OD INSULATION (FLANGE)

APPROXIMATE INSULATION LENGTH:

START FROM PEN. MARK NO. 771:

AT 9" OD INSULATION (4" PIPING): LENGTH = (64.87 - .62 - 3.5) + 8[π(6)(90°/180°)]

+ .38 + 8 + 6 + (47.88 - 4.12) + (119.12 - 2.38 - 2.25) + (109 - 3.75 - 3)

+ (118.38 - 3 - 2.5) + (113.5 - 2.5 - 3.25) + (89.88 - 2) + 69.12

+ (140 - 15.25 - 3) + (149.25 - 3.5) + (8.12 + 91.75 - 11 - 2.5)

+ (115.50 - 2.5 - 3.5) + (54.62 - 3.5 - 6) + (106.75 - 6) + 130.5 + 23

+ 16.75 + 97.25 + 121 + (124.62 - 4) + (123.5 - 4 - 3.75) + (36.62 - 3.75)

+ 14.88 + 64.5 = 2136(1/12) = 178.00FT

AT 8" OD INSULATION (4" PIPING): LENGTH = 15.25(1/12) = 1.27FT

AT 7" OD INSULATION (4" PIPING): LENGTH = 4(7.44)(1/12) = 2.48FT

AT 7" OD INSULATION (2" PIPING): LENGTH = 5.75 + 8.25 + 3.75 = 17.75(1/12) = 1.48FT

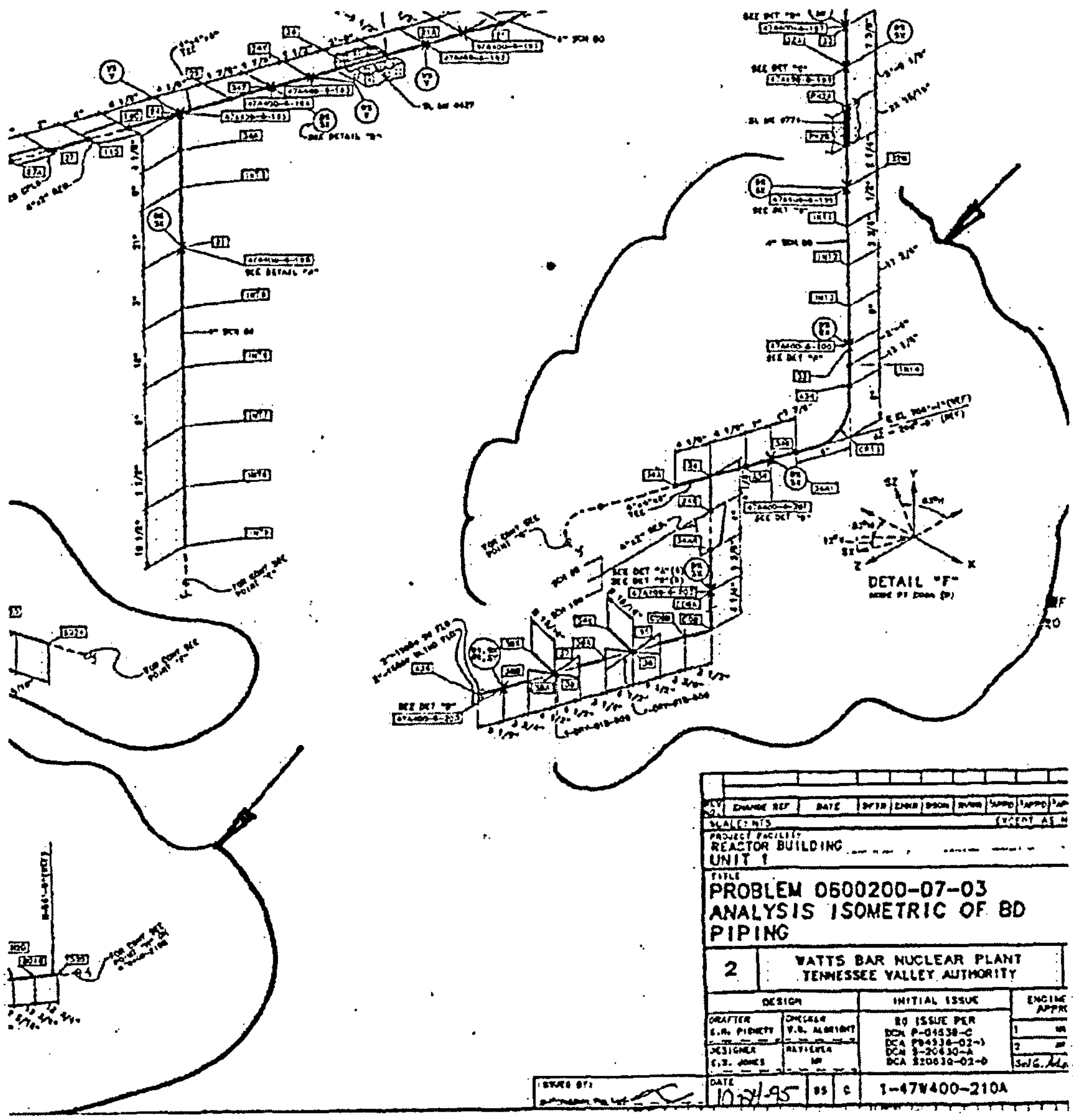
AT 9" OD INSULATION (2" PIPING/VLV): LENGTH = 2(12)(1/12) = 2.00FT

AT 13" OD INSULATION (8.62" OD FLANGE): LENGTH = 8.66(1/12) = 0.73FT

CONTAINMENT DEBRIS WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WBI-DWD-001M — SHEET 4 OF 5

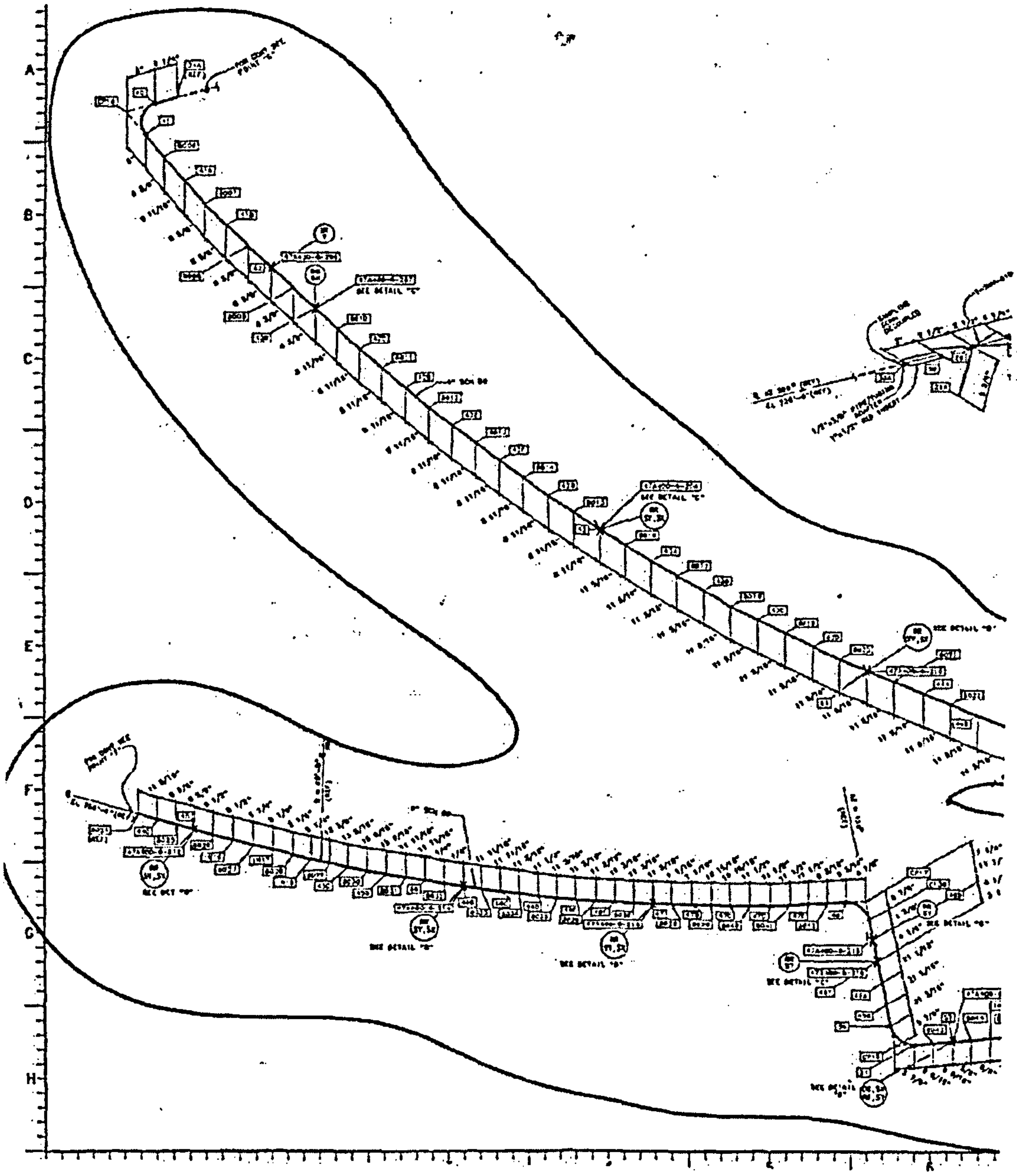
EXCERPT FROM DRAWING 1-47W400-210A



CONTAINMENT DEBRIS WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-001M

EXCERPT FROM DRAWING 1-47W400-210A



CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-002A SHEET 1 OF 3

DATE:	10/09/2003	AREA:	LOOP 1 (LOOP A)	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-040C, SH. 1, REV. B *	
Tools:	47W2500-1, REV. 1	
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location and band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints).**
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	REACTOR COOLANT INTERIM LEG (CROSSOVER LEG)
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS [signature] Date: 10/09/03

Checked By: MIKE SOLLIE [signature] Date: 10/31/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-002A SHEET 2 OF 3

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 1	702'	2	RC INTERIM LEG	SEE CALC	SEE CALC	RMI	SEE CALC	88.62	S.S.	STD	N/A	N/A

APPROXIMATE INSULATION VOLUME:

AT LOOP: (START FROM STEAM GENERATOR NOZZLE)

$$V = [\pi(42^2 - 36.31^2)/4 \times 6] + [\pi(44^2 - 37.5^2)/4 \times \pi(47.5)(40°)/180°]$$

$$+ [\pi(47^2 - 36.31^2)/4 \times 34.66] + [\pi(44^2 - 36.31^2)/4 \times (54.25 - 34.66 + 2.5 + 2.75)]$$

$$+ [\pi(44^2 - 37.5^2)/4 \times \pi(51.25)(90°)/180°] + [\pi(44^2 - 36.31^2)/4 \times 41.69]$$

$$+ [\pi(49^2 - 42^2)/4 \times \pi(44.25)(90°)/180°] + [\pi(49^2 - 37.62^2)/4 \times (9.75-2.38)]$$

$$= 146389(1/12^3) = 84.72\text{FT}^3$$

AT VALVES & CAP:

$$V = (3)[\pi 5^2/4 \times 9.75] + [\pi 5.5^2/4 \times 9.75] + (10.75^2 \times 6.44) = 1551(1/12^3) = 0.90\text{FT}^3$$

TOTAL VOLUME = $87.72 + 0.90 = 88.62\text{FT}^3$

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-002B SHEET 1 OF 86

DATE:	10/22/2003	AREA:	LOOP 1	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, FRANK C. YAO

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-031C, SH. 1, REV. 0 *	
Tools:	590955-032C, SH. 1, REV. B *	
Drawings	590955-033C, SH. 1, REV. A *	
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	REACTOR COOLANT PUMP
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS [signature] Date: 10/22/03

Checked By: FRANK C. YAO [signature] Date: 10/22/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-002B SHEET 2 OF 56

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 1	702'	2	REACTOR COOLANT PUMP	SEE CALC	SEE CALC	RMI	SEE CALC	63.45	S.S.	STD	N/A	N/A

APPROXIMATE INSULATION VOLUME:

AT PUMP: (CONSIDER INSULATION THICKENESS = 2.75")

$$V = [\pi(87.5^2 - 82^2)/4 \times 121.6] + [\pi(82^2 - 44^2)/4 \times 2.75] - 3(55.54)(121.6)$$

$$- 3[(244 - 55.54) \times 36.83] - (\pi 17.69^2 \times 2.75) = 55588(1/12^3) = 32.17\text{FT}^3$$

AT COOLANT NOZZLE COVER:

$$V = (44.5 \times 46 \times 2.75) + 2(27.25 \times 44.5 \times 2.75) + 2(40.5 \times 27.5 \times 2.75)$$

$$+ 2(18.5 \times 27.5 \times 2.75) - (\pi 17.69^2 \times 2.75) = 18519(1/12^3) = 10.8\text{FT}^3$$

AT SUPPORTS: (SEE VIEWS A-A & L-L)

$$V = 2[(48 \times 36.83 \times 2.75) + 2(36.83 \times 21.25 \times 2.75) + 2(48 \times 24 \times 2.75)$$

