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1	1	Design Authority D.W. BERGMANN		8-19-96		1	1	C.D. KIRK	Per Telecon	8/19/96	
1	1	Design Agent A.E. BRIDGES	Alvin E. Bridges	8/19/96	H0-40	1	1	M.J. Langevin	Per Telecon	8/19/96	
1	1	Cog.Eng. N.R. ROE	N R Roe	8/19/96		1	1	G.A. RITTER	G.A. Ritter	8/19/96	H0-32
1	1	Cog. Mgr. R.P. OMBERG	R B Baker for R P O								
1	1	QA J.A. TITTLE	J A Tittle	8/19/96							
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N.R. ROE
Signature of EDT Originator
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R.P. OMBERG
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TEST REPORT FOR K BASIN MK I LID REMOVAL AND REPLACEMENT SYSTEM

N. R. ROE
Westinghouse Hanford Company, Richland, WA 99352
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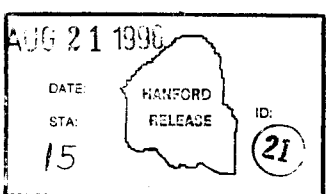
Abstract: This report provides the results of acceptance testing of sampling equipment for use in the Hanford K Basin. The equipment, MK I Lid Removal/Replacement Tools, were designed to remove/replace MK I Spent Fuel Canister lids so that other equipment may be used to sample the canister contents. The tools were determined to be acceptable for their intended use.



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TEST REPORT FOR K BASIN MK I LID REMOVAL AND REPLACEMENT SYSTEM

N. R. Roe
Spent Nuclear Fuel Evaluations

August 1996

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TEST REPORT FOR K BASIN MK I LID REMOVAL AND REPLACEMENT SYSTEM

1.0 INTRODUCTION

A number of key activities underway as part of the Spent Nuclear Fuels Project (SNFP) are related to the processing and disposing of spent nuclear fuel (SNF) from the 105-K Basins (K Basins). The proposed "Path Forward" (Reference 1) disposition of SNF identifies the programmatic concepts and project schedules associated with the SNFP. Development of SNF recovery equipment, processing equipment, transport methods, and disposal options all require specific SNF characterization data.

While some data on SNF have been obtained, recent studies conclude there is less data than needed for project decisions and equipment design bases. Additional quality data are required and will be defined through the process of developing Data Quality Objectives (DQO) and Sample Analyses Plans (SAP). Because of the requirements for characterizing SNF in both K East (KE) and K West (KW) Basins, the SNF sampling system is being developed to be used as a routine process run by Basin Operations. MK I decapping/recapping tools are components of the Phase II KW characterization sampling system. MK I tools will be utilized to expose sludge and fuel elements in the canisters for sampling purposes. Application of the system will be under the cognizance of the Spent Nuclear Fuel Evaluations group which is tasked to provide characterization data for the SNFP. Responding to requirements in **System Design Description For Sampling Fuel In K Basins** (Reference 2), and in the **Standards Engineering Practices** (Reference 3), this Acceptance Test Report (ATR) documents the results of functional testing, and acceptance testing which is a way to demonstrate the ability of the equipment to perform its function in a safe and efficient manner.

1.1 RESPONSIBILITIES

Spent Nuclear Fuel Evaluations (SNFE) Design Authority responsible for approving the test plan, test procedure, and final test report.

SNFE Design Agent/Cognizant Engineer responsible for providing test documentation and reviewing/evaluating test results.

SNFE Test Engineer responsible for overseeing maintenance of equipment, providing liaison with other organizations involved with testing, and preparing/issuing the test report.

1.2 DEFINITIONS

Fuel samples Selected fuel elements and parts that will be shipped to the 327 Building (hot cells) for examination.

Feature Testing Feature Testing is performed to test certain features of a piece of equipment or system to demonstrate that fabrication, assembly, installation, and/or operation requirements have been met for that feature.

Feature testing shall require a 305 Building Work Plan and job safety documentation (see Appendix B).

Functional Testing Functional Testing is performed to test the final equipment configuration or system of assembled equipment items in preparation for acceptance testing. During functional testing, all components of the equipment or system are operated individually and as a whole to determine the equipment satisfactorily meets the overall functional, operational, and design requirements. Functional testing is used to determine if final changes are required before acceptance testing.

Acceptance Testing Acceptance testing is performed with the equipment or system in the final in-service configuration (in the Cold Test Facility) to verify that functional, operational, and design requirements have been met.

1.3 PROJECT BASIS OF NEED FOR SAMPLING SYSTEM

The system and equipment that is the subject of this ATR will be used to sample and ship spent nuclear fuel elements, broken fuel parts, and canister sludge to the 327 Building for examination. This activity is an integral part of the current SNFP characterization program plan (Reference 4), which responded to the accelerated Path Forward Memorandum of Agreement (Reference 5).

2.0 BACKGROUND

The KW and KE fuel storage basins were constructed as part of the 100 K Production Reactor project between 1952 and 1954. In the early 1970s the K Reactors were decommissioned leaving the storage basins empty. Due to the proximity of the K Basins to N Reactor, the basins were utilized to store (short term) N Reactor fuel prior to processing in the 200 Area. Fuel from N Reactor was sealed in MK I and MK II canisters and transported to KW Basin. Tools designed in 1980s were previously used to decap both types of canisters in the KW Basin. The MK II tools are still operational but the original MK I tools have been determined to be infeasible for SNFE Phase II characterization activities. Redesigned MK I equipment and processes were required to effectively sample a representative population of KW Basin canisters.

3.0 SYSTEM DESCRIPTION

The design of the sampling system is based in large part on concepts and equipment used in the 1994-95 fuel and sludge sampling campaigns. This system is designed to decap and re-encapsulate MK I fuel canisters (Reference 6) to facilitate the data collection (sampling of fuel and sludge) necessary to characterize the KW Basin contents. The KW MK I canisters are encapsulated using a piston-shaped lid with a Grafoil™[1] compression ring inserted into the top of the canister during initial encapsulation (Reference 9). The canister needs to be internally pressurized to drive out the lid and to allow fuel and sludge samples to be obtained from the top of the canister (Reference 9).

Unless otherwise noted, the equipment functions at the canister interface but is manually operated from locations above the basin grating (see Figure 1).

Valve Stem Handling Tool The function of this tool is to remove the center vent valve from MK I canister lids. The design is shown in Drawing H-1-81198 (see Appendix A). An alternative valve removal tool was designed to prevent loosening the entire valve body in case the valve stem has been overtightened. This alternative tool features a socket that fits over the valve body to hold it in place while an internal rod assembly loosens the valve stem. This tool will be shown in Drawing H-1-82348 (scheduled to be released in 9/96).

Tube Crimping Tool The function of this tool is to effectively close off the tube connecting the MK I canister barrel gas space to the gas trap. The tool does not have to completely close the flow path. However, the leak path should not contribute significantly to water addition to the basin. In addition, restricting the volume of flow into the canister will help prevent disturbing the sludge inside the canisters, which will improve the data quality of the sludge samples. The design of this tool is shown in Drawing H-1-81202 (see Appendix A). The tool was designed to provide roughly a 70:1 mechanical advantage, i.e., 20 lbf applied to the handle will provide 1400 lbf of crimping force.

Nut Handling Tool The function of this tool is to loosen MK I lid nuts during lid removal (if necessary) and to tighten the nuts during lid replacement. The tool was designed to allow tightening to a torque of 30 ft-lbs. The tool also features a universal joint assembly that allows a misalignment of about ± 5°. The design of this equipment is shown in Drawing H-1-81199 (see Appendix A).

Pressure System The function of this tool is to apply water pressure to the inside of MK I canisters via the center vent valve to gradually push the lid out of the canister. The system utilizes a booster pump that increases the inlet pressure by up to 120 psi. The pump discharge flow, which varies with pressure boost, is approximately 6.7 gpm at 100 psi boost. The pump is only needed if the standard K Basin demineralized water supply pressure is not capable of removing a lid.

[1] Grafoil is a trade name of the SEPCO INC.

Two pressure gages are provided with the system: one pressure gage monitors the pump discharge pressure, the second gage monitors the approximate canister internal pressure (the pressure downstream of the control valve). The pump system connects to a pressurization tool via a hose and quick disconnect fittings.

The design of this system is shown in Drawings H-1-81200, H-1-81204, and H-1-82089. The pressurization tool shown in Drawing H-1-81200 (see Appendix A) is a previous design and will be used as a spare. The primary pressurization tool shown in H-1-82089 (see Appendix A) was designed to reduce the flow restrictions through the tool such that a lid could be removed without crimping (if necessary).

Lid Handling Tool The primary function of this tool is to install new MK I lids into the canister during recapping operations. The tool could also be used to pick up a MK I lid during removal, but normally the pressurization tool (H-1-82089) will be used to pick up the lid since it will already be connected for the lid removal process. The tool was designed to seat the lid such that the top of the lid is flush with the top of the canister cylinder after the lid nuts are tightened. The design of the MK I lid handling tool is shown in Drawing H-1-81197 (see Appendix A).

Scraper Tool The function of this tool is to remove excess Grafoil™ seal material from the inside of the canister if necessary. If no significant amount of seal material remains inside a canister barrel after removing a lid, the scraper tool may not be required. This tool is shown in Drawing H-1-81201 (see Appendix A). The scraper tool is essentially a modified MK I lid (with sharpened edges for scraping) adapted to the end of T-handled pole.

4.0 FUNCTIONS AND REQUIREMENTS

This section is a virtual restatement from the **System Design Description For Sampling Fuel In K Basins** (Reference 2). The functions and requirements documented in the SDD (Reference 2) were written to cover the entire KW campaign including: fuel handling tools, single element fuel canisters, hydrogen samplers, and the gas liquid sampler. Because the SDD covered a wide range of equipment the functions and requirements were general, the following are a modified set which are specific to the MK I tools and the corresponding processes.

4.1 FUNCTIONS

The system will provide the capability to safely and efficiently sample SNF from sealed canisters located in the KW Basin. Included in the system are the tools to decap/recap selected closed canisters for characterization purposes in KW basin.

The system will reliably provide access to MK I canister fuel and sludge, will minimize the sample disturbance while decapping, will be capable of decapping numerous canisters throughout Phase II characterization, and will minimize potential contamination in the KW Basin during lid removal.

The system will incorporate as many proven/feasible design features as possible from past MK I and MK II decapping and will incorporate features to eliminate or reduce previously encountered problems.

4.2 REQUIREMENTS

The following summarize the system requirements:

A. The system shall provide the capability to sample batches of fuel and sludge from MK I canisters.

B. The system shall operate with present utilities available in the K West Basin area, and be able to operate with the existing physical environment (e.g., from existing grating, within overhead obstructions, weight restrictions, air quality, etc.) and the K Basin Safety Analysis Report (SAR).

C. Interfaces of other Phase II characterization equipment shall be fully defined and integrated in the system planning (Figure 2). Interface limits (e.g., dose rate, size, etc.) in each case shall be fully integrated.

D. The system shall be designed for routine use by K Basin Operations staff. System controls and handling will account for the encumbrances on the operators wearing the levels of protective clothing needed in K West basin.

E. The system and its operation will minimize waste and consider ease of disposal of waste throughout its life cycle (i.e., fabrication, operation, storage and final disposal of equipment).

F. The system shall limit the amount of water added to KW Basin during Phase II fuel and sludge sampling to 2000 gallons.

G. The system shall limit personnel exposure to five (5) person-rems.

H. The system shall not require more than three (3) operators at any one time during decapping.

5.0 FUNCTIONAL TEST RESULTS FOR MK I CANISTER TOOLS

Functional tests were performed on the MK I decapping and recapping tool system. The tests were performed at the 305 Engineering Testing Lab (ETL) Cold Test Facility Pool in order to examine the performance of the tools after mechanical changes were made. Functional tests were required to document compliance to the Functions/Requirements (Section 4.0) from design, and throughout the evolution of the tools. Numerous modifications were made to the MK I tool system to optimize its performance by maximizing its capabilities and enhancing its operability in the field. A list of modifications is provided within this document. Once the equipment was proven to satisfy the criteria of the functions/requirements, an acceptance test was conducted to prepare the system for use in the 105 K-West (KW) Basin.

This section provides a general description of the tests performed on the system and the results of each test. A description of the tools and techniques used to remove/replace MK I canister lids is included in this document in previous sections. Procedural and equipment improvements based on the functional tests results, are also included.

Lid Handling Tool (see Drawing H-1-81197 in Appendix A entitled MK I Lid Handling Tool) It was determined the weight of the lid handling tool (57 lbs) was unacceptable as designed. The excessive weight was not needed to effectively seat the new (re-encapsulating) MK I lids into the canisters. Testing concluded the tool could perform as desired with only half the weight since any additional force required to seat a new lid could be generated by the operator. Rigidity of the tool remained important, therefore, a float was designed to reduce the weight of the tool without affecting its structural integrity. Additionally, the float was designed to be 4.5 inches in diameter to ensure its mobility through the 5 inch entrance slot of the decapping station. The modified tool, which weighs about 37 lbs in water with float installed, functioned adequately during testing.