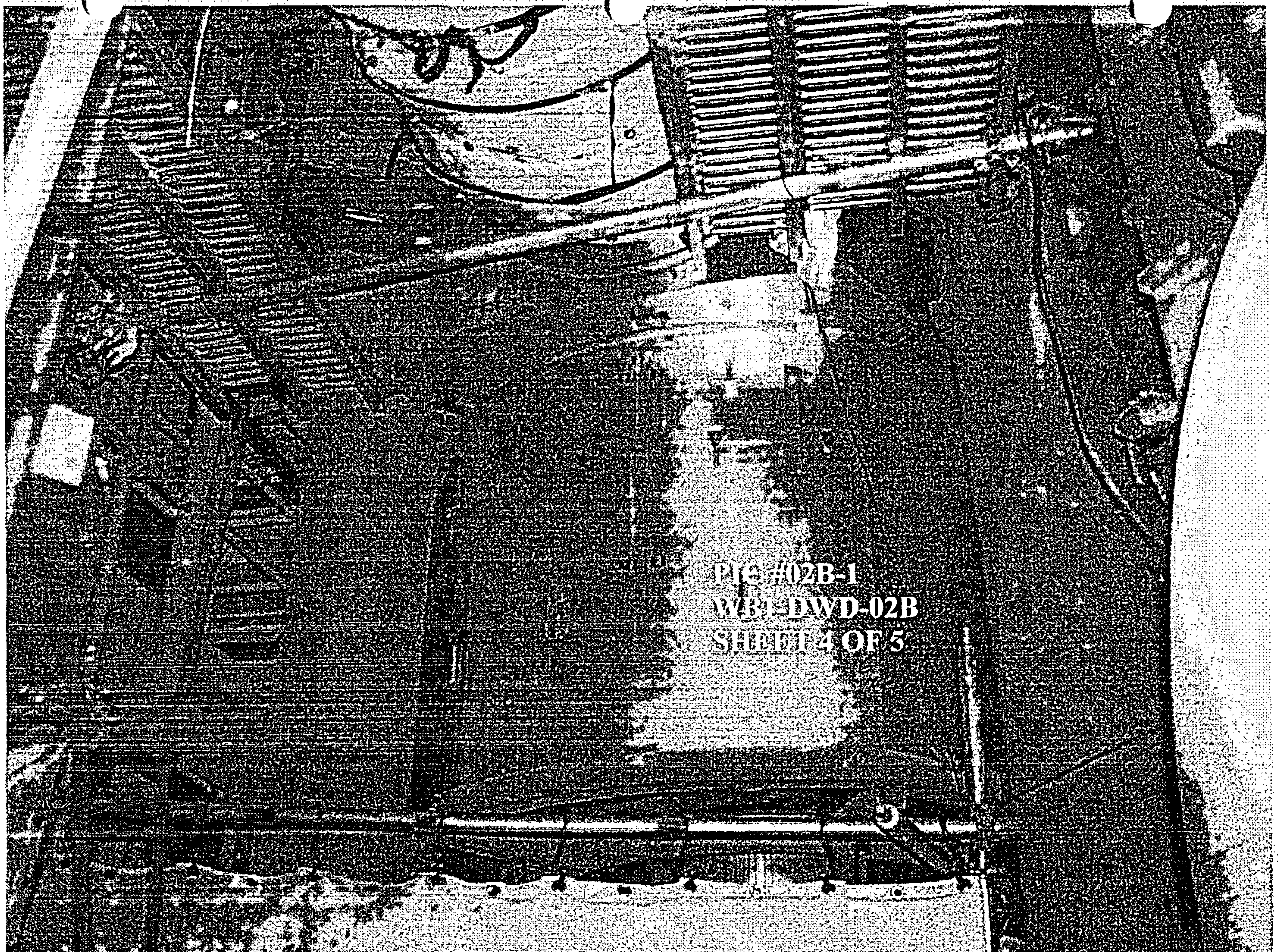
$$- 2(\pi 14^2 \times 2.75) + \pi[10.5^2 - 7^2]10] = 28080(1/12^3) = 16.25\text{FT}^3$$

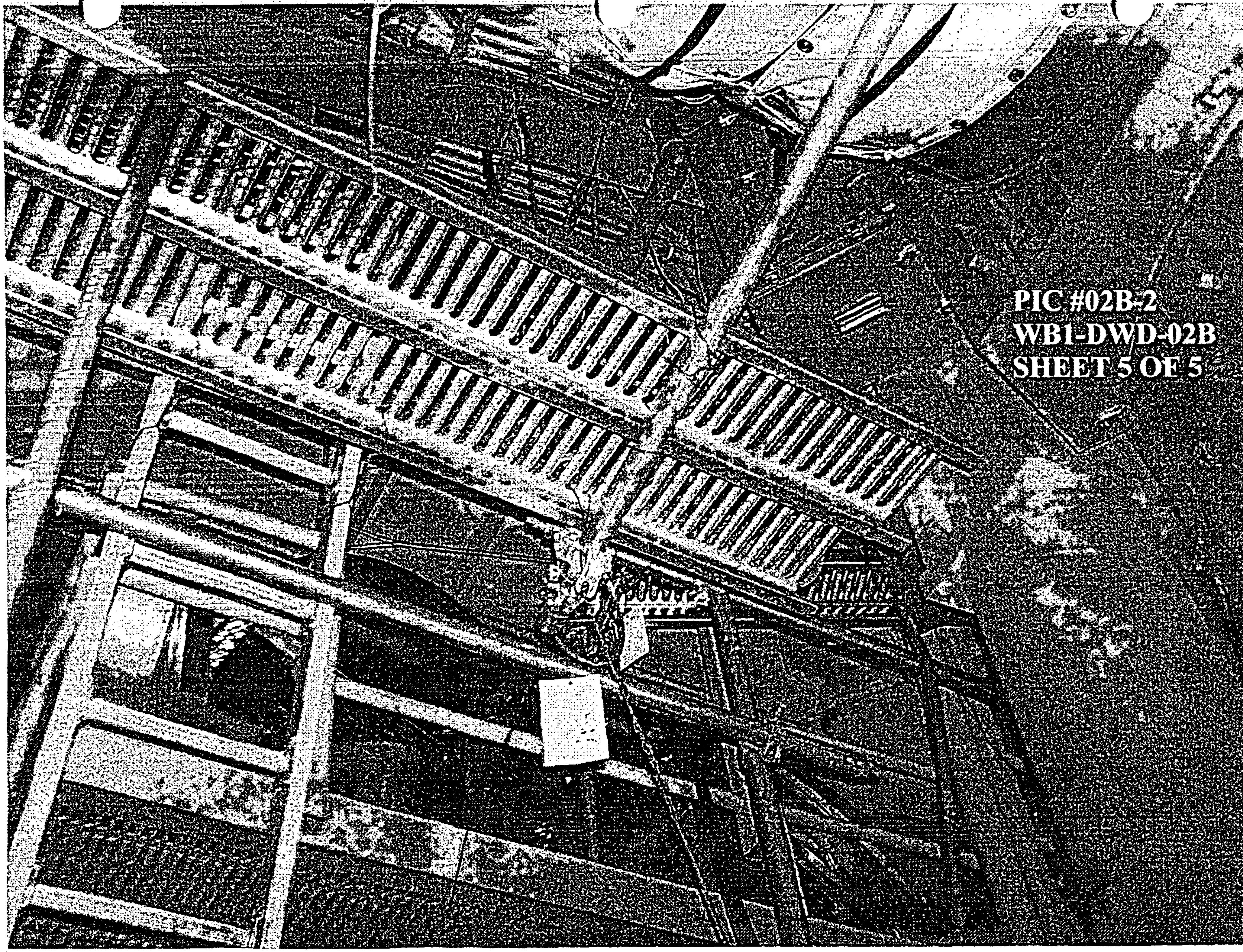
AT SUPPORT: (SEE VIEW K-K)

$$V = 2(48 \times 18.75 \times 2.75) + 2(36.83 \times 18.85 \times 2.75) - 2(\pi 14^2 \times 2.75)$$

$$+ \pi[10.5^2 - 7^2]10 = 7307(1/12^3) = 4.23\text{FT}^3$$

TOTAL VOLUME = 32.17 + 10.8 + 16.25 + 4.23 = 63.45FT³


PIC #02B-1
WB1-DWD-02B
SHEET 4 OF 5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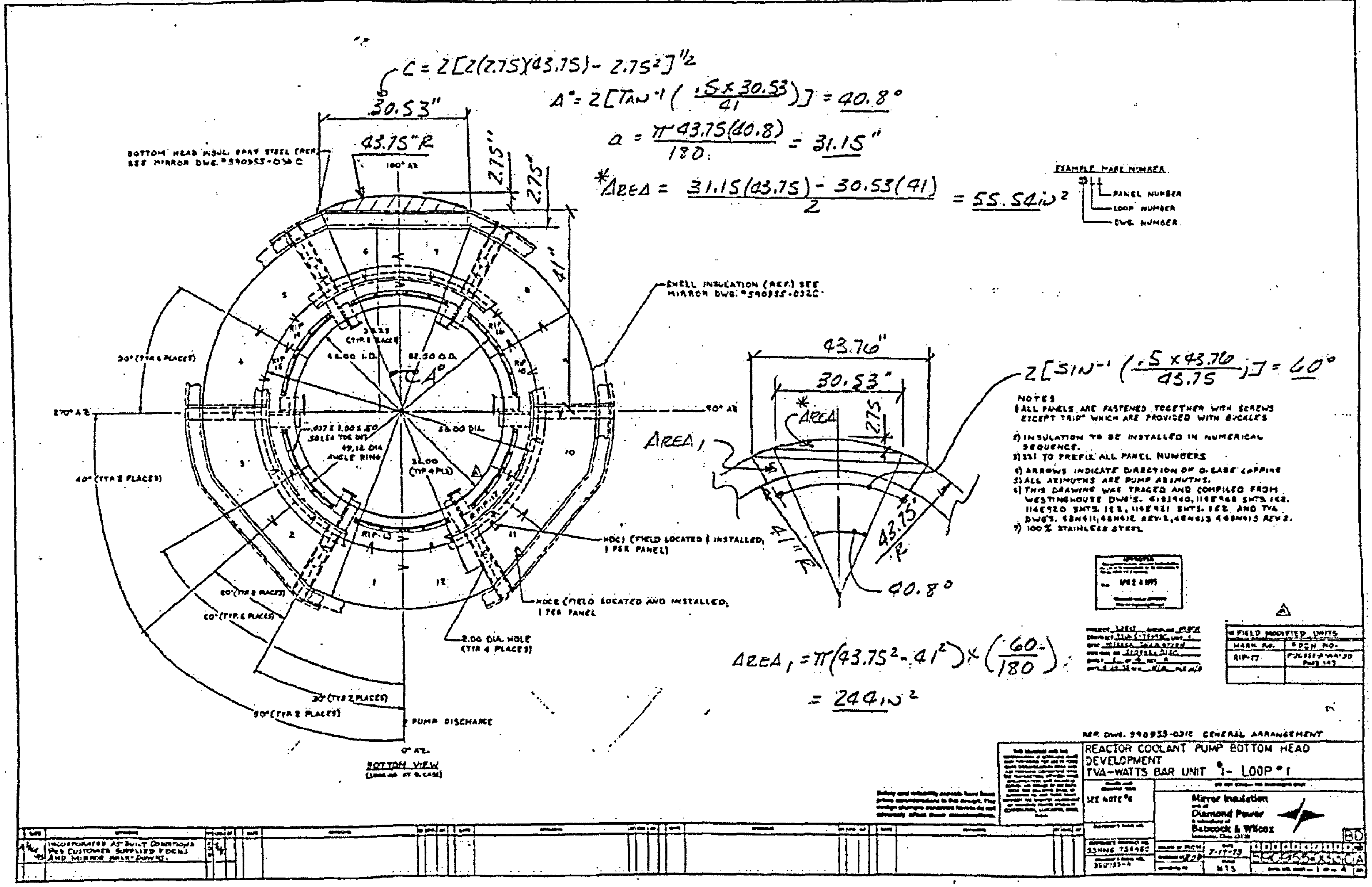
WB1-DWD-02B
SHEET 5 OF 5



WBI-DWD-002B
PG 6 OF 6

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-002C SHEET 1 OF 84 CGW 10/21/03

DATE:	10/27/2003	AREA:	LOOP 1	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-043C, REV. A *	
Tools:	47W465-202, REV. D	
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints).**
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	RC INTERIM LEG DRAIN
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS CGWalls Date: 10/22/03

Checked By: MIKE SOLLIE Mike Sollie Date: 10/31/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS													
WALKDOWN PACKAGE#: WB1-DWD-002C SHEET 2 OF 4													
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
0600200-13-09	LOOP 1	702'	2	INTERIM LEG DRAIN	2.38	0.88	RMI	3.8125	0.45	S.S.	STD	N/A	10" OD INSULATION
0600200-13-09	LOOP 1	702'	2	INTERIM LEG DRAIN	2.38	14.00	RMI	2.8125	4.46	S.S.	STD	N/A	8" OD INSULATION
0600200-13-09	LOOP 1	702'	2	INTERIM LEG DRAIN	2.38	0.55	RMI	2.3125	0.13	S.S.	STD	N/A	7" OD INSULATION
0600200-13-09	LOOP 1	702'	2	INTERIM LEG DRAIN	2.38	0.50	RMI	1.3125	0.05	S.S.	STD	N/A	5" OD INSULATION

APPROXIMATE INSULATION LENGTH:

STARTING FROM RC INTERIM LOOP:

AT 10" OD INSULATION:

LENGTH = 10.5(1/12) = 0.88FT

AT 8" OD INSULATION:

LENGTH = 19.5 + 7.5 + 20.75 + 59.5 + 35.5 + 1.76 + 5.56 + 8 + 10 + 8.5

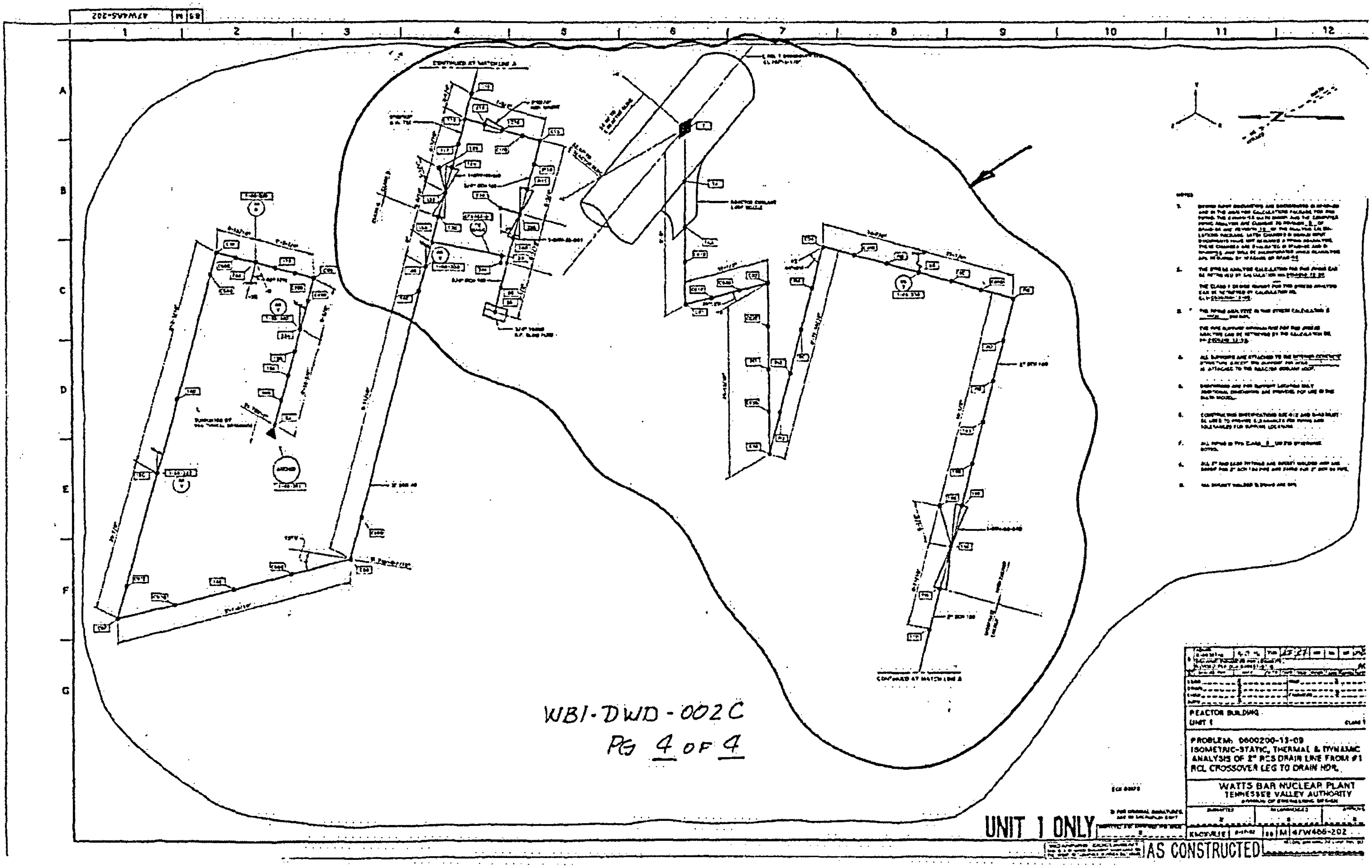
= 168(1/12) = 14.00FT

AT 7" OD INSULATION:

LENGTH = 6.5(1/12) = 0.55FT

AT 5" OD INSULATION:

LENGTH = 5.94(1/12) = 0.5FT


47W465-202
CONTINUED AT MATCH LINE A
REACTOR COOLANT LOOP
ANCHOR
CONTINUED AT MATCH LINE A
WBI-DWD-002C
PG 4 OF 4
UNIT 1 ONLY
AS CONSTRUCTED
REACTOR BUILDING
UNIT 1
PROBLEM: 0600200-13-09
ISOMETRIC-STATIC, THERMAL & DYNAMIC
ANALYSIS OF 2" RCS DRAIN LINE FROM #1
RCL CROSSOVER LEG TO DRAIN HDR.
WATTS BAR NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
KNOXVILLE
M
47W465-202

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-002D SHEET 1 OF 12

DATE:	11/03/2003	AREA:	LOOP 1 (AZ 0^{0} TO 90^{0})	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	47W2500-1	
Tools:		
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify installation of insulation as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any undocumented insulation.
3	Inspect and determine longitudinal seam location and band spacing if necessary.
4	Document any irregularities of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any undocumented fibrous insulation (e.g., within rupture restraints).
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal).
7	Inspect the area for any weak components that could be dislodged by jet and that could be transported to sump.
8	Inspect any equipment insulation in the area.
9	Inspect and document the general cleanliness of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	TAGS, LIGHTS, TIE-WRAPS

Prepared By: FRANK C YAO *[signature]* Date: 11/03/03

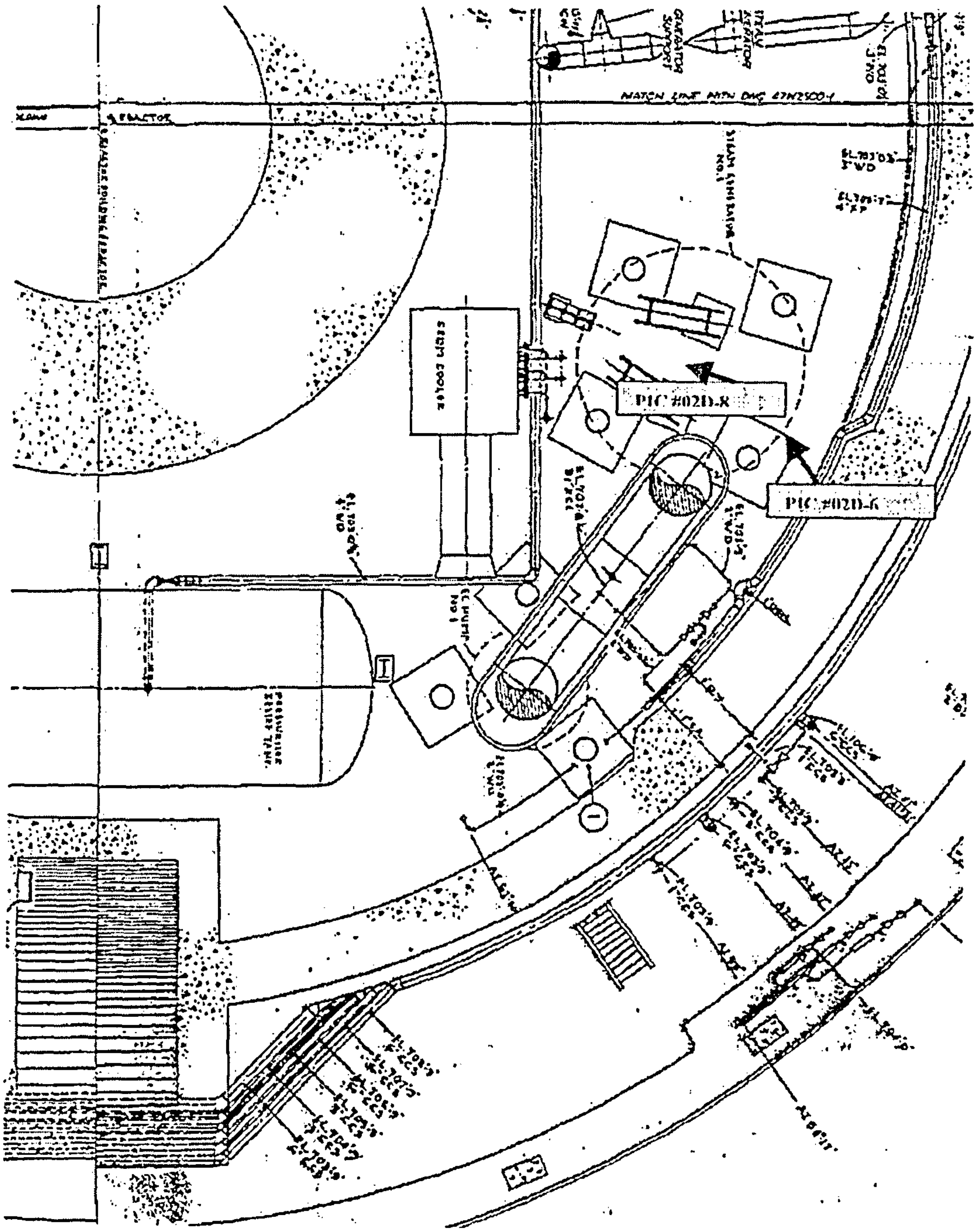
Checked By: MIKE CALDWELL *[signature]* Date: 11/03/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

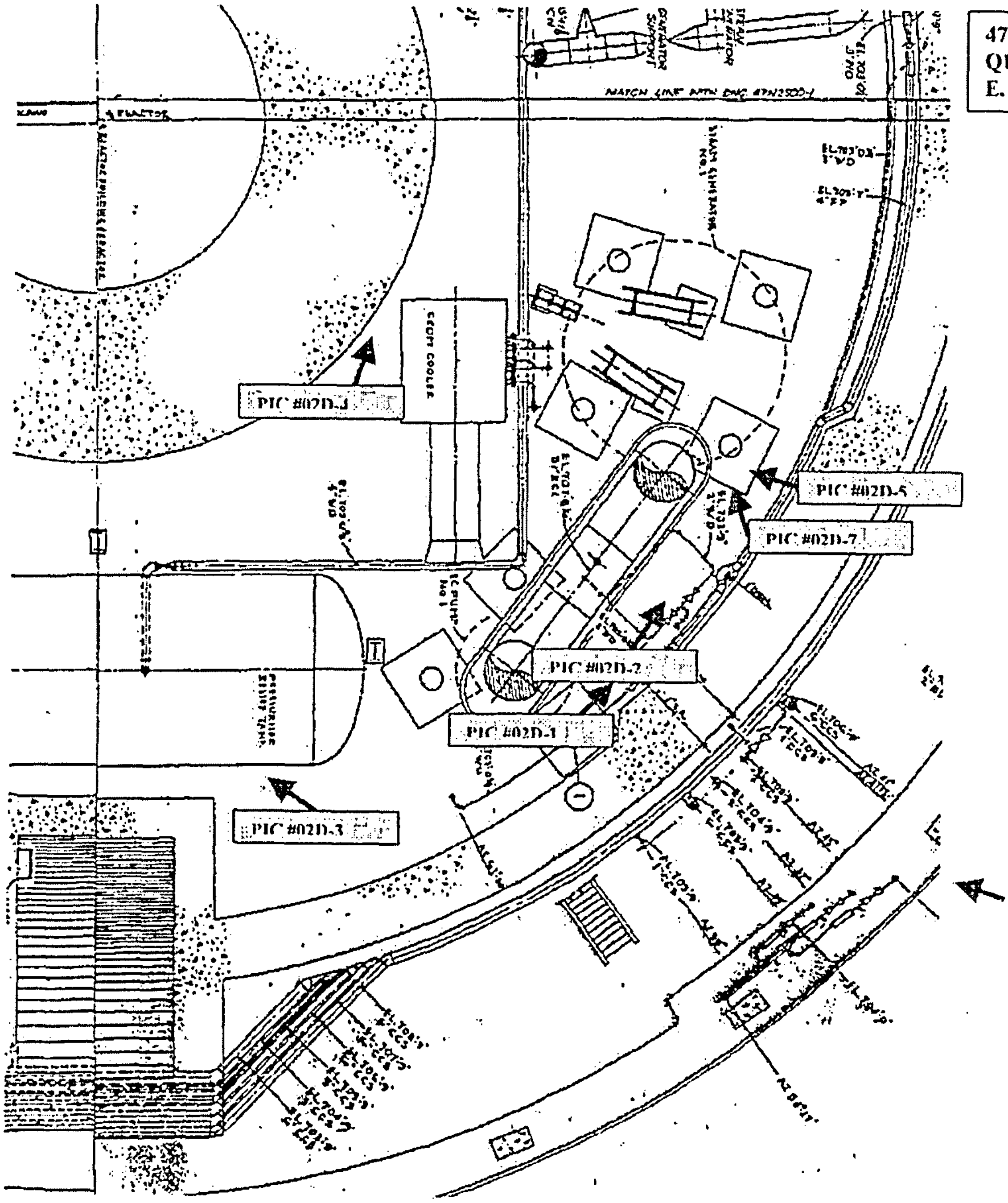
WALKDOWN PACKAGE#: WB1-DWD-002D SHEET 2 OF 12

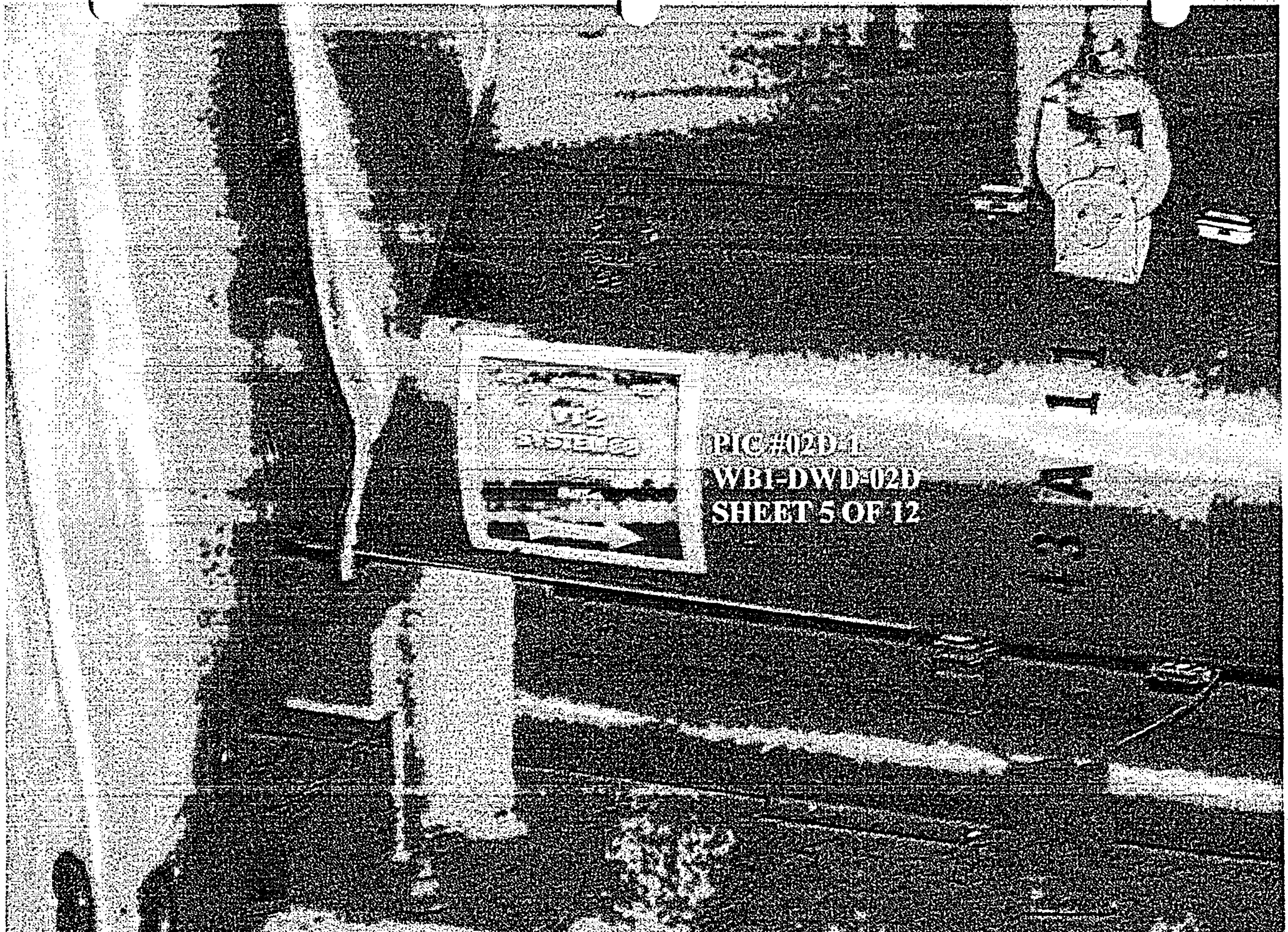
PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 1	702	2	LABELS, SIGNS, & PENETRATION NO.	NA	NA	NA	NA	0.00	NA	NA	NA	SEE REPORT FOR COMMENTS