Lid Removal Tool Pressure System Assembly (see Drawings H-1-81200 and H-1-82089 in Appendix A entitled Lid Removal Tool Pressure System) The Lid Removal Tool Pressure System Assembly (pressurizer tool) was redesigned extensively from the original concept. The redesign was originally determined necessary to reduce pressure losses in the system to allow lid removal without crimping. During functional testing of the original tool, pressure losses from the pump to the canister ultimately reduced the efficiency of the system to remove the MK I lid in a consistent and controlled manner. To alleviate these inefficiencies, the entire system was redesigned. The original tool was not modified, it will be available for use if problems occur with the new tool.

The initial concept of pressurizing the canister via a water stream from a pump and through a tube was not changed, but the system components were determined ineffective. The first design change was to replace the original pump (3 gal/min at 100 psi) with a higher capacity model (7 gal/min at 100 psi). The hose from the pump to the tool, and the tubing inside the pole were redesigned to acquire larger inner diameters (flow path). The universal joint near the lower end of the original tool was not installed on the new tool.

The universal joint was initially designed to aid in engaging the threaded portion of the tool with the center vent valve of the MK I lid without cross-threading. Tests were conducted using a mock-up of the decapping slot and a pole without a universal joint to illustrate the joint was not needed. A pressure gauge was installed at the top of the new tool so measurements corresponding to actual canister pressure could be monitored. Functional testing indicated the pressure required to remove a lid with the redesigned tool was lower (about 25-30 psi) than originally estimated. A needle valve was installed near the top of the new tool to better control the flow into the fuel canister. Further functional tests proved the needle valve controlled the speed of removal effectively.

During feature testing of the redesigned tool, the threaded end fitting (engagement portion of tool) was damaged as the tool was installed in the vent valve. The end fitting was replaced with Inconel™[2] material to eliminate future cross threading or binding. Other modifications near the threaded end fitting were required to restrict the operator from over tightening the threads. Two cap screws were placed on opposite sides of the guide sleeve to physically stop the end fitting from being forced into the valve body after approximately 10 threads engagement. The cap screws performed as designed during functional testing.

Upon completion of all modifications, functional tests revealed a controlled removal process and enhanced system capability.

Nut Handling Tool (see Drawing H-1-81199 in Appendix A entitled Nut Handling Tool) The nut handling tool was designed to tighten and loosen three nuts on top of the MK I lid (Reference 9). Loosening the nuts would retract the female component of the lid, releasing a portion of the force placed on the canister by the Grafoil™ seal. Reducing the force was originally thought essential to removing the lids by water pressurization. Functional testing proved the upgraded pressurization system could consistently remove the lids while the nuts remained torqued. The procedure (Reference 8) was changed to eliminate loosening nuts prior to pressurizing the Mk I canister. The tool will only be used to tighten nuts on new lids for re-encapsulation.

The original design of the nut handling tool required the socket-head portion to have a wide range of motion. The lower end of the tool was fabricated with a universal joint rapped in a rubber compression sleeve. This configuration was thought to be needed to accommodate the difficulty of operating in the confined space of the decapping station. The lower end (socket-head) had the required mobility but lacked the rigidity to support the weight of the tool. During feature testing, it was discovered the universal joint would collapse, making it difficult to engage the nuts. The tool was redesigned to eliminate the difficulties by removing the universal joint and welding the socket-head directly to the pole. After the modification, the tool was functionally tested and endorsed, but questions remained as to its ability to engage all three nuts while being operated in the decapping slot.

[2] Inconel is a trade name of the INTERNATIONAL NICKEL COMPANY

The tool was modified again by reinstalling the universal joint assembly but replacing the compression sleeve with a stainless steel guide. The new configuration eliminated the possibility of the tool collapsing but ensured consistent engagement of the socket-head to the nuts. The tool was successfully tested by using it in a simulated decapping slot to engage all three nuts.

Tube Crimping Tool (see Drawing H-1-81202 in Appendix A entitled MK I Tube Crimping Tool) A programmatic decision was made early in the KW Basin characterization campaign to avoid disturbing the contents when decapping any fuel canisters. The crimper tool was originally designed for dual purposes; 1) to reduce the flow of an effluent stream out of the gas trap to minimize disturbance of the canister sludge, 2) to minimize water addition to the basin such that a maximum pressure could be achieved with minimal water flow. It was proven during functional testing that the improved pressurization system was capable of decapping without restricting the flow out of the gas trap.

In an effort to avoid crimping, a test was devised to rule out the possibility of disturbing the contents (sludge) of the can and thus eliminating both purposes of the crimper. The test to investigate sludge disturbance consisted of placing fly-ash/sand in a MK II canister, pressurizing the canister in increments of 10 psi, and observing any flow through the gas trap. Sludge plumes were recorded immediately after the canister was pressurized giving sufficient evidence that the canister contents (sludge) would be disturbed if the tube was not crimped (Reference 7). Upon analyzing the functional testing data, it was concluded the crimper would only serve to restrict flow for sampling requirements.

The first tube crimping tool was never functionally tested due to its extreme weight and awkward design. The tool weighed 115 lbs and would be infeasible to use given the parameters at the K-Basins facility. A decision was made not to modify the existing crimper but fabricate a lighter, more effective tool. Tests were conducted using a SATEC press to determine the force required to crimp the gas trap tubing (Reference 7). It was discovered that roughly 600 lbs of force, placed on a test tube specimen by a 1/16 inch test round bar, would be adequate to achieve a crimp significantly reducing flow out the gas trap. Considering the amount of force required, it was determined to fabricate a new crimper tool that utilized a large mechanical advantage to accomplish the crimp. A conceptual design was generated based on a cable and pulley system such that pulling a handle on top of the tool actuated a cable to pull a long lever at the other end, this action closed the tool jaws. A force of 20 lbs exerted on the handle would generate 1400 lbs of force at the tool jaws. After initial functional testing of the crimper tool, the gas trap tubing was not sufficiently crimped. The radius of the crimping surface (crimping jaws) was too large, the crimping surface needed to be reduced so a smaller area of tubing could be crimped. The surface was reduced from 1/16 inch to 1/32 inch and further functional testing revealed a complete crimp/seal.

Valve Stem Handling Tool (see Drawing H-1-81198 in Appendix A entitled Valve Stem Handling Tool) The valve tool was determined to operate successfully after repeated functional tests under different circumstances. The tool was further tested to resolve time interval and tool sequencing issues (Reference 7).

Lid Lowering Device (see Sketch 1 in Appendix A entitled Lid Lowering Device) The lowering device was originally fabricated out of slotted stainless steel and 2 lifting eyes (Reference 7). The device was designed to connect under the hexagon portion of the center vent valve, on top of the MK I lid. Cables would lower the lid to the storage table and remove the device. Functional testing proved this configuration inadequate as the lid was released before it reached the stand. A new lowering device was constructed that would attach the lid to the cables mechanically. The redesigned device was fabricated to clutch the center vent valve using a spring actuated mechanism. Upon testing, The lowering device was determined to satisfy the functional requirements.

Scraping Tool (see Drawing H-1-81201 in Appendix A entitled MK I Scaper/Cleaner) The scrapping tool was initially fabricated by threading a female component of a MK I lid to a stainless steel tube. The lid was expected to be effective in scraping the residual Grafoil™ material as its outer diameter closely matched the inner diameter of the MK I canister. Initial functional testing, using a rubber adhesive to bond the Grafoil™ material to the canister barrel, showed much of the Grafoil™ material remained inside the canister after scraping.

It was determined the surface area of the tool contacting the Grafoil™ was too large, making it difficult to generate enough point load to remove the Grafoil™. The tool was modified by cutting out lid sections therefore reducing the surface area and increasing point loads. Knife edges were also formed on the vertical portions of the lid to enhance the tools efficiency when moved side to side, as well as when using an up and down motion. Further functional testing indicated the tool removed significant amounts of the Grafoil™ seal material from a decapped MK I fuel canister (Reference 7).

MASTER LEE Air Grips The function of the MASTER LEE tool is to remove the loosened vent valve stem from the canister lid which will allow the pressurizer tool to engage. The MASTER LEE tool was not functionally tested to prove competency nor to document acceptance by the KW Basin, the air grips are commercially available and have previously been approved, accepted, and operated at the facility. The tool was included in the ATP and this ATR to prove its effectiveness in performing a specific function within the decapping process (Reference 7). The tool was not originally included as part of the decapping procedure but due to schedule and budget requirements, it was added to avoid modifying the vent valve handling tool. The tool was utilized well as part of the lid removal system.

Lid Preparation Stand (see Sketch 2 in Appendix A entitled MK I/II Lid Stand) The lid stand was designed to hold MK I and MK II lids under water just prior to re-encapsulation. The stand was functionally tested and determined to fulfill requirements.

The purpose of the functional tests were to demonstrate that the equipment was performing as designed and to determine if modifications were needed to enhance the performance of the equipment. Based upon results of these functional tests, acceptance criteria were established and documented in the ATP for Prototype K Basin Mk I Lid Removal Tools (see Appendix B).

6.0 ACCEPTANCE CRITERIA

Acceptance criteria were established for the MK I lid removal/replacement system to determine the credibility of the test results. The criteria are closely related to the functions and requirements (Section 4.0) established for the tools. The ATP (Appendix B) outlines the test requirements, test description, test procedure, and the acceptance criteria.

The criteria, given in the table below, were established through functional testing and K Basin Operations input. The criteria document the specific objectives for each piece of equipment. The acceptance criteria includes operability of the equipment in the sampling area (Decapping Slot) and compliance with all other parameters associated with 100 K Facility. Operation and engineering personnel were involved in establishing criteria prior to the acceptance test, and personnel from safety, engineering, operations, and quality assurance were involved in confirming the criteria were met during the test.

PERFORMANCE CRITERIA

Criteria	Acceptable	Not Acceptable	Comments
Valve stem tool removes valve stem			
Wrench adequately mates with nuts and adequately removes and torques nuts.			
Pressurization system meets required pressure and flow controls			
Crimping tool adequately crimps vent tube.			
Pressurization system pressurizes canister and removes lid.			
Scraper tool adequately removes remaining Grafoil™ seal material from inside of canister barrel.			
Lid replacement tool fits up to new lid, adequately positions lid in place, and seals lid.			

* Completed table is found as Attachment 1 in the ATP (Section 7.0)

7.0 ACCEPTANCE TESTING

Acceptance tests were performed on the MK I lid removal/replacement system on June 25, 1996 (see Appendix B). The equipment was arranged in the basin just as for previous feature tests (see Figure 1). Appendix E of the ATP (Appendix B) and procedure OP-07-108W (Reference 8) were followed for the lid removal process. An ECN (Reference 10) was issued against the ATP because the decapping/recapping equipment and process had changed significantly from the ATP release date.

Prior to the acceptance test a MK I canister and the lid storage stand were placed under water on the floor of the test basin at the 305 ETL. A MK I lid was placed on one barrel of the submerged canister and torqued to 30 ft-lbs. The acceptance test began with an ETL Technician placing the vent valve tool on the center vent valve in preparation to remove the vent valve stem. The entire valve body was becoming lose and the test was stopped to evaluate the situation. A nut on the under side of the lid was not sufficiently tightened so the lid had to be removed by utilizing the off-set vent valve. To accommodate the personnel attending the test, the test was performed out of order from this point through the remainder of the ATP. The ATP Traveler (Appendix B) was performed starting with part 6.0 thru 6.1, then from 6.8 thru 7.0, and finally 6.2 thru 6.7.

Lid removal was performed twice to prove the pressurizer tool could decap a MK I lid with and without crimping the gas trap tube. The pressure recorded with a crimped gas trap was 20 to 25 psi, and 27 to 30 psi was recorded to remove a lid with an uncrimped gas trap. Visual inspections were documented to determine the effectiveness of the lid placement tool and the scraper tool.

8.0 ACCEPTANCE TEST CONCLUSIONS

The entire system worked as designed during the ATP and was determined to be acceptable. All of the criteria presented in the ATP and this ATR were satisfied as indicated by the acceptance test results. The information obtained from the acceptance test indicates the MK I lid removal tools function as designed and can effectively decap and re-encapsulate numerous fuel canisters. Upon completion of the operator training, the tools will be ready for field deployment.

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10. Engineering Change Notice, G.A. Ritter, "ECN against WHC-SD-TP-TP-006 Rev. 0," ECN 605192, June 1996.