47W2500-1
QUAD-I
E. 702' TO 710'

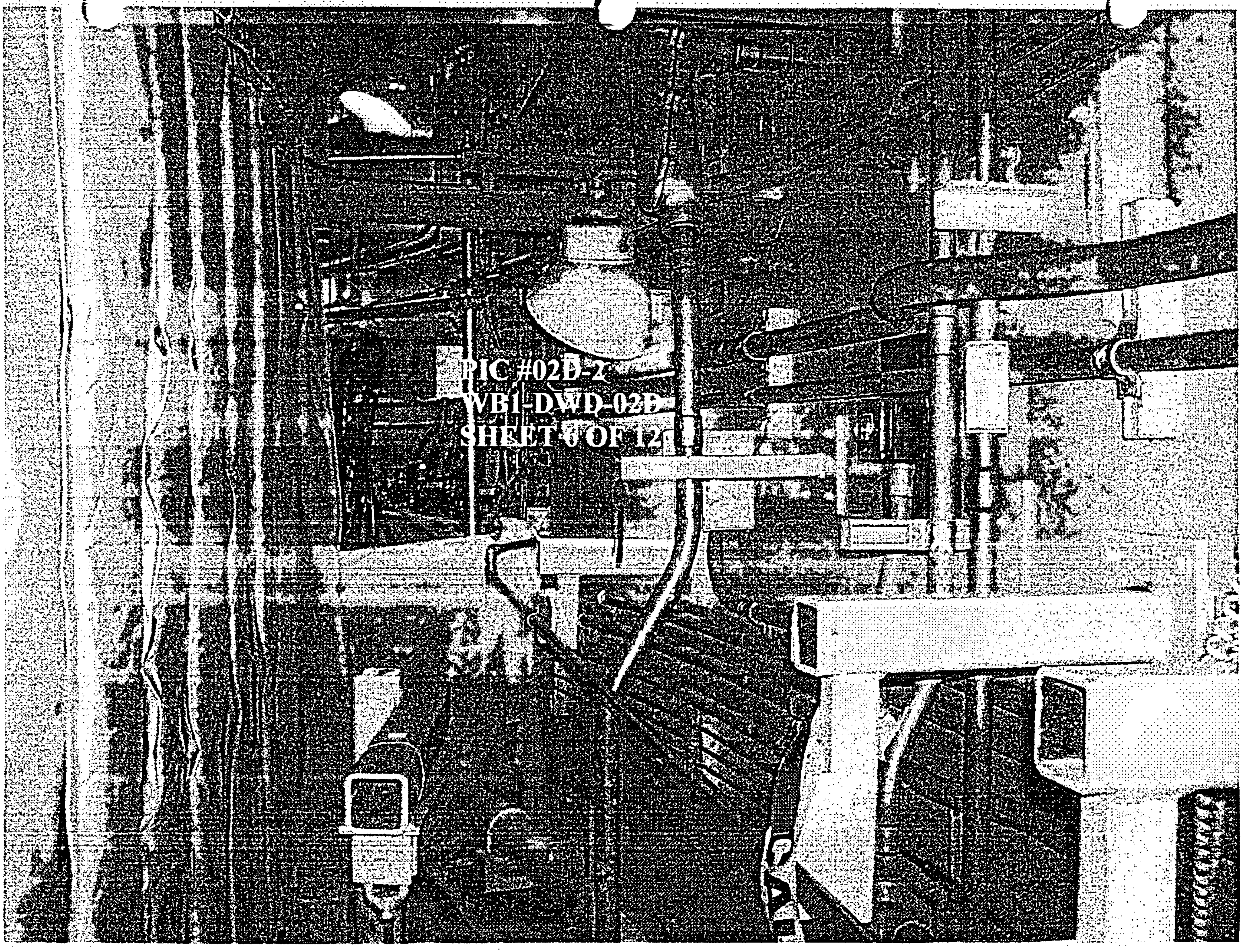


47W2500-1
QUAD-I
E. 702' TO 710'