FIGURE 1. Acceptance Test Tool Configuration

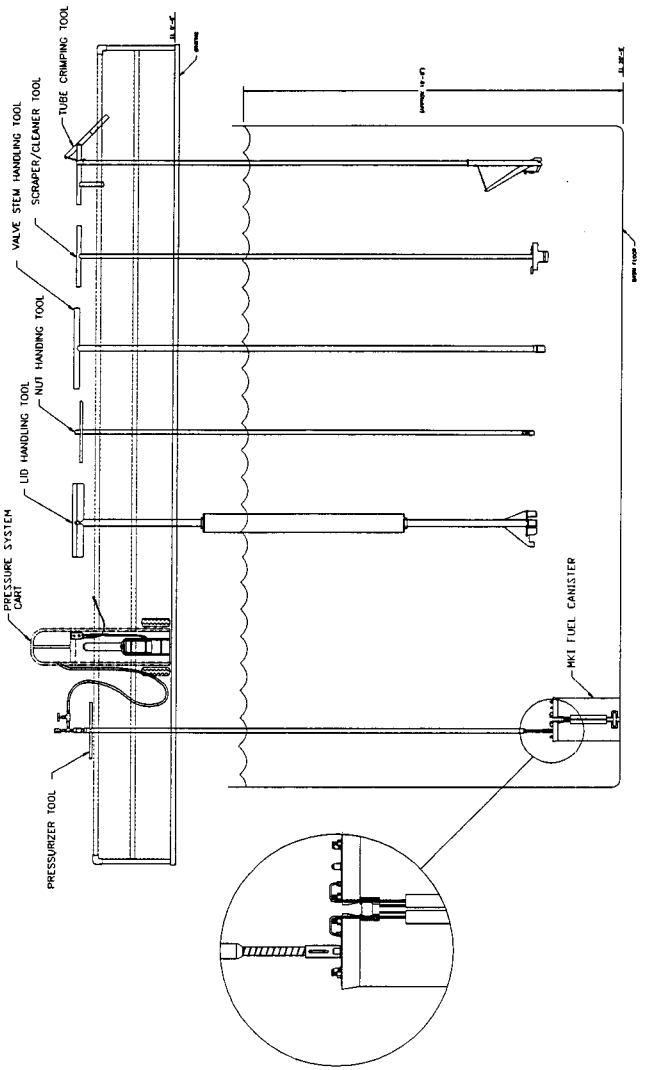

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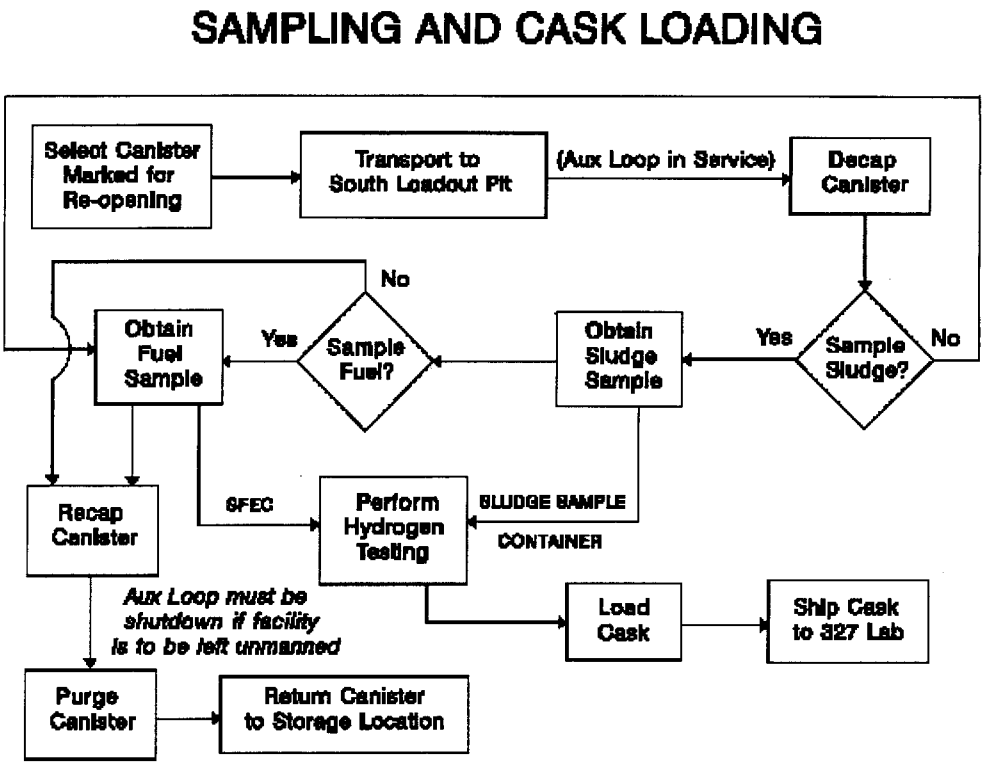
FIGURE 2. Flow Diagram For Phase II Characterization Activities



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APPENDIX A

Lid Removal Tool H-1 Drawings And Sketches

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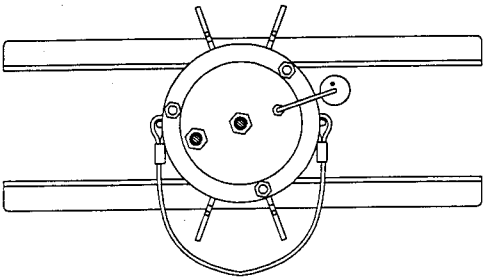
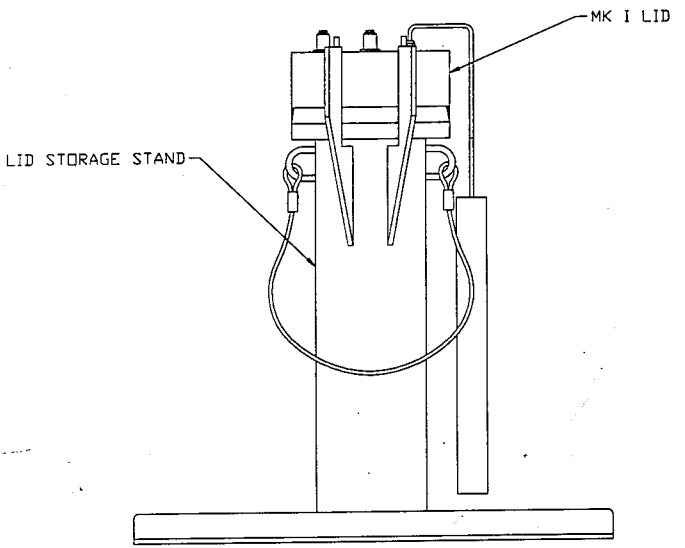
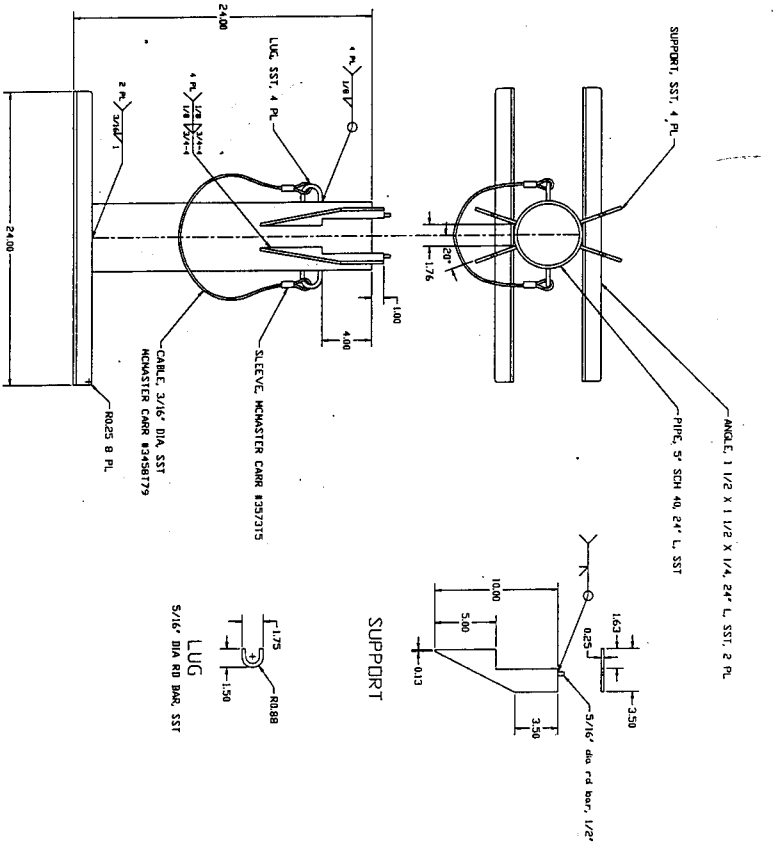
SKETCH 1 Lid Storage Stand

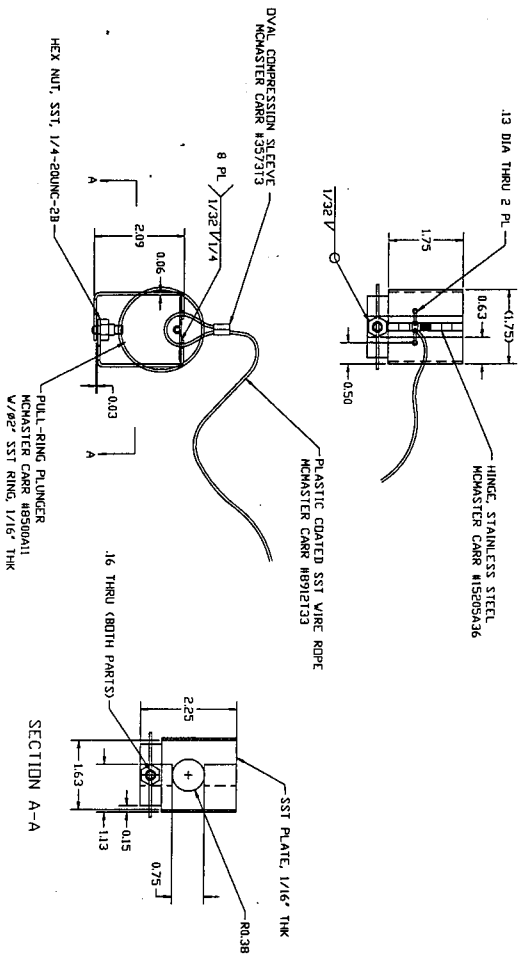




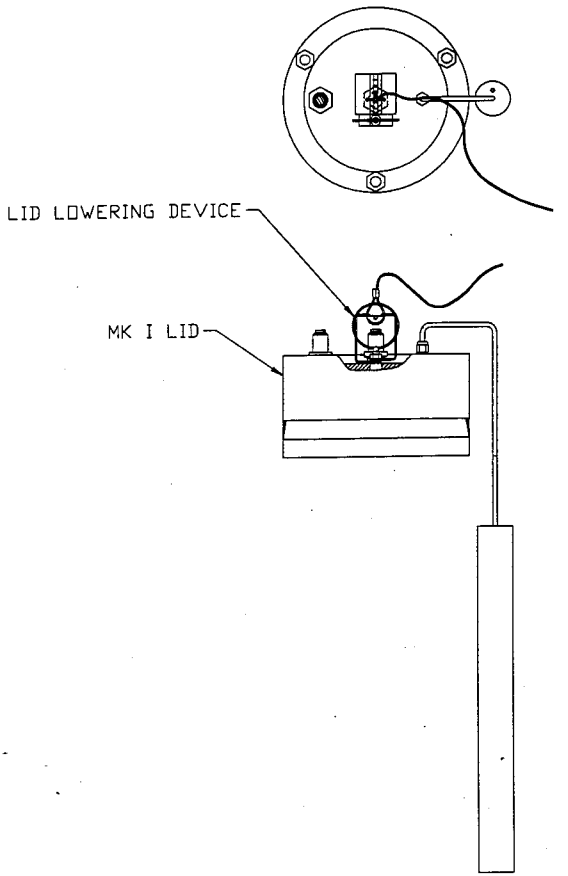
SKETCH 1 cont.

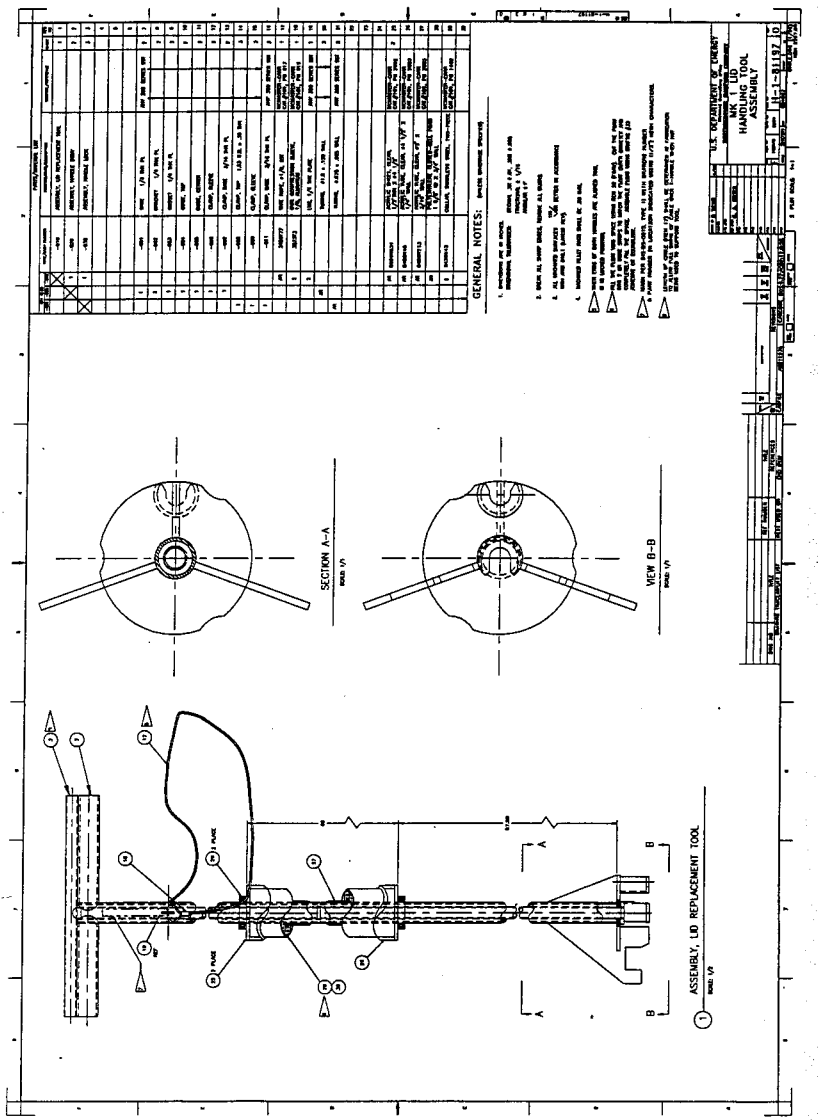


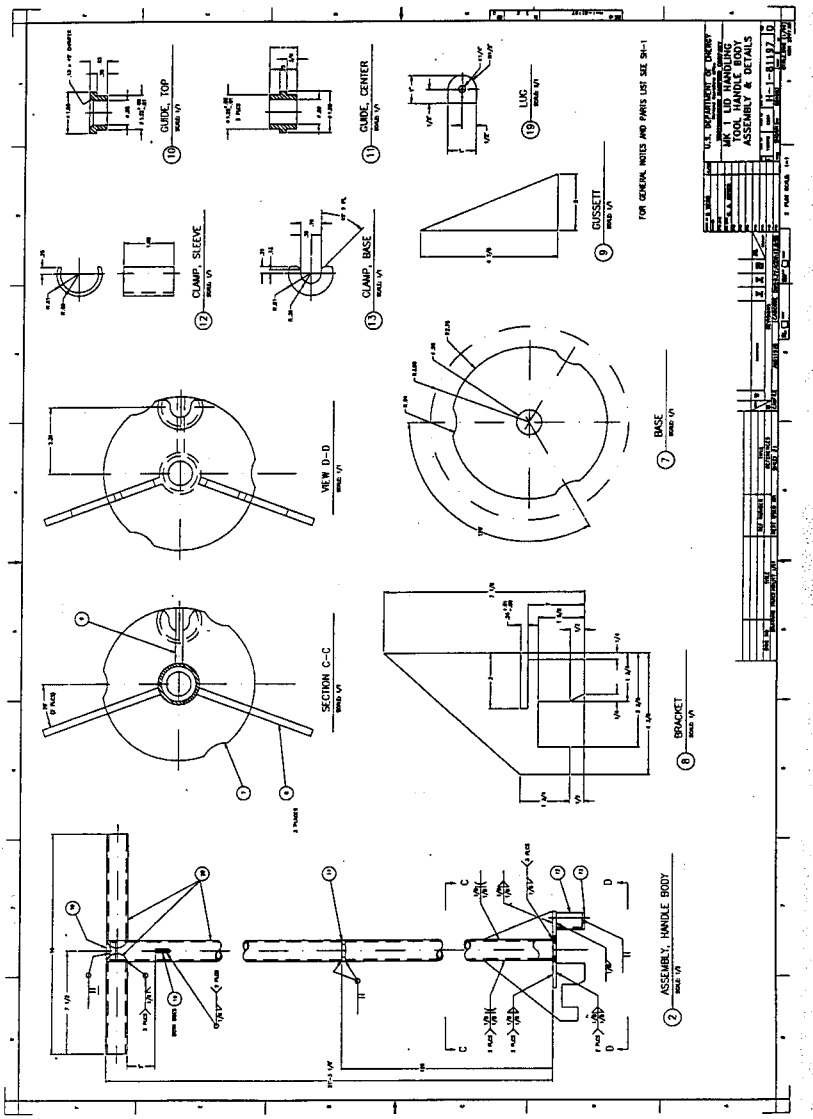
SKETCH 2 Lid Lowering Device

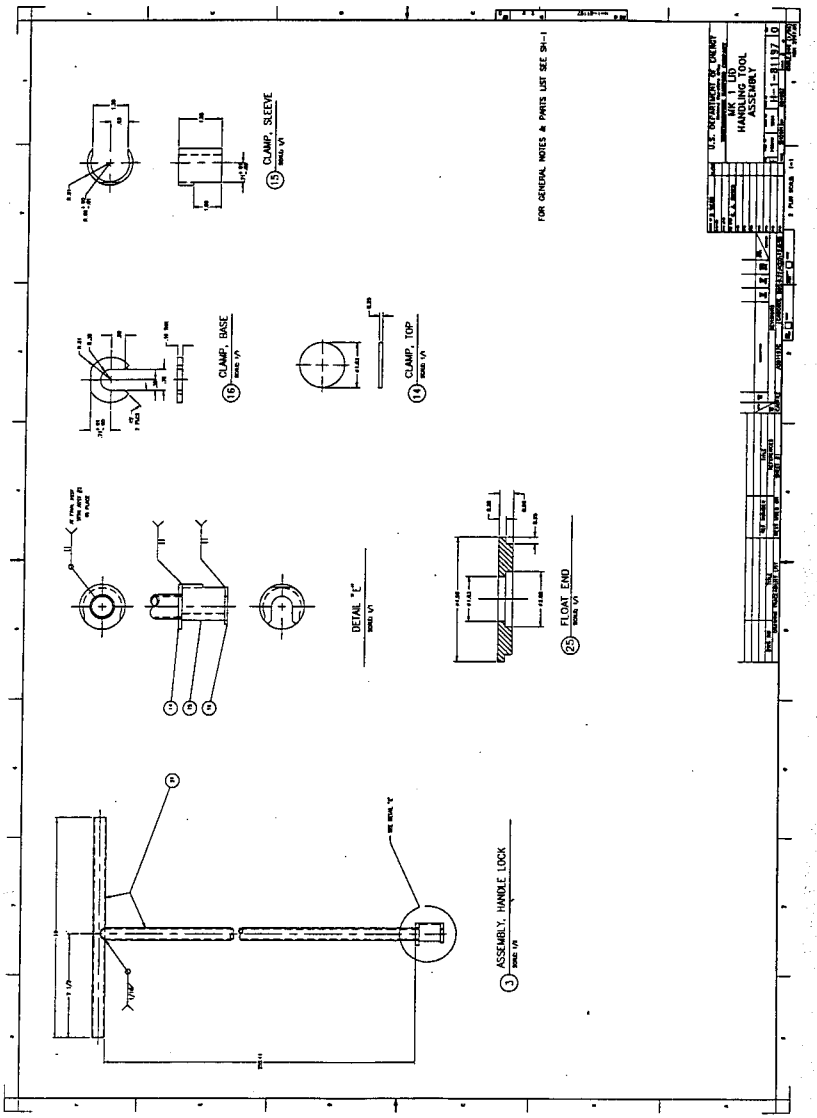


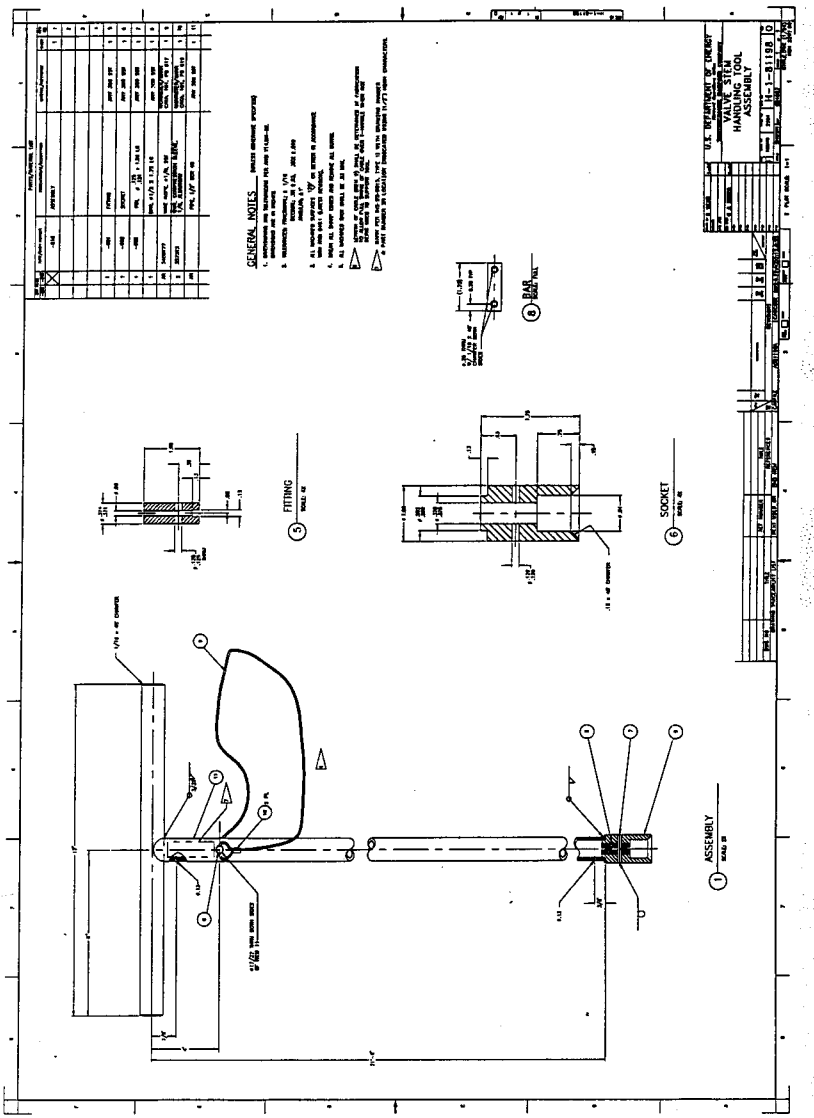
SKETCH 2 cont.