PIC #02D-1
WB1-DWD-02D
SHEET 5 OF 12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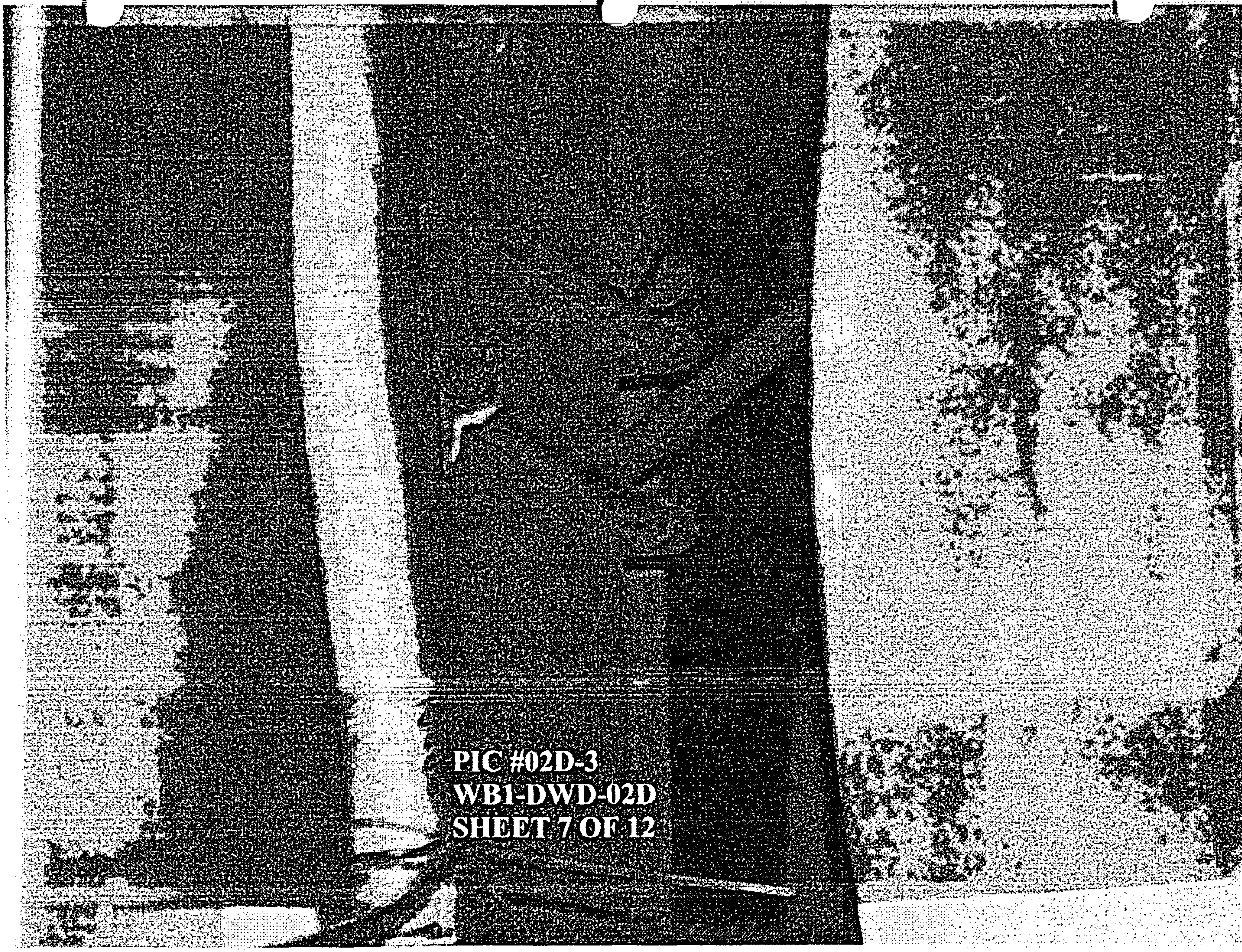
WB1-DWD-02D
SHEET 6 OF 12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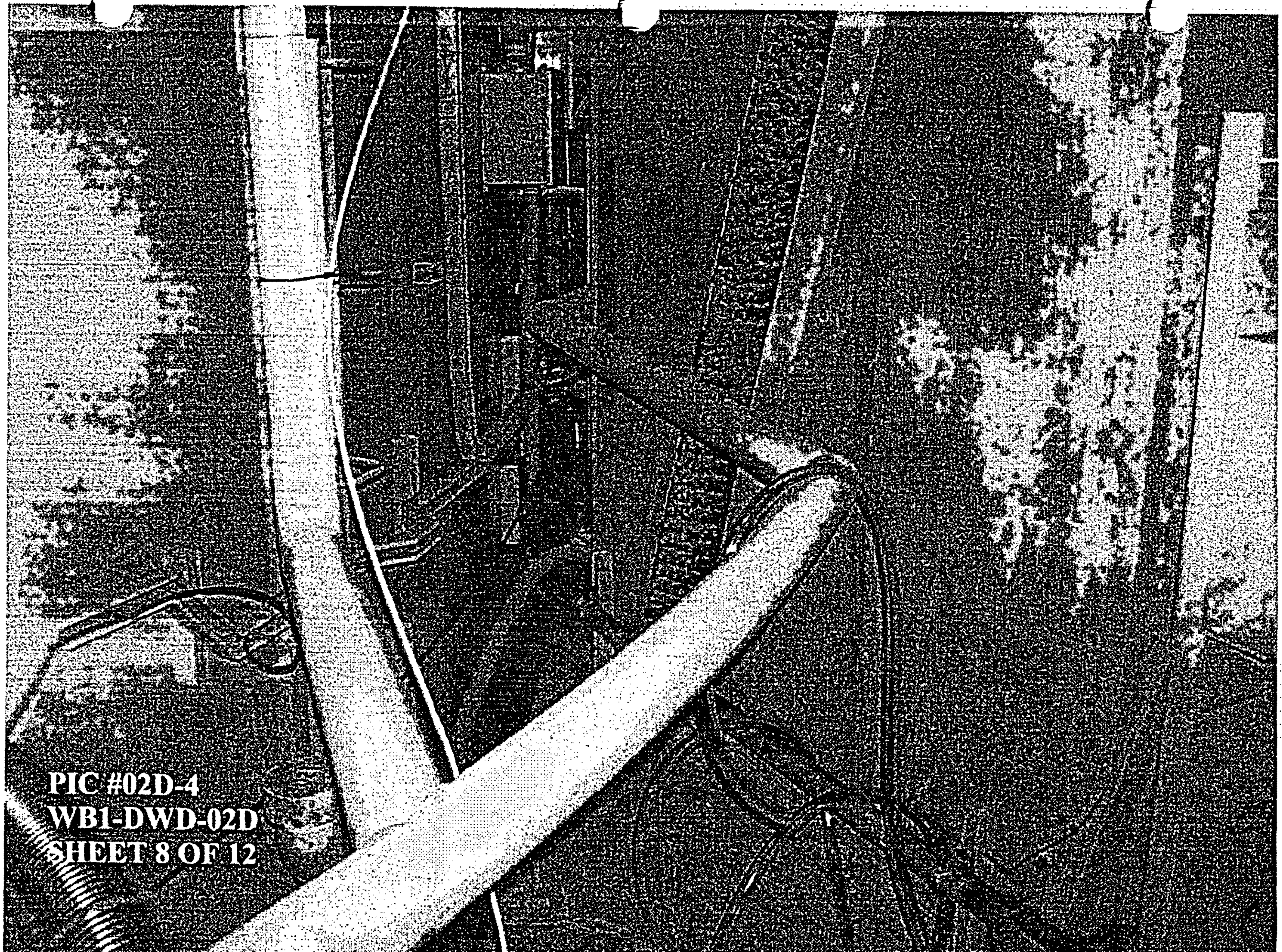
WB1-DWD-02D
SHEET 7 OF 12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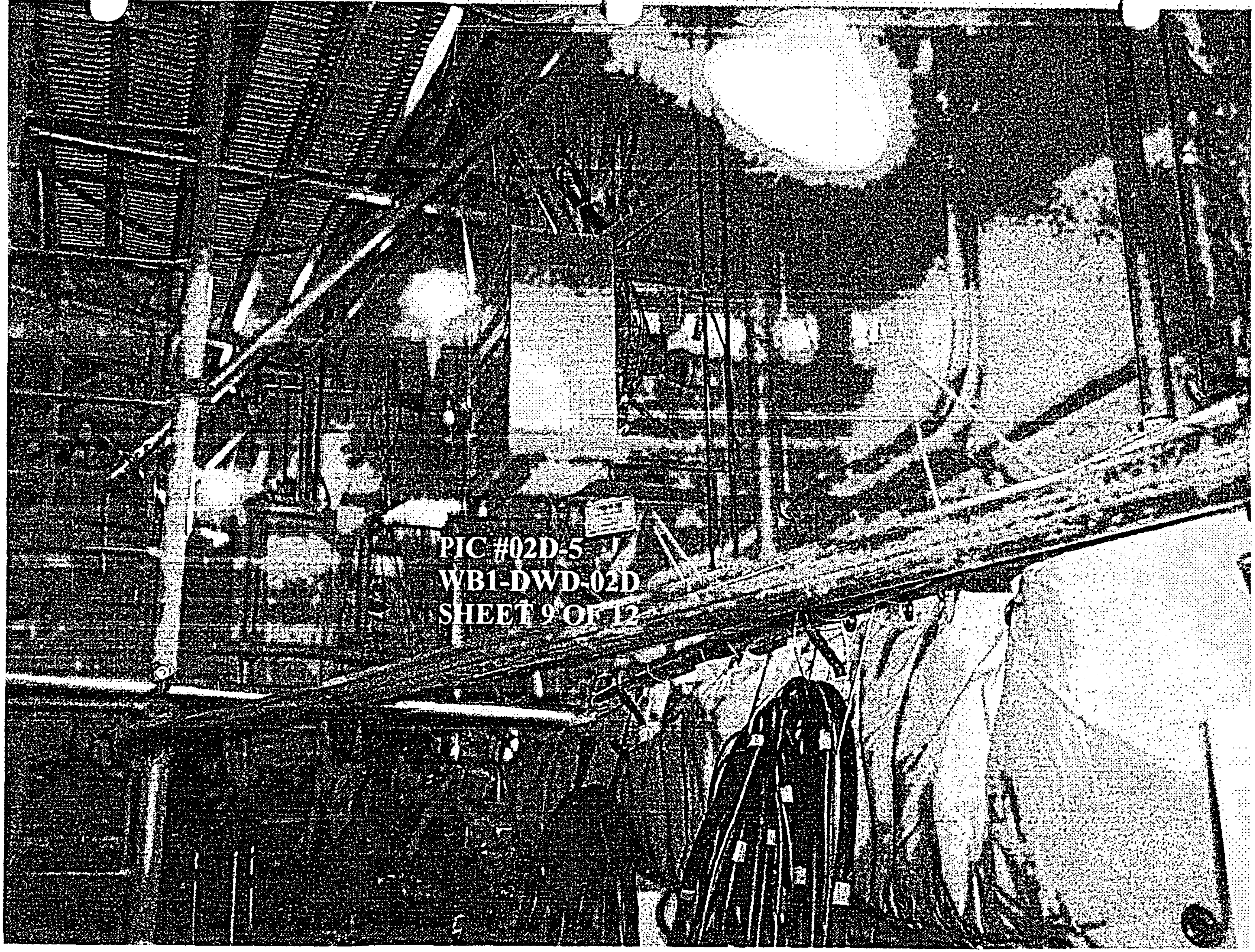
WB1-DWD-02D
SHEET 8 OF 12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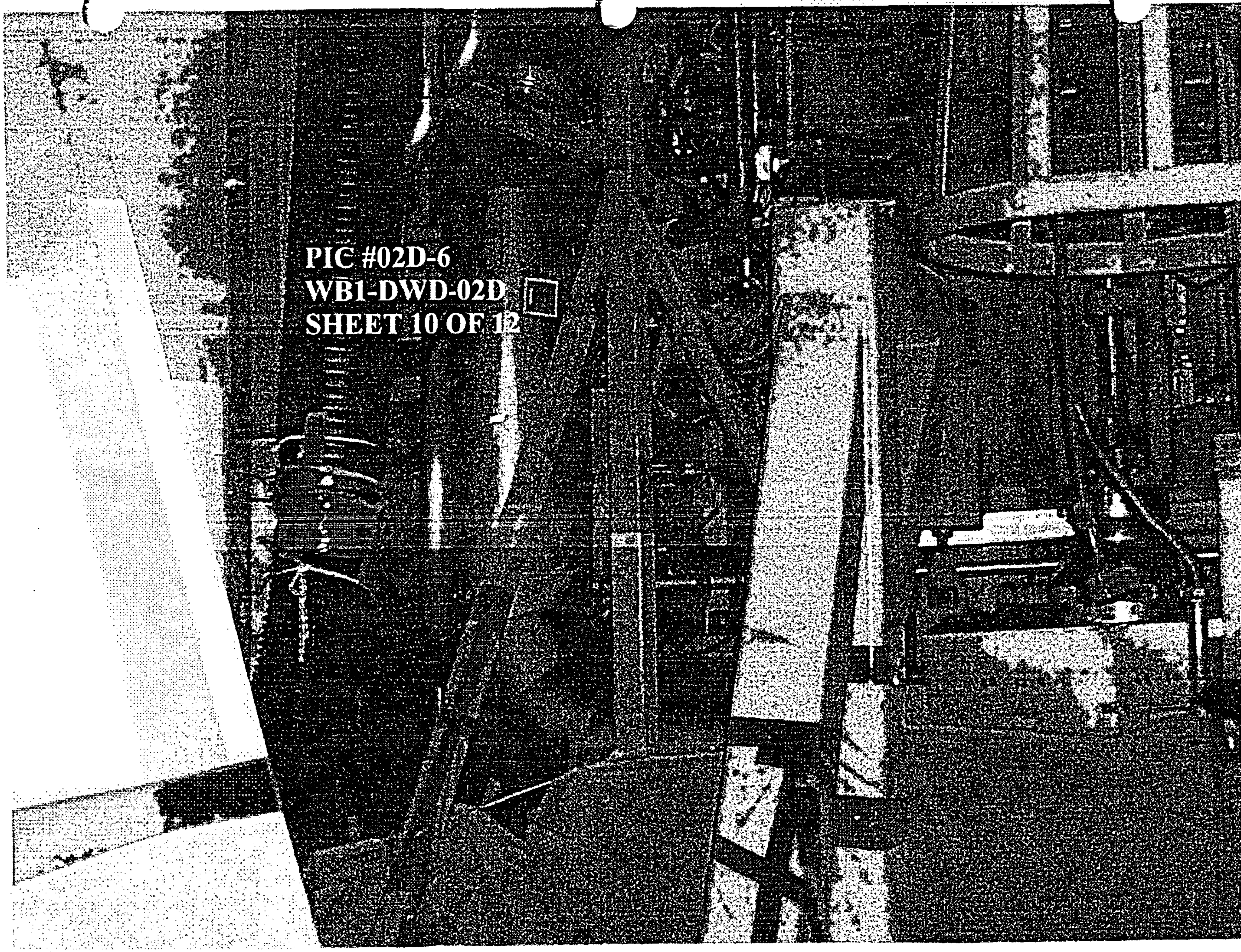
WB1-DWD-02D
SHEET 9 OF 12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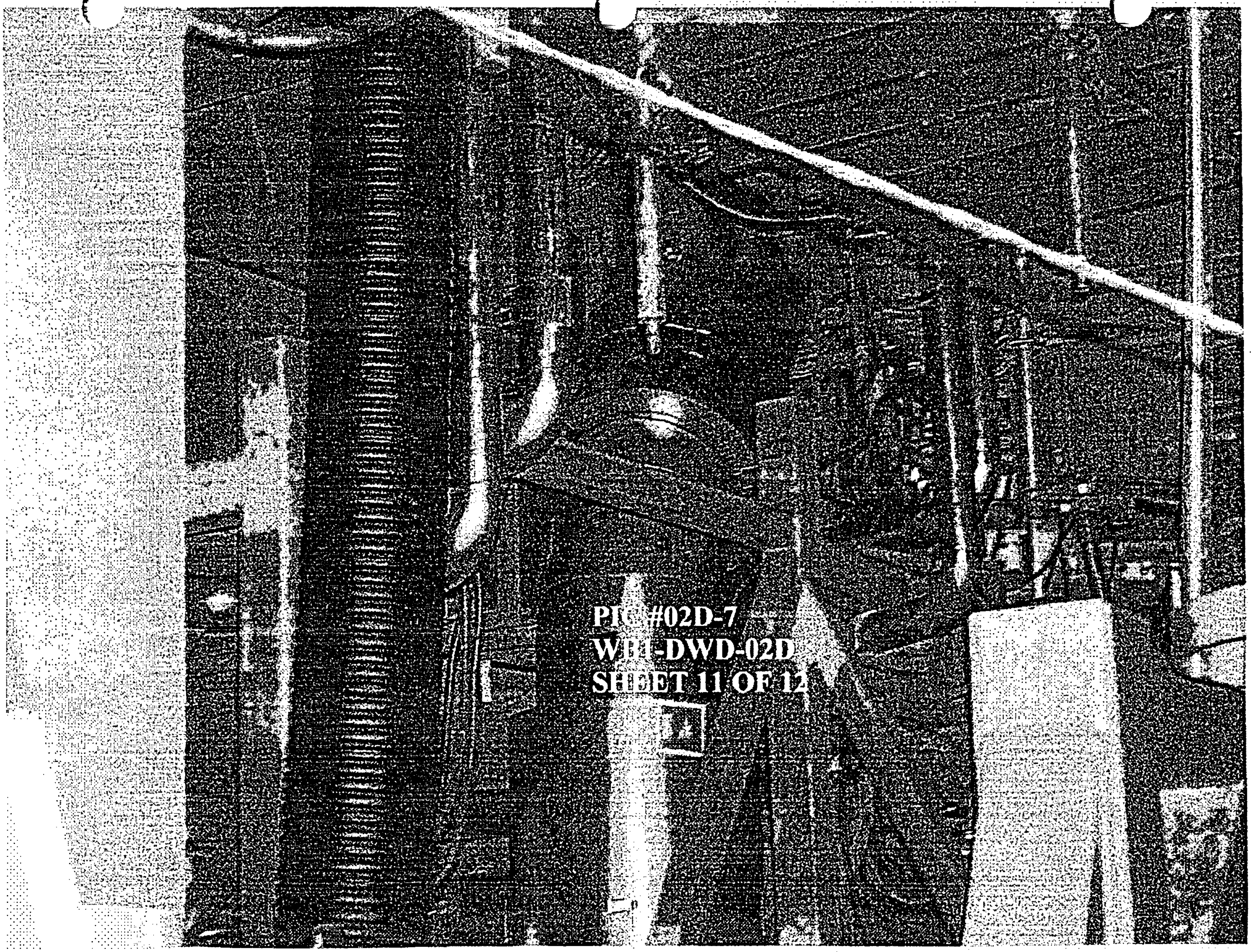
WB1-DWD-02D
SHEET 10 OF 12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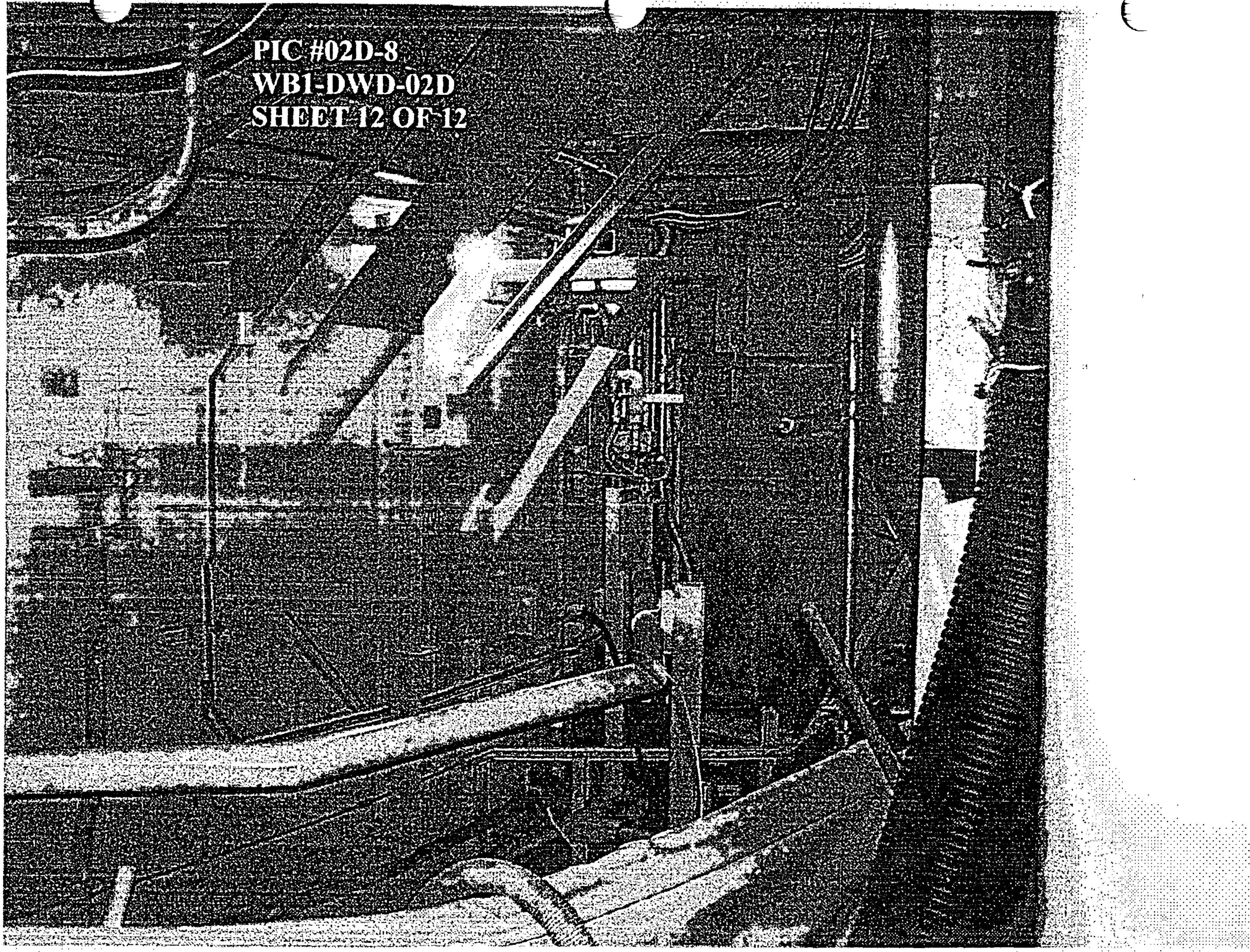
WB1-DWD-02D
SHEET 11 OF 12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WB1-DWD-02D
SHEET 12 OF 12

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-002E SHEET 1 OF 3

DATE:	11/25/2003	AREA:	LOOP 1	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	47W2500-1	1-47W243-6
Tools:		1-47W243-7
Drawings		1-47W243-8
Flashlights		47W331-1
Ladders		DCN NO W-32667-C
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify **installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	*Inspect the area for any* **weak components** *that could be dislodged by jet and that could be transported to sump.*
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	CONTAINMENT VESSEL PENETRATIONS
	CAL-Sil in penetration sleeves, open to inside of crane wall. HO

Prepared By: FRANK C YAO Date: 11/25/03

Checked By: MIKE CALDWELL Date: 11/25/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-002E SHEET 2 OF 3

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	RACEWAY	702	1	CALCIUM SILICATE	SEE CALC	SEE CALC	CALCIUM SILICATE	SEE CALC	56.700	NA	NA	NA	SEE CALCULATION

CALCIUM SILICATE IN PENETRATION

VOLUME OF CAL SILICATE (RACEWAY)

PIPE OUTSIDE DIAMETER = D
LENGTH FROM STEEL CONTAINMENT TO INS CRANE WALL = L
OUTSIDE DIAMETER OF INSULATION = D'
THICKNESS OF INSULATION = T

PEN NO	D(IN)	T(IN)	D'=D+2T	NET INSUL. XSECTION A(SQ IN)	L (FT)	V (CU FT)
X-13A	32.0	3.5	39.0	390.344	15.604	42.30
X-12A	16.0	2.5	21.0	145.299	14.271	14.40
TOTAL=						56.70

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-003A SHEET 1 **OF** 4

DATE:	10/09/2003	**AREA:**	LOOP 2 (LOOP B)	**RWP NO.:**	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	**Piping & Equipment Drawings:**	**Cable Tray Drawings:**
	590955-040C, SH. 1, REV. B (NOTES ONLY) *	
Tools:	590955-040C, SH. 2, REV. B *	
Drawings	47W2500-2, REV. 1	
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	REACTOR COOLANT INTERIM LEG (CROSSOVER LEG)
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS CGWalls Date: 10/09/03