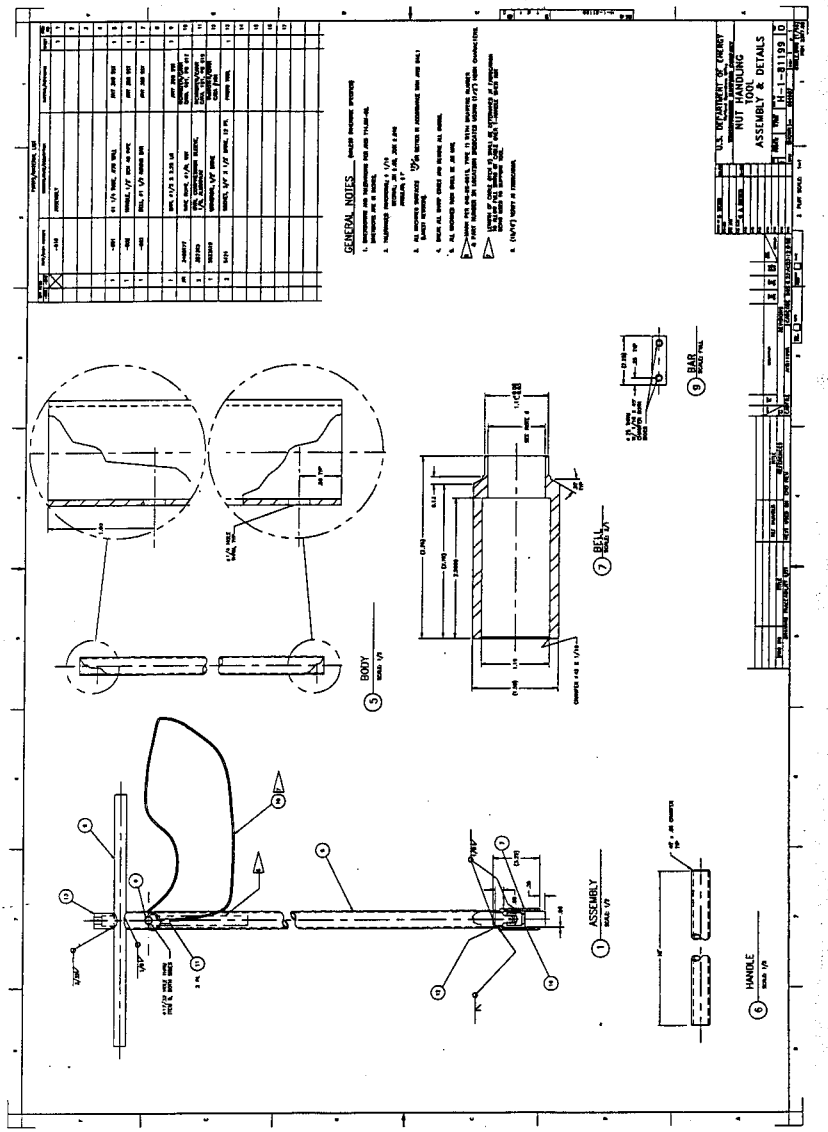


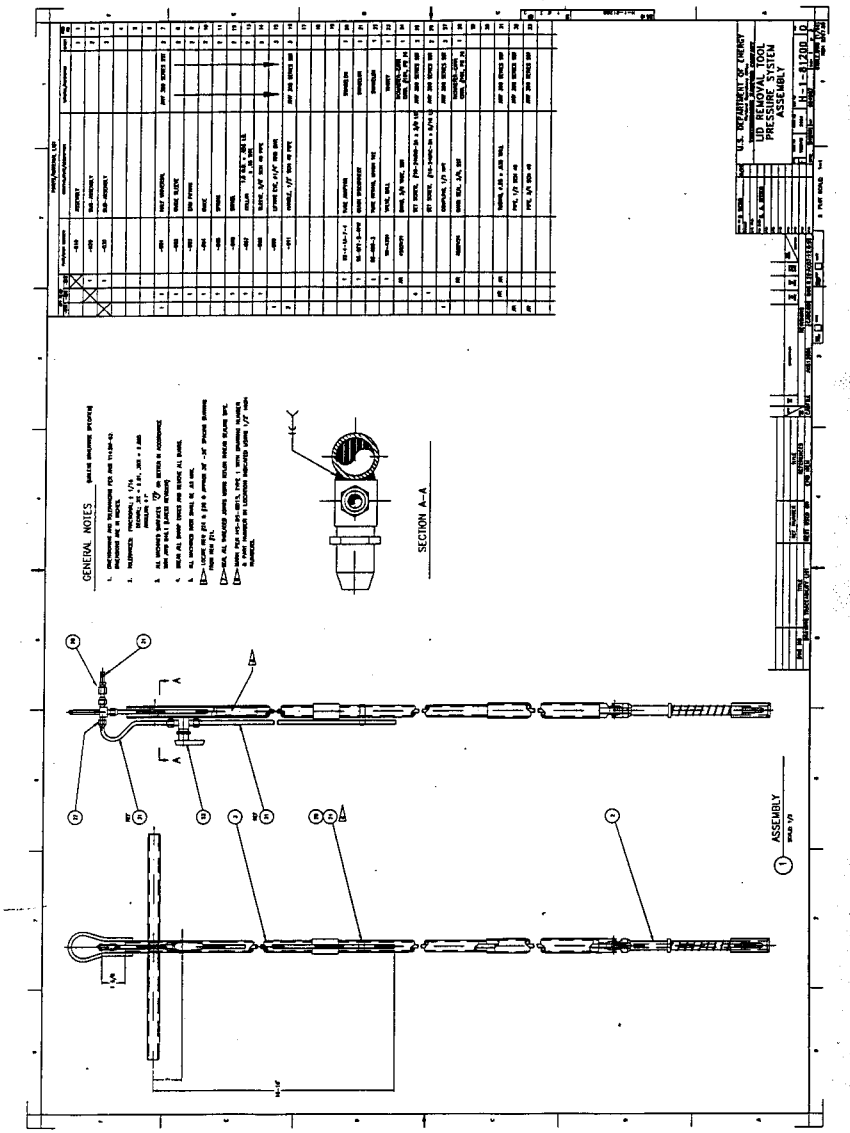

MK 1 LID
HANDLING TOOL
ASSEMBLY
GENERAL NOTES:
SECTION A-A
VIEW B-B
ASSEMBLY, LID REPLACEMENT TOOL

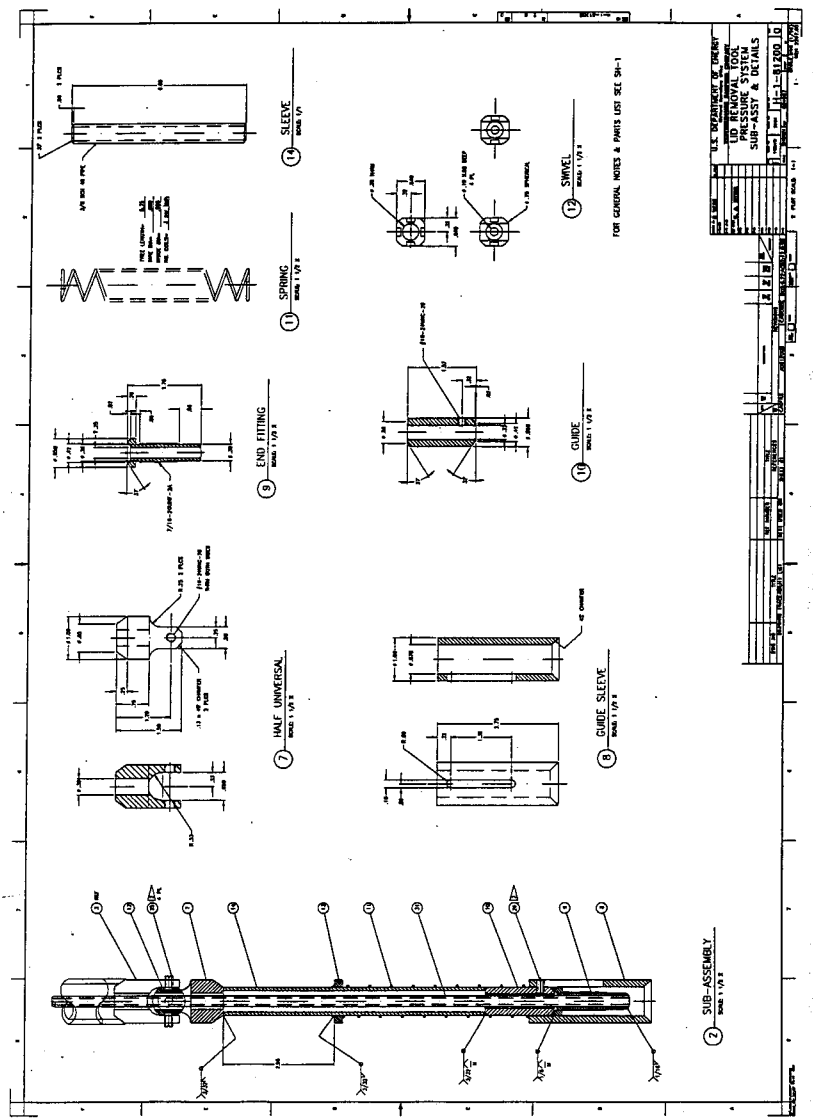

U.S. DEPARTMENT OF ENERGY
MK-I LID HANDLING
TOOL HANDLE BODY
ASSEMBLY & DETAILS
11-1-81192 ID
FOR GENERAL NOTES AND PARTS LIST SEE SH-1
ASSEMBLY, HANDLE BODY
BRACKET
BASE
GUSSETT
LUG
GUIDE, CENTER
GUIDE, TOP
CLAMP, BASE
CLAMP, SLEEVE
SECTION C-C
VIEW D-D

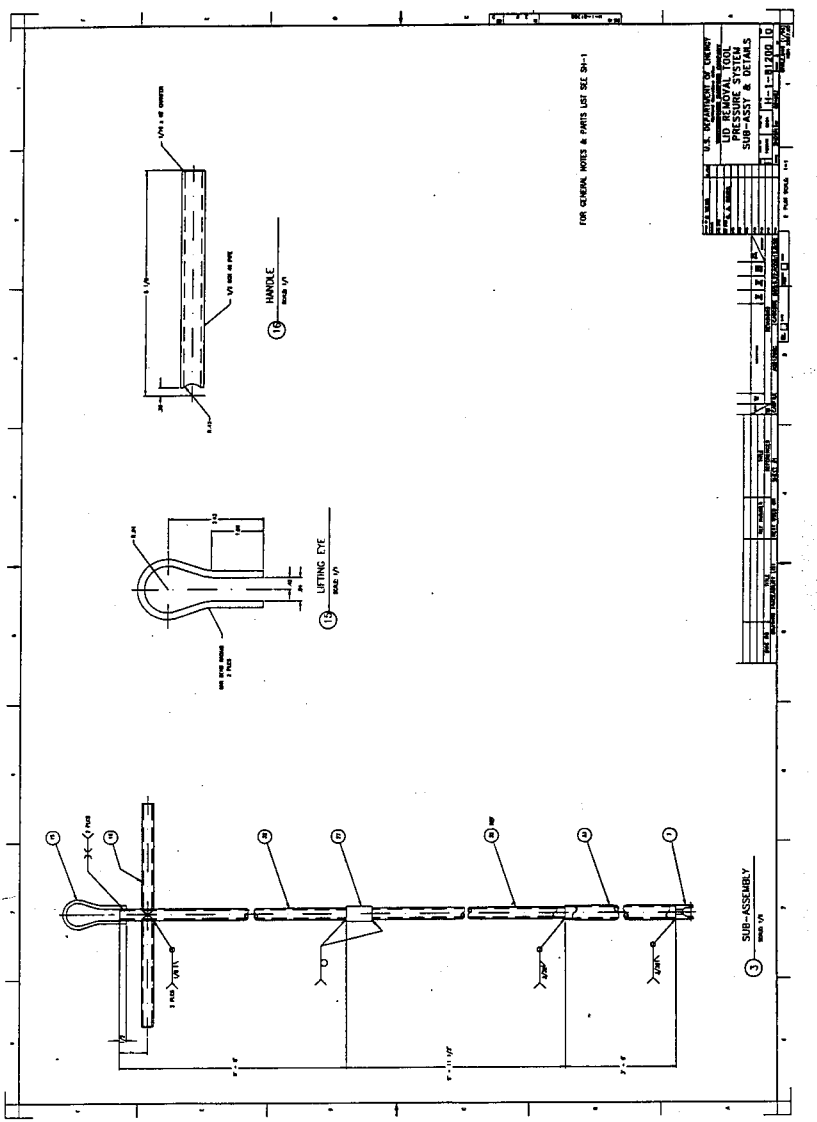

FOR GENERAL NOTES & PARTS LIST SEE SH-1
MK 1 CID
HANDLING TOOL
ASSEMBLY
CLAMP, SLEEVE
CLAMP, BASE
CLAMP, TOP
DETAIL "C"
FLOAT END
ASSEMBLY, HANDLE LOCK

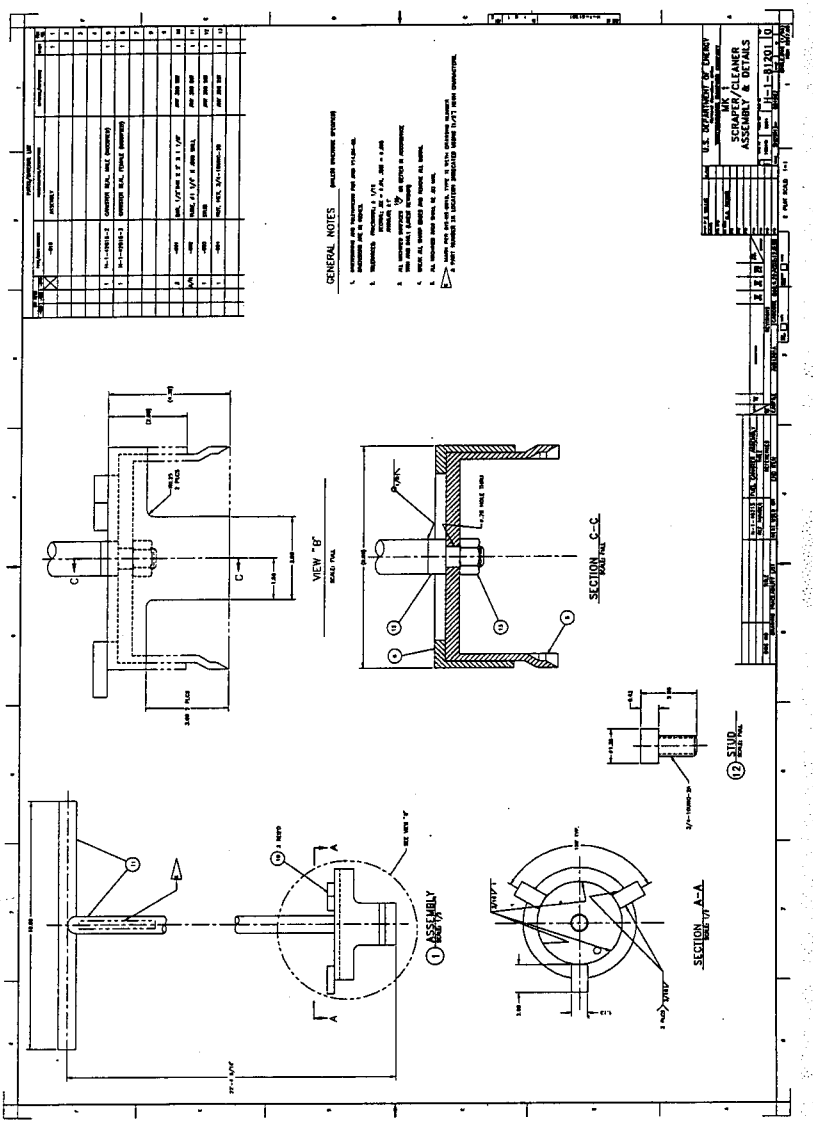

GENERAL NOTES
VALVE STEM
HANDLING TOOL
ASSEMBLY
FITTING
SOCKET
BAR
ASSEMBLY


GENERAL NOTES
U.S. DEPARTMENT OF ENERGY
NUT HANDLING TOOL
ASSEMBLY & DETAILS
BODY
BELL
BAR
ASSEMBLY
HANDLE


GENERAL NOTES
SECTION A-A
ASSEMBLY
U.S. DEPARTMENT OF ENERGY
LID REMOVAL TOOL
PRESSURE SYSTEM
ASSEMBLY


SLEEVE
SPRING
END FITTING
HALF UNIVERSAL
GUIDE SLEEVE
GUIDE
SWIVEL
SUB-ASSEMBLY
FOR GENERAL NOTES & PARTS LIST SEE SH-1


FOR GENERAL NOTES & PARTS LIST SEE SH-1
U.S. DEPARTMENT OF ENERGY
LID REMOVAL TOOL
PASSIVE SYSTEM
SUB-ASSY & DETAILS
HANDLE
LIFTING EYE
SUB-ASSEMBLY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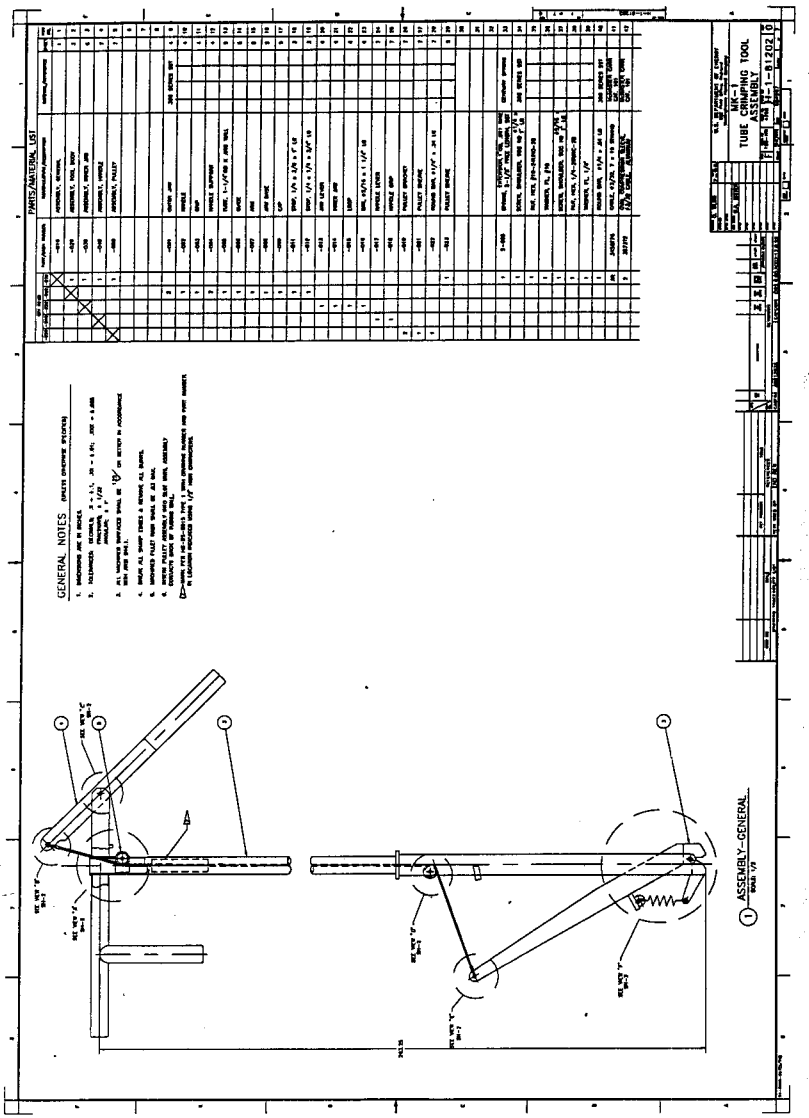
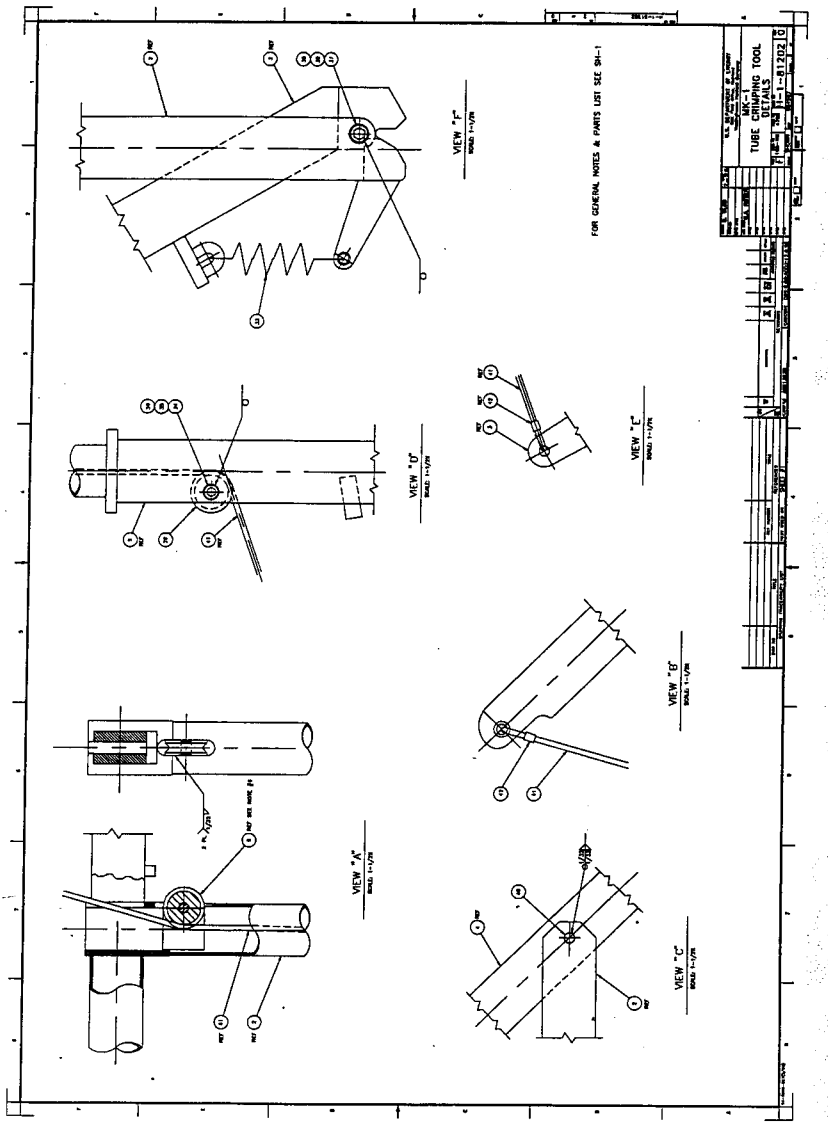
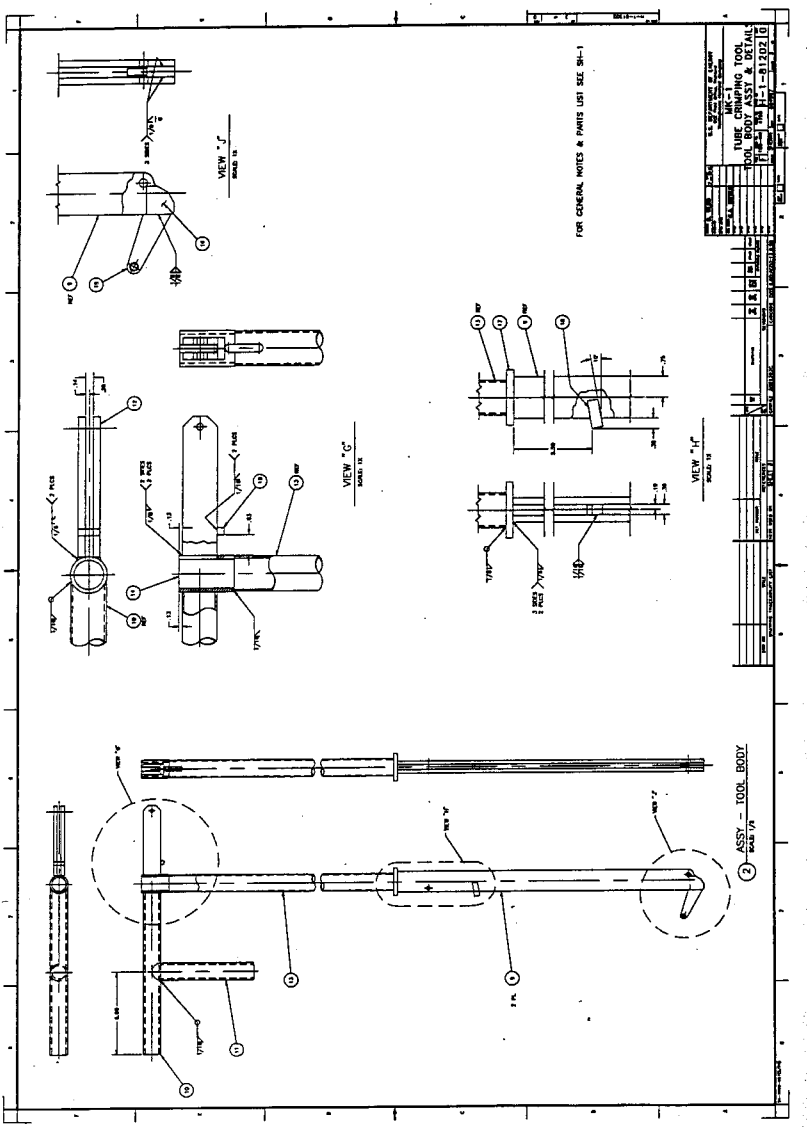
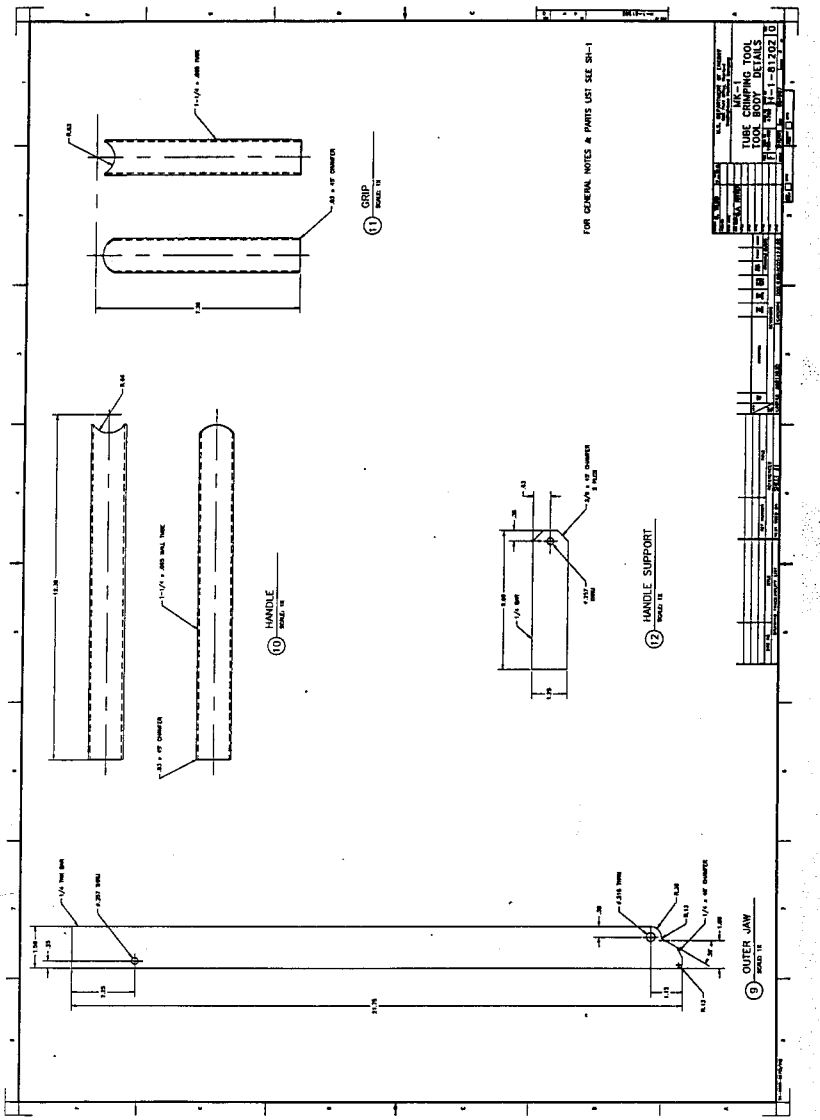
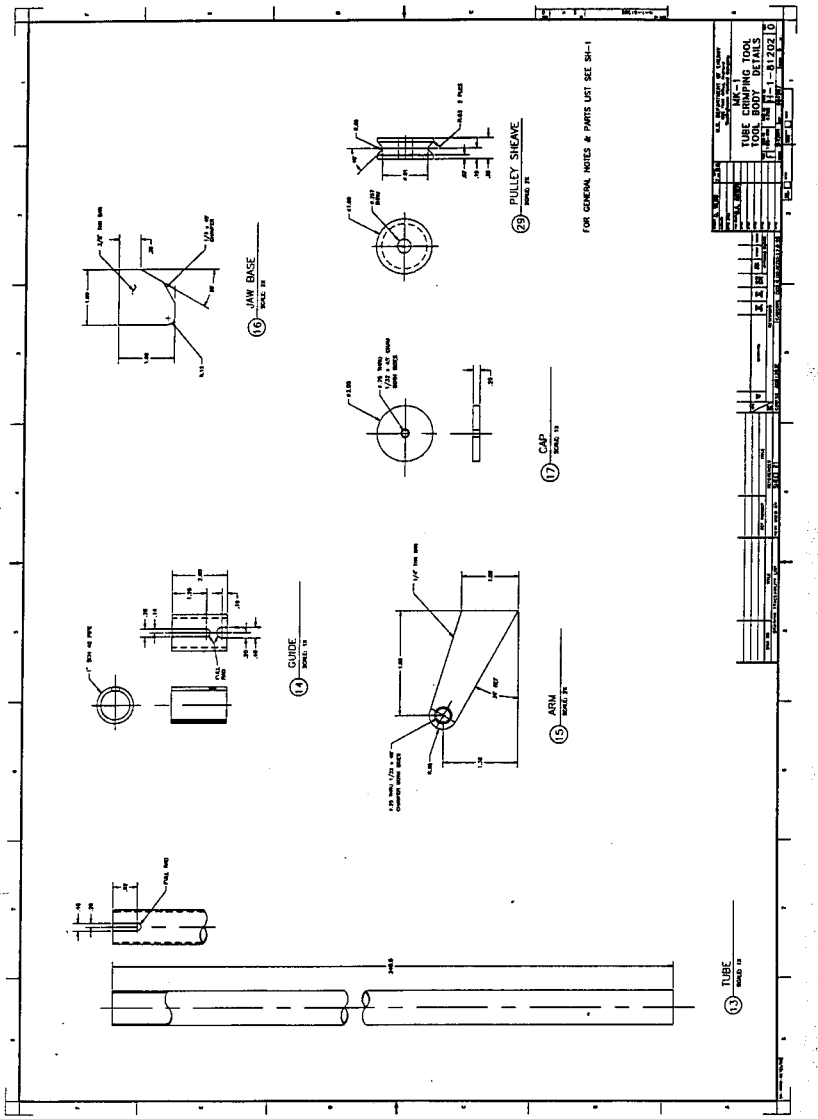
VIEW "B"
SECTION C-C
SECTION A-A
(1) ASSEMBLY
(2) STUD
SCRAPER/CLEANER ASSEMBLY & DETAILS