Checked By: MIKE SOLLIE Mike Sollie Date: 10/31/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-003A SHEET 2 OF 4

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 2	702'	3	RC INTERIM LEG	SEE CALC	SEE CALC	RMI	SEE CALC	85.81	S.S.	STD	N/A	N/A

APPROXIMATE INSULATION VOLUME:

AT LOOP: (START FROM STEAM GENERATOR NOZZLE)

$$V = [\pi(42^2 - 36.31^2)/4 \times 6] + [\pi(44^2 - 37.5^2)/4 \times \pi(47.5)(40°)/180°]$$
$$+ [\pi(47^2 - 36.31^2)/4 \times 34.66] + [\pi(44^2 - 36.31^2)/4 \times (54.25 - 34.66 + 2.5 + 2.75)]$$
$$+ [\pi(44^2 - 37.5^2)/4 \times \pi(51.25)(90°)/180°] + [\pi(44^2 - 36.31^2)/4 \times 42.38]$$
$$+ [\pi(49^2 - 42^2)/4 \times \pi(44.25)(90°)/180°] + [\pi(49^2 - 37.62^2)/4 \times (9.75-2.38)]$$
$$= 146724(1/12^3) = 85.91\text{FT}^3$$

AT VALVES & CAP:

$$V = (3)[\pi 5^2/4 \times 9.75] + [\pi 5.5^2/4 \times 9.75] + (10.75^2 \times 6.44) = 1551(1/12^3) = 0.90\text{FT}^3$$

$$\text{TOTAL VOLUME} = 85.91 + 0.90 = 86.81\text{FT}^3$$


WB1-DWD-003A PG 4 OF 4
PICTURE 003A-1
LOOP 2 CROSSOVER LEG

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-003B SHEET 1 OF 4

DATE:	10/22/2003	AREA:	LOOP 2	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-031C, SH. 2, REV. 0 *	
Tools:	590955-032C, SH. 2, REV. D *	
Drawings	590955-033C, SH. 2, REV. A *	
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify Installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation** (e.g., within rupture restraints).
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	REACTOR COOLANT PUMP
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS *[signature]* Date: 10/27/03

Checked By: MIKE SOLLIE *[signature]* Date: 10/31/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-003B SHEET 2 OF 4

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 2	702'	3	REACTOR COOLANT PUMP	SEE CALC	SEE CALC	RMI	SEE CALC	63.45	S.S.	STD	N/A	N/A

APPROXIMATE INSULATION VOLUME:

AT PUMP: (CONSIDER INSULATION THICKENESS = 2.75")

$V = [\pi(87.5^2 - 82^2)/4 \times 121.6] + [\pi(82^2 - 44^2)/4 \times 2.75] - 3(55.54)(121.6)$

$- 3[(244 - 55.54) \times 36.83] - (\pi 17.69^2 \times 2.75) = 55588(1/12^3) = 32.17 FT^3$

AT COOLANT NOZZLE COVER:

$V = (44.5 \times 46 \times 2.75) + 2(27.25 \times 44.5 \times 2.75) + 2(40.5 \times 27.5 \times 2.75)$

$+ 2(18.5 \times 27.5 \times 2.75) - (\pi 17.69^2 \times 2.75) = 18519(1/12^3) = 10.8 FT^3$

AT SUPPORTS: (SEE VIEWS A-A & L-L)

$V = 2[(48 \times 36.83 \times 2.75) + 2(36.83 \times 21.25 \times 2.75) + 2(48 \times 24 \times 2.75)$

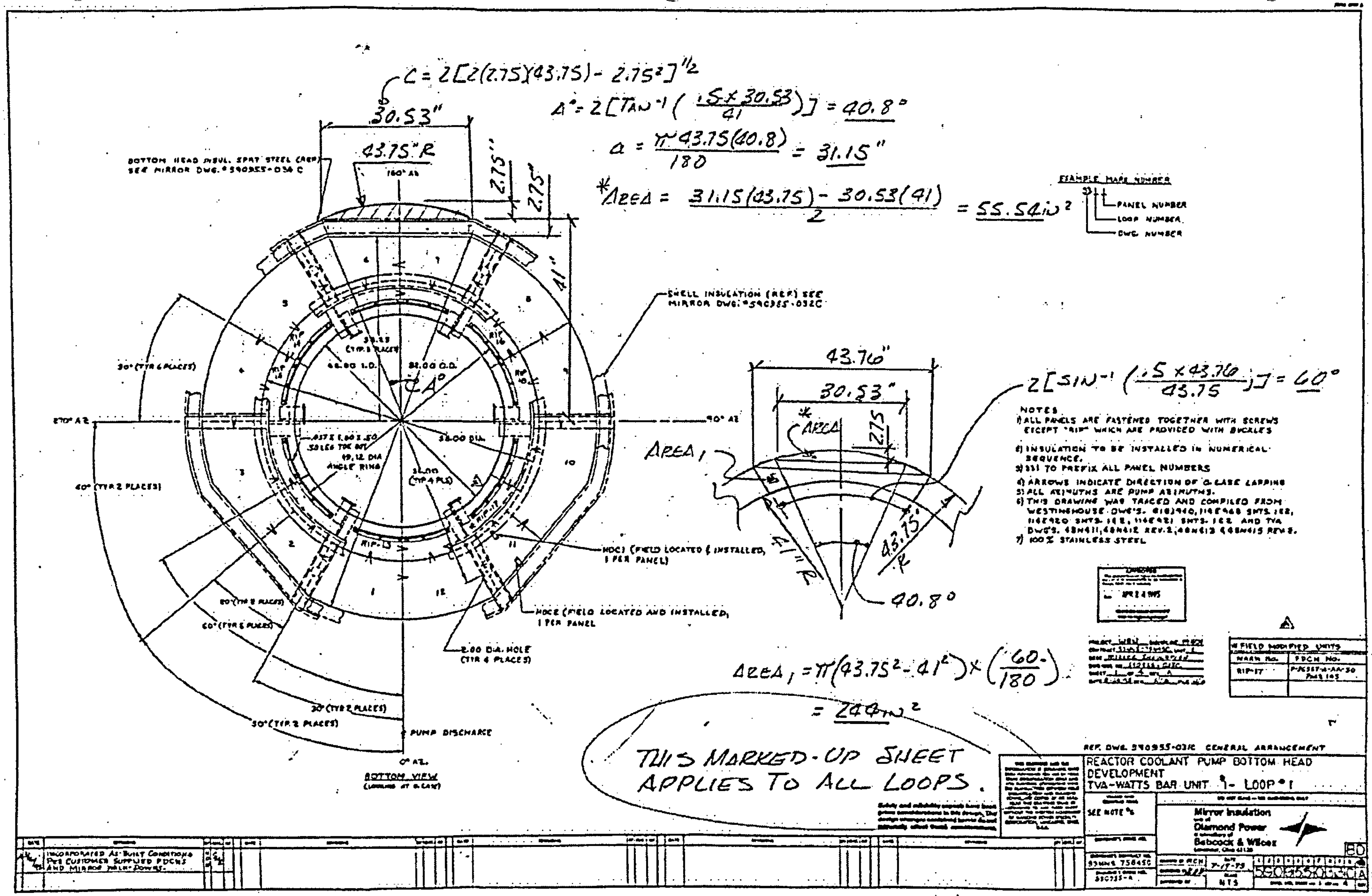
$- 2(\pi 14^2 \times 2.75) + \pi[10.5^2 - 7^2]10] = 28080(1/12^3) = 16.25 FT^3$

AT SUPPORT: (SEE VIEW K-K)

$V = 2(48 \times 18.75 \times 2.75) + 2(36.83 \times 18.85 \times 2.75) - 2(\pi 14^2 \times 2.75)$

$+ \pi[10.5^2 - 7^2]10 = 7307(1/12^3) = 4.23 FT^3$

TOTAL VOLUME = 32.17 + 10.8 + 16.25 + 4.23 = 63.45FT³



WBI-DWD-003B
SH. 4 OF 4

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-003C SHEET 1 OF 34 CGW 10/27/03

DATE:	10/27/2003	AREA:	LOOP 2	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-043C, REV. A *	
Tools:	47W465-219, REV. D	
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	*Inspect and verify any fibrous materials inside electrical components and cabinets*

	COMMENTS
	RC INTERIM LEG DRAIN
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS [signature] Date: 10/27/03

Checked By: MIKE SOLLIE [signature] Date: 10/31/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-003C SHEET 2 OF 4

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
0600200-13-10	LOOP 2	702'	3	INTERIM LEG DRAIN	2.38	0.88	RMI	3.8125	0.45	S.S.	STD	N/A	10" OD INSULATION
0600200-13-10	LOOP 2	702'	3	INTERIM LEG DRAIN	2.38	14.00	RMI	2.8125	4.46	S.S.	STD	N/A	8" OD INSULATION

APPROXIMATE INSULATION LENGTH:

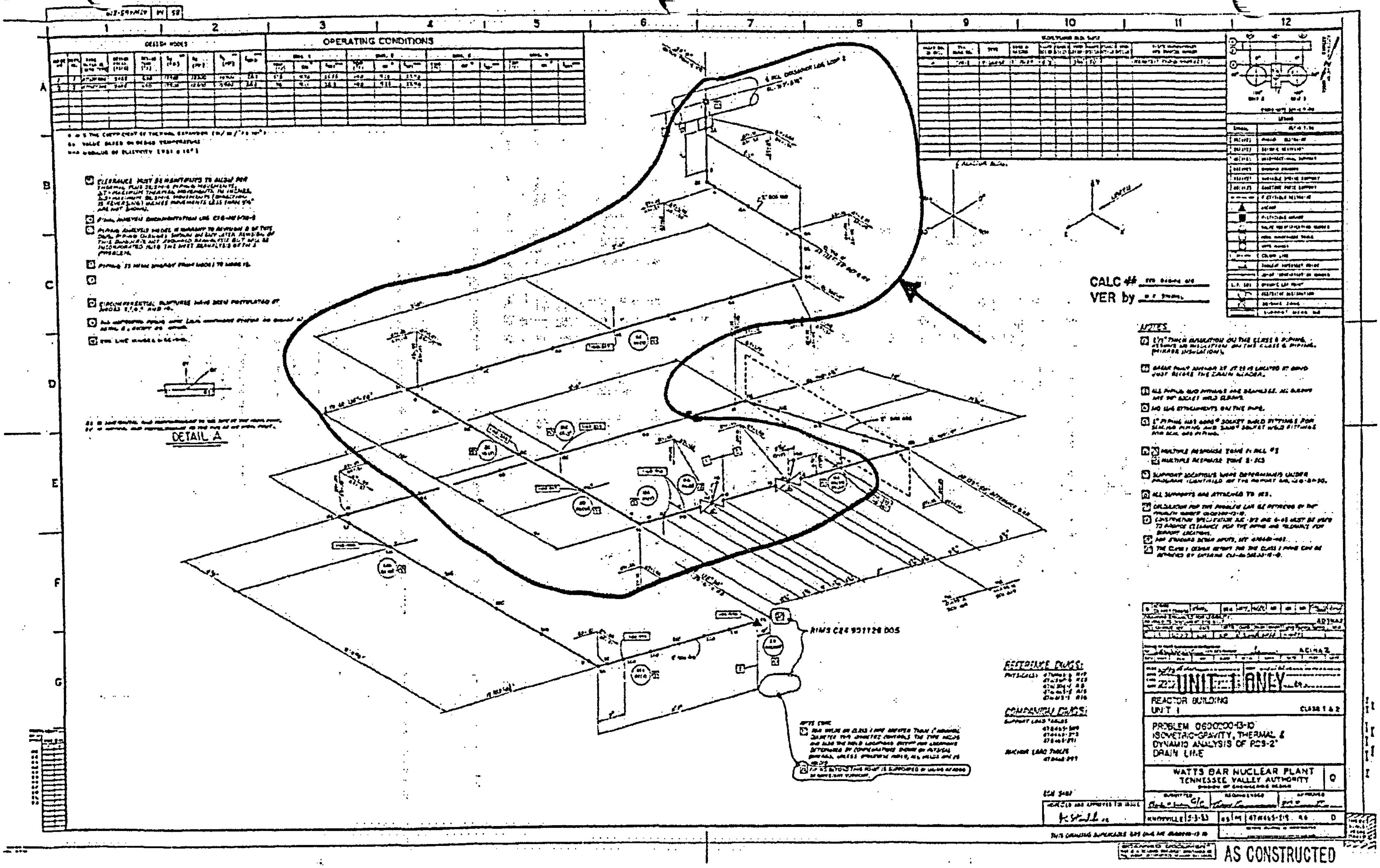
STARTING FROM RC INTERIM LOOP:

AT 10" OD INSULATION:

LENGTH = 10.5(1/12) = 0.88FT

AT 8" OD INSULATION:

LENGTH = 14.5 + 7.5 + 20.5 + 60 + 35.6 + 5.5 + 13 + 11 = 168(1/12) = 14.0FT



WBI-DWD-003C
PG 4 OF 4

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-003D SHEET 1 OF 3

DATE:	11/25/2003	AREA:	LOOP 2	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	47W2500-2	1-47W243-6
Tools:		1-47W243-7
Drawings		1-47W243-8
Flashlights		47W331-1
Ladders		DCN NO W-32667-C
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	CONTAINMENT VESSEL PENETRATIONS
	Cal-Sil in penetration sleeves, open to inside of crane wall. MC

Prepared By: FRANK C YAO [signature] Date: 11/25/03

Checked By: MIKE CALDWELL [signature] Date: 11/25/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-003D SHEET 2 OF 3

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 2	702	3	CALCIUM SILICATE	SEE CALC	SEE CALC	CALCIUM SILICATE	SEE CALC	70.580	NA	NA	NA	SEE CALCULATION

CALCIUM SILICATE IN PENETRATION

VOLUME OF CAL SILICATE (RACEWAY)

PIPE OUTSIDE DIAMETER = D
LENGTH FROM STEEL CONTAINMENT TO INS CRANE WALL = L
OUTSIDE DIAMETER OF INSULATION = D'
THICKNESS OF INSULATION = T

PEN NO	D(IN)	T(IN)	D'=D+2T	NET INSUL. XSECTION A(SQ IN)	L (FT)	V (CU FT)
X-13B	32.0	3.5	39.0	390.344	15.484	41.97
X-12B	16.0	2.5	21.0	145.299	14.198	14.33
X-12C	16.0	2.5	21.0	145.299	14.255	14.38
TOTAL=						70.68