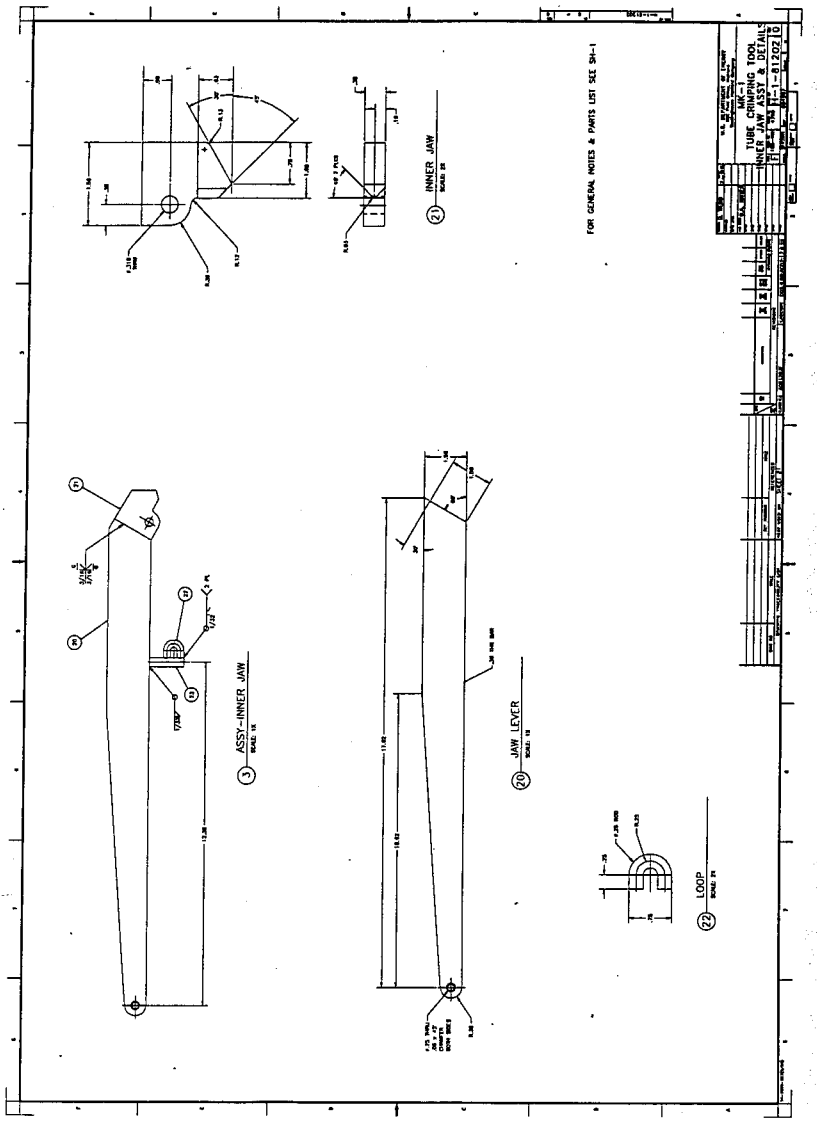

PARTS/MATERIAL LIST
GENERAL NOTES
TUBE CRIMPING TOOL ASSEMBLY
MK-1
H-1-81202
ASSEMBLY-GENERAL

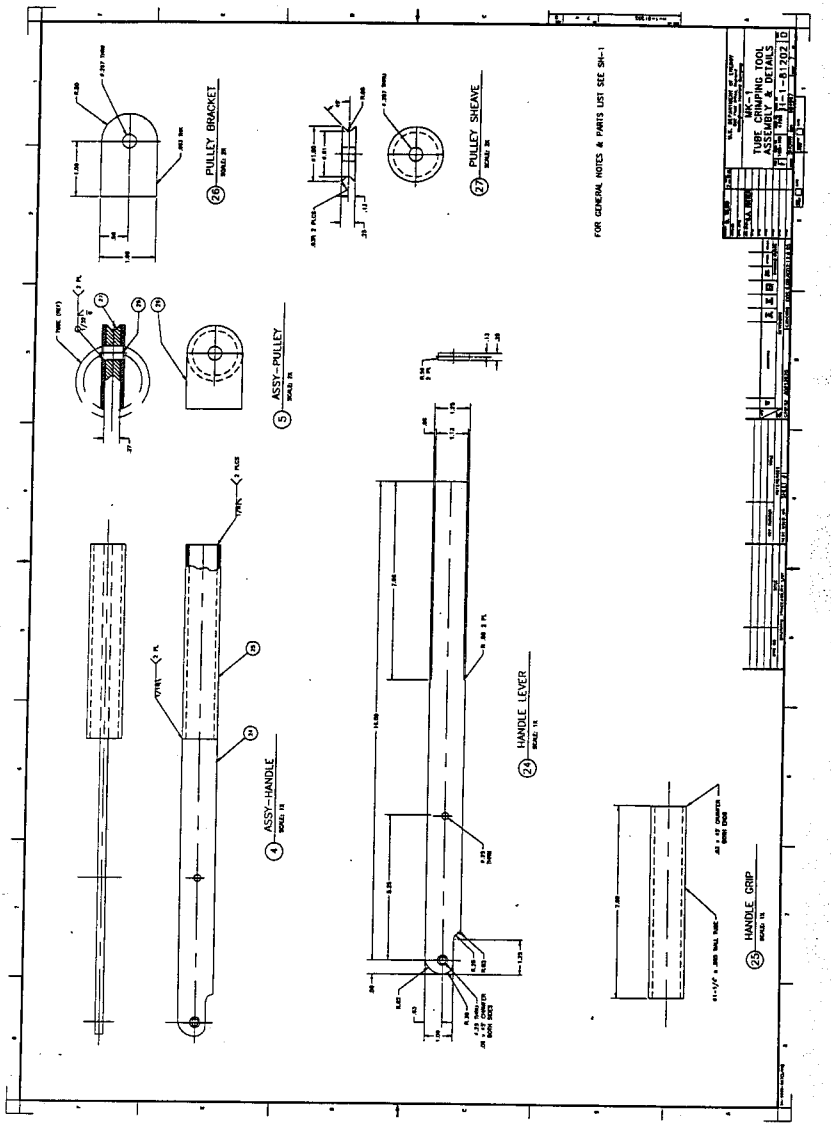

VIEW "F"
VIEW "D"
VIEW "E"
VIEW "G"
VIEW "A"
VIEW "C"
FOR GENERAL NOTES & PARTS LIST SEE SH-1
TUBE CRIMPING TOOL DETAILS
MK-1

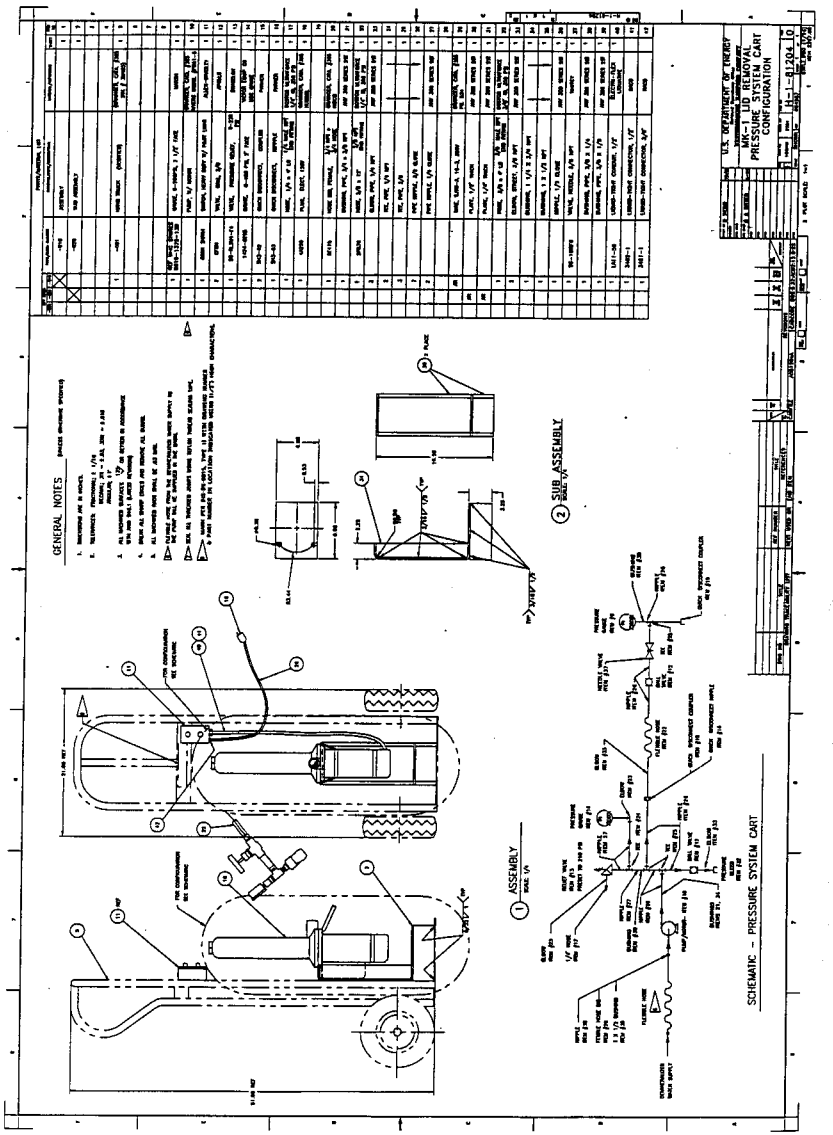

TUBE CRIMPING TOOL
TOOL BODY ASSY & DETAILS
FOR GENERAL NOTES & PARTS LIST SEE SH-1
VIEW "J"
VIEW "G"
VIEW "H"
2 ASSY — TOOL BODY