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-004A SHEET 1 OF 3

DATE:	10/09/2003	AREA:	LOOP 3 (LOOP C)	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-040C, SH. 1, REV. B (NOTES ONLY) *	
Tools:	590955-040C, SH. 3, REV. B *	
Drawings	47W2500-3, REV. 1	
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify installation of insulation as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any undocumented insulation.
3	Inspect and determine longitudinal seam location and band spacing if necessary.
4	Document any irregularities of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any undocumented fibrous insulation (e.g., within rupture restraints).
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal).
7	Inspect the area for any weak components that could be dislodged by jet and that could be transported to sump.
8	Inspect any equipment insulation in the area.
9	Inspect and document the general cleanliness of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	REACTOR COOLANT INTERIM LEG (CROSSOVER LEG)
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS [signature] Date: 10/09/03

Checked By: MIKE SOLLIE [signature] Date: 10/31/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-004A SHEET 2 OF 3

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 3	702'	4	RC INTERIM LEG	SEE CALC	SEE CALC	RMI	SEE CALC	85.43	S.S.	STD	N/A	N/A

APPROXIMATE INSULATION VOLUME:

AT LOOP: (START FROM STEAM GENERATOR NOZZLE)

$V = [\pi(42^2 - 36.31^2)/4 \times 6] + [\pi(44^2 - 37.5^2) \times \pi(47.5)(40°)/180°]$

$+ [\pi(47^2 - 36.31^2)/4 \times 34.91] + [\pi(44^2 - 36.31^2)/4 \times (55.5 - 34.91 + 2.5 + 2.75)]$

$+ [\pi(44^2 - 37.5^2)/4 \times \pi(51.25)(90°)/180°] + [\pi(44^2 - 36.31^2)/4 \times 42.12]$

$+ [\pi(49^2 - 42^2)/4 \times \pi(44.25)(90°)/180°] + [\pi(49^2 - 37.62^2)/4 \times (9.75-2.38)]$

$= 146053(1/12^3) = 84.53FT^3$

AT VALVES & CAP:

$V = (3)[\pi 5^2/4 \times 9.75] + [\pi 5.5^2/4 \times 9.75] + (10.75^2 \times 6.44) = 1551(1/12^3) = 0.90FT^3$

TOTAL VOLUME = 84.53 + 0.90 = 85.43FT^3

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-004B SHEET 1 OF 34 CGW 10/27/03

DATE:	10/27/2003	AREA:	LOOP 3	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-043C, REV. A *	
Tools:	47W406-328, REV. E	
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	RC INTERIM LEG DRAIN
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS [signature] Date: 10/27/03

Checked By: MIKE SOLLIE [signature] Date: 10/3?/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-004B SHEET 2 OF 4

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 3	702'	4	INTERIM LEG DRAIN	2.38	1.92	RMI	3.8125	0.99	S.S.	STD	N/A	10" OD INSULATION
N/A	LOOP 3	702'	4	INTERIM LEG DRAIN	2.38	9.50	RMI	2.8125	3.02	S.S.	STD	N/A	8" OD INSULATION

APPROXIMATE INSULATION LENGTH:

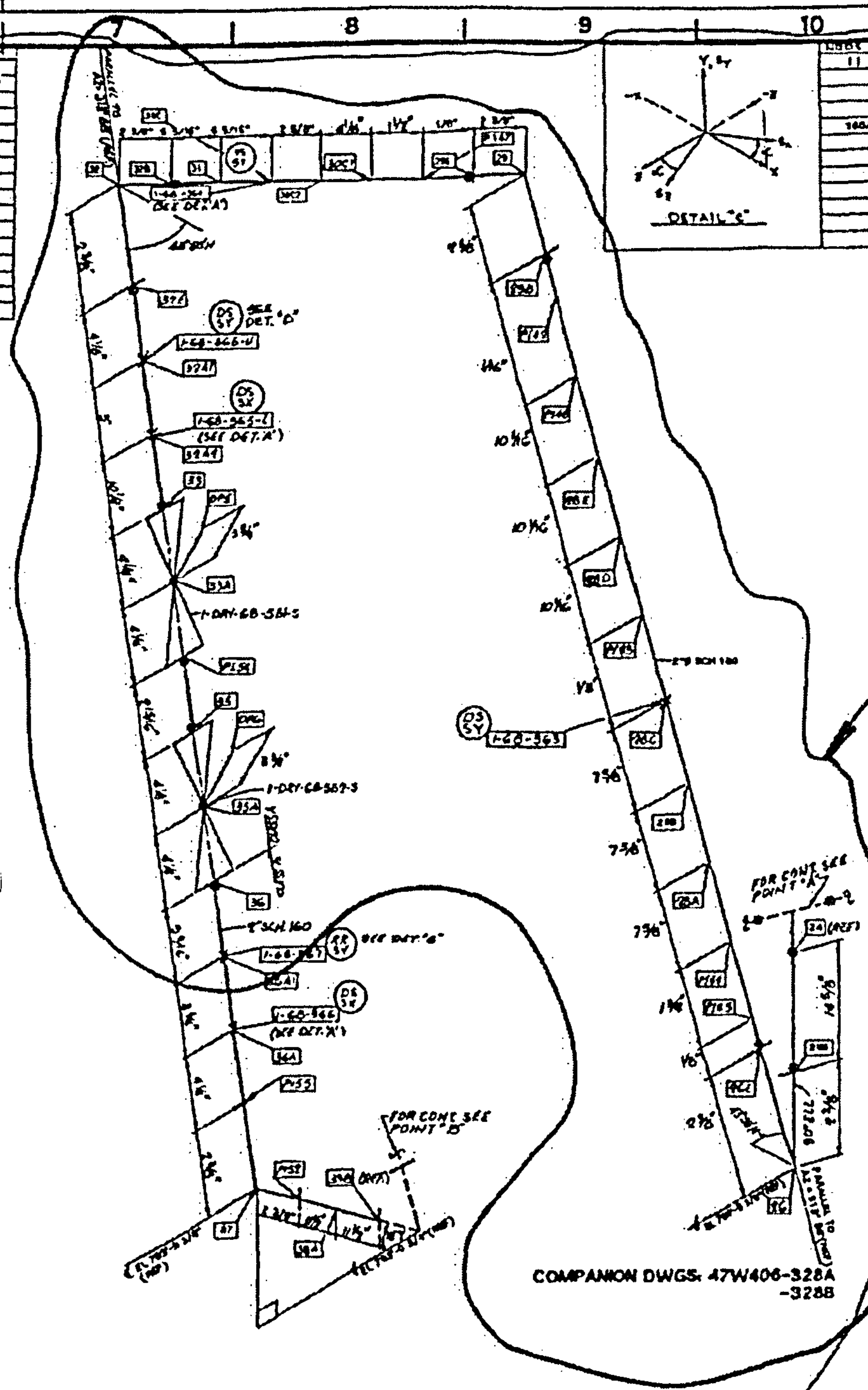
STARTING FROM RC INTERIM LOOP:

AT 10" OD INSULATION:

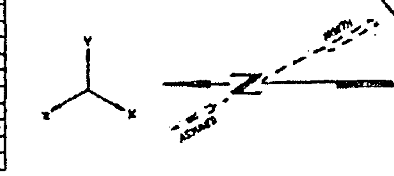
LENGTH = 11.44 + 11 = 23(1/12) = 1.92FT

AT 8" OD INSULATION:

LENGTH = 9.25 + 5.25 + 22.75 + 31.25 + 26 + 19.06 = 114(1/12) = 9.5FT



NODE PT.	OC
11	53°
166A	46°



NOTES CONT'D

9. ALL PIPING 2" AND SMALLER IS SOCKET WELDED UNLESS OTHERWISE NOTED.

10. FOR WELDS (SHOWN AS •) ON CLASS A PIPE GREATER THAN 1" NOMINAL DIAMETER THIS ISOMETRIC IDENTIFIES THE TYPE OF WELDS AND THE WELD LOCATIONS. UNLESS OTHERWISE NOTED, ALL WELDS ARE AS WELDED.

11. The location/orientation of supports are indicated as follows:
(A) As analyzed
(D) As designed
The differences between as designed and as analyzed support locations/orientations have been reconciled in Rev. 14 of this stress calculation. Also see note 1.

NOTES

1. Design input documents are documented in RPAID-00 and in the analysis calculations package for this piping. The computer math model and the computer piping analysis are current to revision A of RPAID-00 and revision 13 of the analysis calculations package. Later changes in design input documents have not required a piping reanalysis. These changes are evaluated in RPAID-03 and in RPAID-92, and will be incorporated when reanalysis are required by RPAID-00 or RPAID-92.

2. The stress analysis calculation for this piping can be retrieved by calculation no. 0600200-08-10.

The Class 1 design report for this stress analysis can be retrieved by calculation no. CL1-0600200-08-10.

Also, this rigorous analysis supersedes alternate analysis calculation no. N/A.

3. The piping analyzed in this stress calculation is HIGH energy.

The pipe rupture information for this stress analysis can be retrieved by the calculation no. PR-0600200-08-10.

4. All supports are attached to the ICS building except the supports for nodes A1 are attached to the indicated structure/equipment (RCL #3).

5. Dimensions are for support location only. Additional dimensions are provided for use in the math model.

6. Construction specifications N3C-912 and G-43 must be used to provide clearances for piping and tolerances for support locations.

7. All piping is TVA Class A unless otherwise noted.

COMPANION DWGS: 47W406-328A
-328B

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PG 4 OF 4

DRAWING ENHANCED FOR LEGIBILITY
REVISED PER DCA'S ... ACTNA2

UNIT 1 ONLY

REACTOR BUILDING
UNIT 1
CLASS 1, 2 & 3

PROBLEM 0600200-08-10
ISOMETRIC-STATIC, THERMAL & SEISMIC ANALYSIS OF 3" LETDOWN LINE FROM RCL CROSSOVER LEG LOOP 3 TO REGENERATIVE HEAT EXCHANGER

WATTS BAR NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN
Q

SUBMITTED	RECOMMENDED	APPROVED

KNOXVILLE	4-12-88	64	M	47W406-328	E

INSPECTED AND APPROVED FOR ISSUE

ADI NA2

THIS DRAWING SUPERSEDES EDS DWGS. 0600200-08-10 AND 0600200-13-11

AS CONSTRUCTED

CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-004C SHEET 1 OF 5

DATE:	10/27/2003	AREA:	LOOP 3	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-072C, SH. 1, REV. C *	
Tools:	47W406-328, REV.E	
Drawings		
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine **longitudinal seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints).**
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	3" LETDOWN LINE AT RC LOOP 3 INTERIM LEG
	CONTINUED TO WALKDOWN PACKAGE NO. WB1-DWD-008C.
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS [signature] Date: 10/27/03

Checked By: MIKE SOLLIE [signature] Date: 11/9/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-004C SHEET 2 OF 5

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
0600200-08-10	LOOP 3	702'	4	LETDOWN LINE	3 50	13 25	RMI	3 25	6.34	S.S.	STD	N/A	10" OD INSULATION

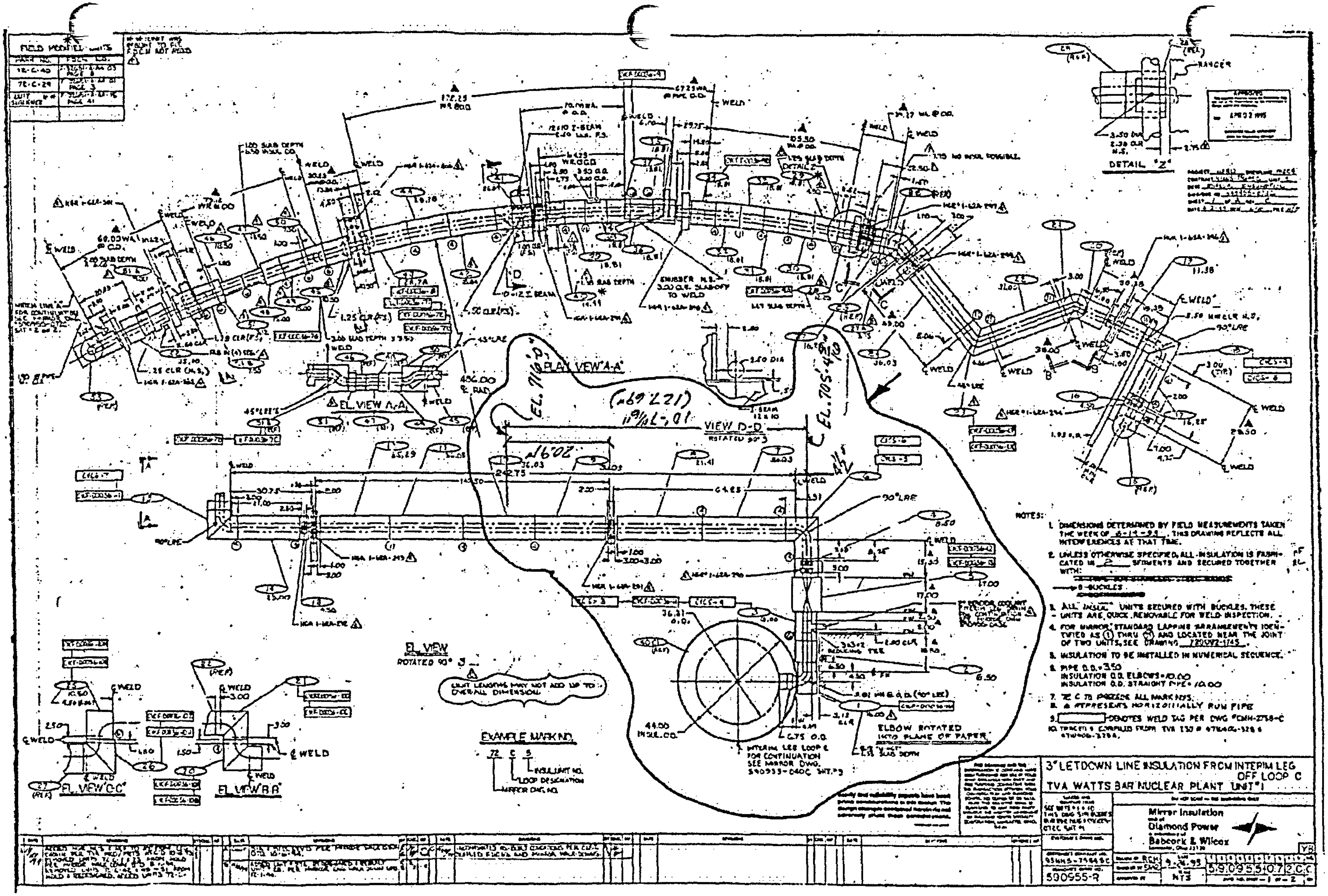
APPROXIMATE INSULATION LENGTH:

STARTING FROM RC INTERIM LOOP:

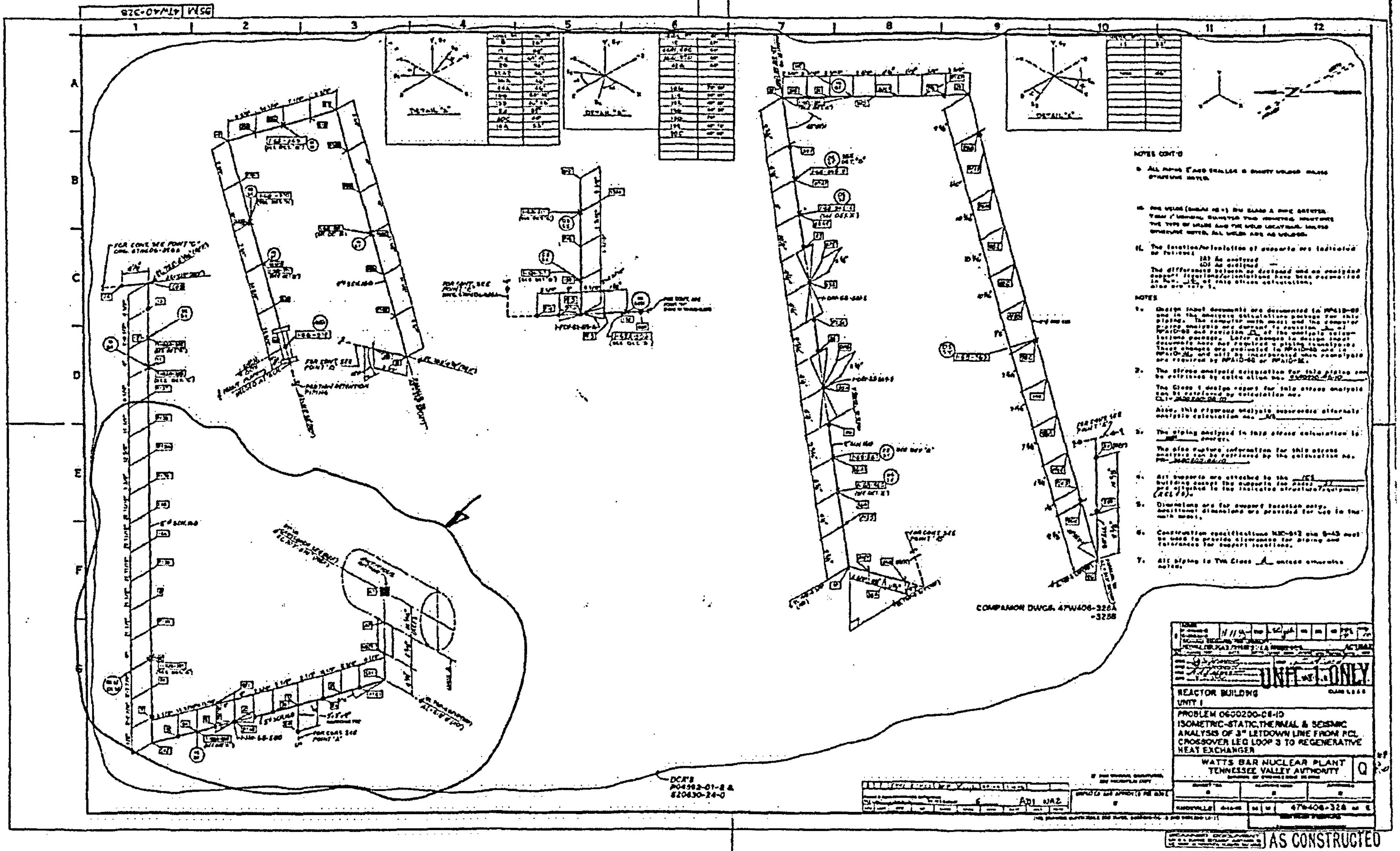
AT 10" OD INSULATION:

LENGTH = $19 + 6.5 + 10 + 17 + 8.5 + 7 + \pi(4.5)(90°/180°) + 63.25 + 19.91 =$

$159(1/12) = 13.25$FT



WBI-DWD-004C
PG 4 OF 5



WBI-DWD-004C
PG. 5 OF 5

CONTAINMENT DEBRIS
WALKDOWN PACKAGE
WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-004D SHEET 1 OF 4

DATE:	10/22/2003	AREA:	LOOP 3	RWP NO.:	8010
		ELEV:	702'		

INSPECTORS:	C. G. WALLS, MIKE SOLLIE

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	590955-031C, SH. 3, REV. 0 *	
Tools:	590955-032C, SH. 3, REV. C *	
Drawings	590955-033C, SH. 3, REV. A *	
Flashlights		
Ladders		
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	Verify installation of insulation as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any undocumented insulation.
3	Inspect and determine longitudinal seam location and band spacing if necessary.
4	Document any irregularities of the general condition of the piping insulation
5	Inspect and mark up layout drawings to show any undocumented fibrous insulation (e.g., within rupture restraints).
6	Inspect and mark up cable tray drawings to show location of fire barriers (vertical and horizontal).
7	Inspect the area for any weak components that could be dislodged by jet and that could be transported to sump.
8	Inspect any equipment insulation in the area.
9	Inspect and document the general cleanliness of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	REACTOR COOLANT PUMP
	* TVA CONTRACT NO. 93NNS-75645C

Prepared By: C. G. WALLS *CGWalls* Date: 10/23/03

Checked By: MIKE SOLLIE *Mike Sollie* Date: 10/30/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-034D SHEET 2 OF 56

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 3	702'	4	REACTOR COOLANT PUMP	SEE CALC	SEE CALC	RMI	SEE CALC	63.45	S.S.	STD	N/A	N/A

APPROXIMATE INSULATION VOLUME:

AT PUMP: (CONSIDER INSULATION THICKENESS = 2.75")

$V = [\pi(87.5^2 - 82^2)/4 \times 121.6] + [\pi(82^2 - 44^2)/4 \times 2.75] - 3(55.54)(121.6)$

$- 3[(244 - 55.54) \times 36.83] - (\pi 17.69^2 \times 2.75) = 55588(1/12^3) = 32.17\text{FT}^3$

AT COOLANT NOZZLE COVER:

$V = (44.5 \times 46 \times 2.75) + 2(27.25 \times 44.5 \times 2.75) + 2(40.5 \times 27.5 \times 2.75)$

$+ 2(18.5 \times 27.5 \times 2.75) - (\pi 17.69^2 \times 2.75) = 18519(1/12^3) = 10.8\text{FT}^3$

AT SUPPORTS: (SEE VIEWS A-A & L-L)

$V = 2[(48 \times 36.83 \times 2.75) + 2(36.83 \times 21.25 \times 2.75) + 2(48 \times 24 \times 2.75)$

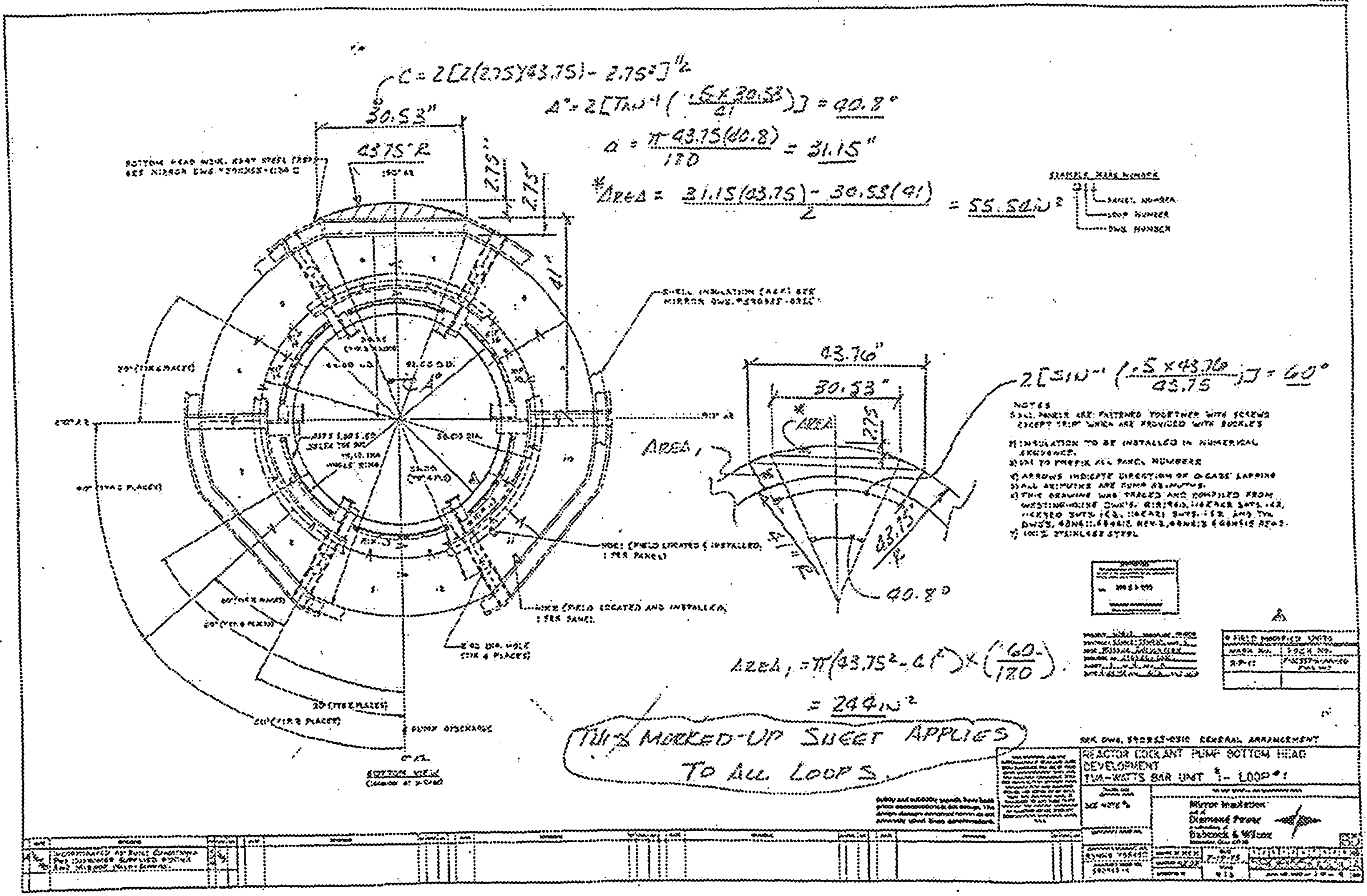
$- 2(\pi 14^2 \times 2.75) + \pi[10.5^2 - 7^2]10] = 28080(1/12^3) = 16.25\text{FT}^3$

AT SUPPORT: (SEE VIEW K-K)

$V = 2(48 \times 18.75 \times 2.75) + 2(36.83 \times 18.85 \times 2.75) - 2(\pi 14^2 \times 2.75)$

$+ \pi[10.5^2 - 7^2]10 = 7307(1/12^3) = 4.23\text{FT}^3$

TOTAL VOLUME = 32.17 + 10.8 + 16.25 + 4.23 = 63.45FT^3



WBI-DWD-004D
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CONTAINMENT DEBRIS WALKDOWN PACKAGE WATTS BAR N. P. UNIT 1

WALKDOWN PACKAGE NO. WB1-DWD-004E SHEET 1 OF 3

DATE:	11/25/2003	AREA:	LOOP 3	RWP NO.:	8010
		ELEV:	702		

INSPECTORS:	FRANK C YAO, MIKE CALDWELL

REF. MATERIALS:	Piping & Equipment Drawings:	Cable Tray Drawings:
	47W2500-3	1-47W243-6
Tools:		1-47W243-7
Drawings		1-47W243-8
Flashlights		47W331-1
Ladders		DCN NO W-32667-C
Cameras		
Binoculars		
Tape measure		
Sample bags		
Pens/markers		

INSPECTION LIST:

ITEM NO.	DESCRIPTION
1	**Verify installation of insulation** as documented in existing plant drawings and/or documentation.
2	Inspect and mark up layout drawings to show any **undocumented** insulation.
3	Inspect and determine longitudinal **seam location** and **band spacing** if necessary.
4	Document any **irregularities** of the general condition of the piping insulation.
5	Inspect and mark up layout drawings to show any **undocumented fibrous insulation (e.g., within rupture restraints)**.
6	Inspect and mark up cable tray drawings to show location of **fire barriers** (vertical and horizontal).
7	Inspect the area for any **weak components** that could be dislodged by jet and that could be transported to sump.
8	Inspect any **equipment insulation** in the area.
9	Inspect and document the general **cleanliness** of the area.
10	Inspect and verify any fibrous materials inside electrical components and cabinets

	COMMENTS
	CONTAINMENT VESSEL PENETRATIONS
	Cal-Sil in penetration sleeves, open to inside of crane wall MC

Prepared By: FRANK C YAO [signature] Date: 11/25/03

Checked By: MIKE CALDWELL [signature] Date: 11/25/03

WATTS BAR NUCLEAR PLANT UNIT 1 WALK DOWN RESULTS

WALKDOWN PACKAGE#: WB1-DWD-004E SHEET 2 OF 3

PROBLEM NUMBER	LOCATION	ELEV.	AREA	DESCRIPTION	OD (IN)	LENGTH (FT)	INSULATION TYPE	INSULATION THICKNESS (IN)	INSULATION VOLUME (FT3)	JACKET MATERIAL	BUCKLE TYPE	STRAP TYPE	COMMENTS
N/A	LOOP 3	702	4	CALCIUM SILICATE	SEE CALC	SEE CALC	CALCIUM SILICATE	SEE CALC	42.240	NA	NA	NA	SEE CALCULATION

CALCIUM SILICATE IN PENETRATION

VOLUME OF CAL SILICATE (RACEWAY)

PIPE OUTSIDE DIAMETER = D
LENGTH FROM STEEL CONTAINMENT TO INS CRANE WALL = L
OUTSIDE DIAMETER OF INSULATION = D'
THICKNESS OF INSULATION = T

PEN NO	D(IN)	T(IN)	D'=D+2T	NET INSUL. XSECTION A(SQ IN)	L (FT)	V (CU FT)
X-13C	32.0	3.5	39.0	390.344	15.583	42.24
TOTAL=						42.24