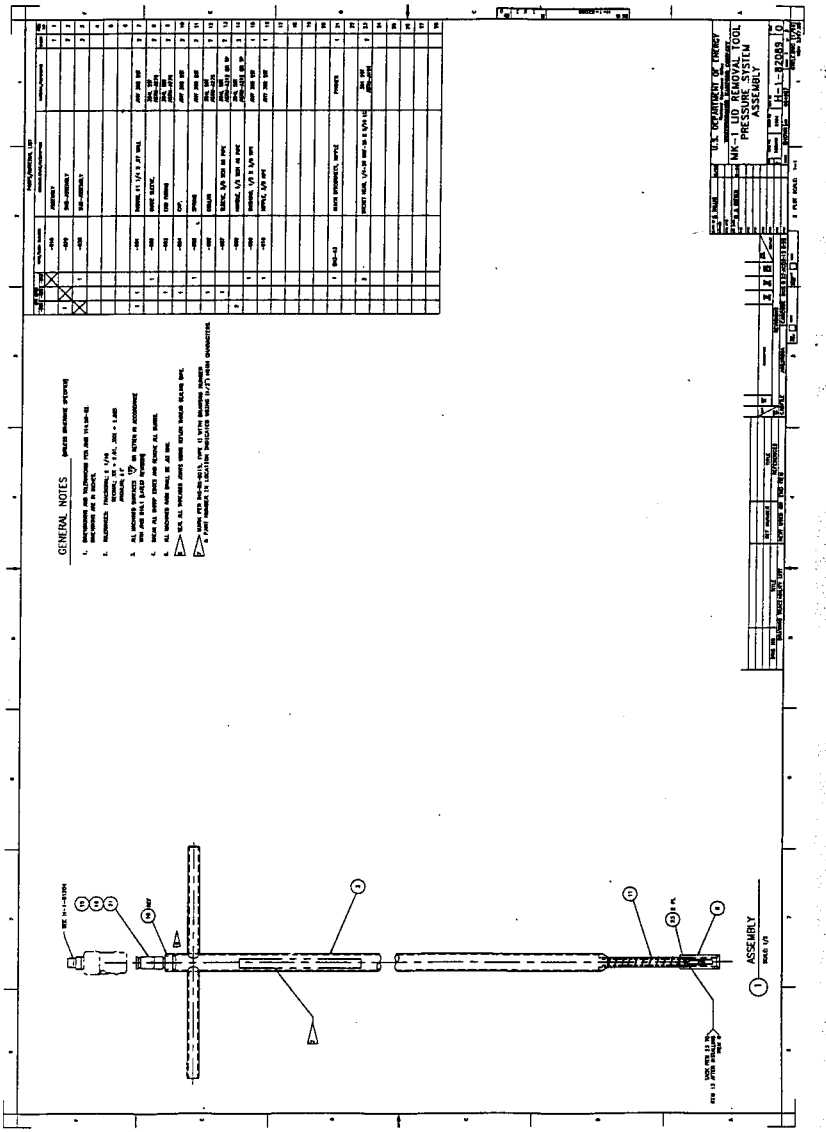

TUBE CRIMPING TOOL
BODY DETAILS
MK-1
FOR GENERAL NOTES & PARTS LIST SEE SH-1
GRIP
HANDLE
HANDLE SUPPORT
OUTER JAW

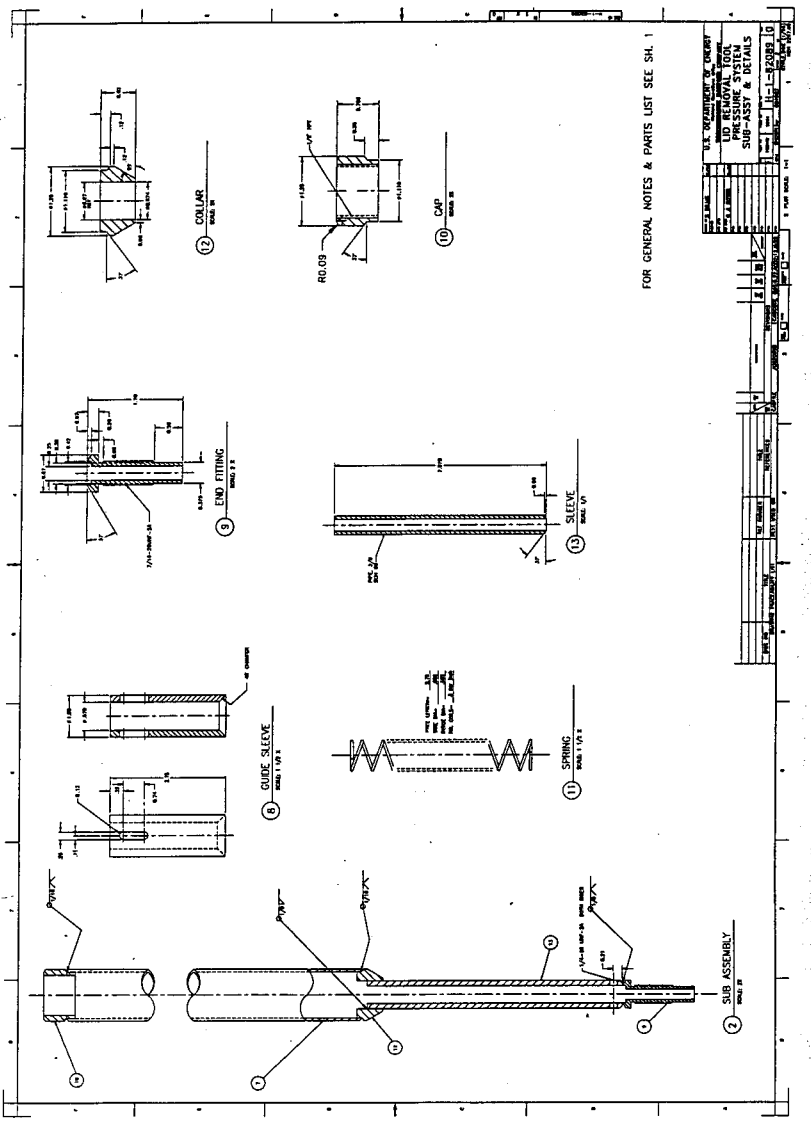

TUBE CRIMPING TOOL
TOOL BODY DETAILS
MK-1
FOR GENERAL NOTES & PARTS LIST SEE SH-1
PULLEY SHEAVE
29
JAW BASE
16
CAP
17
GUIDE
14
ARM
15
TUBE
13

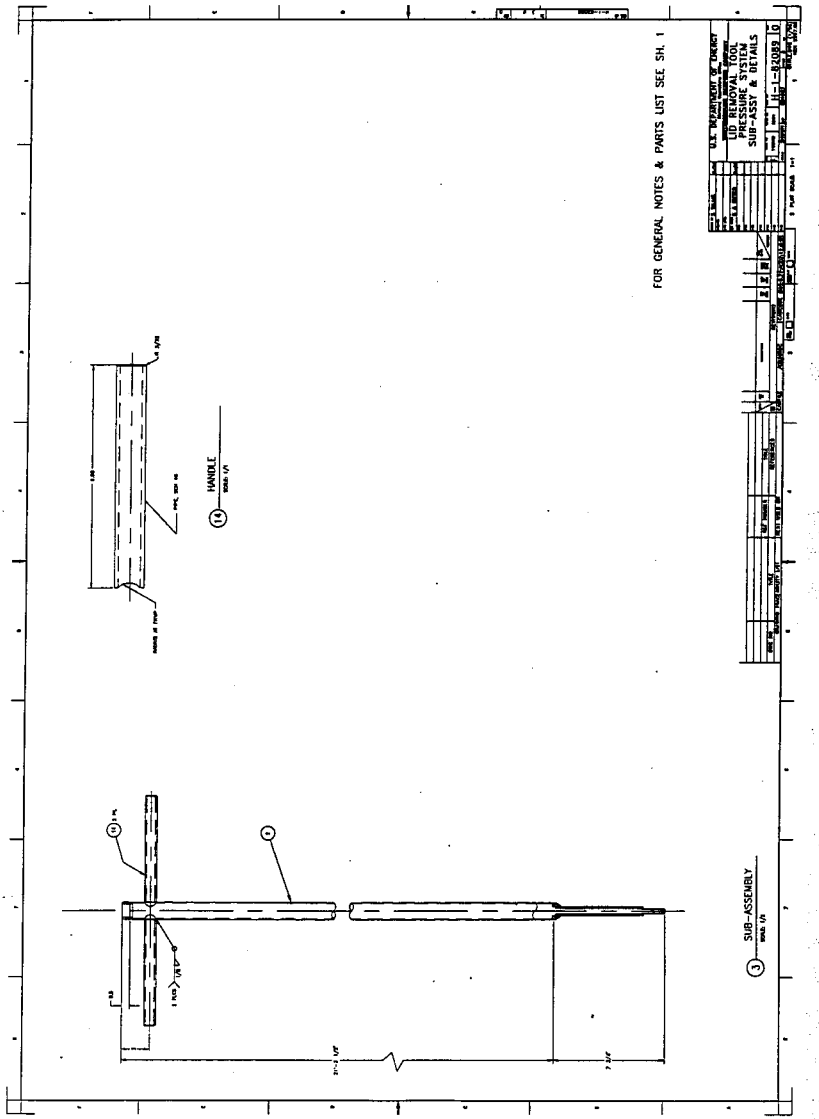

TUBE CRIMPING TOOL
INNER JAW ASSY & DETAILS
FOR GENERAL NOTES & PARTS LIST SEE SH-1
INNER JAW
ASSY-INNER JAW
JAW LEVER
LOOP


TUBE CRIMPING TOOL
ASSEMBLY & DETAILS
WHC-1
FOR GENERAL NOTES & PARTS LIST SEE SH-1
26 PULLEY BRACKET
27 PULLEY SHEAVE
5 ASSY-PULLEY
4 ASSY-HANDLE
24 HANDLE LEVER
29 HANDLE GRIP


GENERAL NOTES
1 ASSEMBLY
2 SUB ASSEMBLY
SCHEMATIC - PRESSURE SYSTEM CART
U.S. DEPARTMENT OF ENERGY
MK-1 LID REMOVAL
PRESSURE SYSTEM CART
CONFIGURATION
H-1-81204.10


U.S. DEPARTMENT OF ENERGY
MK-IA CASK REMOVAL TOOL PRESSURE SYSTEM ASSEMBLY
GENERAL NOTES
ASSEMBLY


FOR GENERAL NOTES & PARTS LIST SEE SH. 1
U.S. DEPARTMENT OF ENERGY
LID REMOVAL TOOL
PRESSURE SYSTEM
SUB-ASSY & DETAILS
11-1-82089 10
SUB ASSEMBLY
CAP
SLEEVE
SPRING
GUIDE SLEEVE
END FITTING
COLLAR
R0.09


FOR GENERAL NOTES & PARTS LIST SEE SH. 1
LID REMOVAL TOOL
PRESSURE SYSTEM
SUB-ASSY & DETAILS
HANDLE
SUB-ASSEMBLY

APPENDIX B

ACCEPTANCE TEST PROCEDURE (ATP)

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MAY 19 1995 21

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 608486

To: (Receiving Organization) Packaging Engineering	3. From: (Originating Organization) Packaging Engineering 84100	4. Related EDT No.:
5. Proj./Prog./Dept./Div.: 84100	6. Cog. Engr.: M. D. Clements E37204	7. Purchase Order No.: NA
8. Originator Remarks: For Approval.		9. Equip./Component No.: NA 10. System/Bldg./Facility: K West
11. Receiver Remarks:		12. Major Assm. Dwg. No.: NA 13. Permit/Permit Application No.: NA 14. Required Response Date:

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-TP-TP-006		0	Test Plan For Prototype K Basin Mark I Lid Removal Tools	SQ	1	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng.: MD Clements	M D Clements	5/17/95	G2-02	JJ Jornberg			X3-72	1	
1	1	Cog. Mgr.: JG Field		5/18/95	G2-02	SL Hecht		5-18-95	L5-01	1	1
1	1	QA: JA Tittle		5-18-95	X3-78	MJ SCHLIEBE			L6-13	1	1
1		Safety: SA Norling		5-18-95	G6-57	Central Files			L8-04		
		Env.									
1	1	SS Shiraga		5/17/95	G2-02						
1	1	KE Adkins			G2-02						

18. M. D. Clements — Signature of EDT Originator — Date 5/17/95

19. Authorized Representative Date for Receiving Organization

20. J. G. Field — Cognizant Manager — Date 5/17/95

21. DOE APPROVAL (if required) Ctrl. No.
- ☐ Approved
- ☐ Approved w/comments
- ☐ Disapproved w/comments

BD-7400-172-2 (04/94) GEF097

BD-7400-172-1 (07/91)

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MAY 19 1995 (21) ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 608486

To: (Receiving Organization) Packaging Engineering	3. From: (Originating Organization) Packaging Engineering 84100	4. Related EDT No.:
5. Proj./Prog./Dept./Div.: 84100	6. Cog. Engr.: M. D. Clements E37204	7. Purchase Order No.: NA
8. Originator Remarks: For Approval.		9. Equip./Component No.: NA
		10. System/Bldg./Facility: K West
11. Receiver Remarks:		12. Major Assm. Dwg. No.: NA
		13. Permit/Permit Application No.: NA
		14. Required Response Date:

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-TP-TP-006		0	Test Plan For Prototype K Basin Mark I Lid Removal - Tools	SQ	1	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng.: MD Clements	M.D. Clements	5/17/95	G2-02	JJ Jernberg	JJ Jernberg		X3-72	1	
1	1	Cog. Mgr.: JG Field	J.G. Field	5/17/95	G2-02	SL Hecht	S.L. Hecht	5-18-95	L5-01	1	1
1	1	QA: JA Tittle	J.A. Tittle	5-15-95	X3-78	MJ SCHLIEBE	M.J. Schliebe		L6-13	1	1
1		Safety: SA Northing	S.A. Northing	5-18-95	56-57	Central Files			L8-04		
		Env.									
1	1	SS Shiraga	S.S. Shiraga	5/17/95	G2-02						
1	1	KE Adkins	K.E. Adkins		G2-02						

18. M. D. Clements 5/17/95
Signature of EDT Originator Date

19. Authorized Representative for Receiving Organization Date

20. J. G. Field 5/17/95
Cognizant Manager Date

21. DOE APPROVAL (if required) Ctrl. No.
- [ ] Approved
- [ ] Approved w/comments
- [ ] Disapproved w/comments

BD-7400-172-2 (04/94) GEF097

BD-7400-172-1 (07/91)

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RELEASE AUTHORIZATION

Document Number:	WHC-SD-TP-TP-006, Rev. 0
Document Title:	Test Plan for Prototype K Basin Mark I Lid Removal Tools
Release Date:	May 19, 1995

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

V.L. Birkland — May 19, 1995

A-6001-400.2 (09/94) WEF256

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ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 605192

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	3a. USQ Required?	4. Date
Supplemental [X] Direct Revision [] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	G. A. Ritter 8M720 H0-38 376-4669	[] Yes [X] No	6/12/96
	5. Project Title/No./Work Order No. Spent Nuclear Fuels Characterization, LB024	6. Bldg./Sys./Fac. No. 105-KW	7. Approval Designator Q
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-TP-TP-006 Rev. 0	9. Related ECN No(s). N/A	10. Related PO No. N/A

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

1. On page 4, change the title of Section 4.1 to read "Spent Nuclear Fuels Evaluation Design Authority".
2. Replace steps 6.4 and 6.6 on pages E-3 and E-4 to delete reference to "by-pass valve" and instead refer to throttle valve.
3. Change step 6.10 to remove lid replacement tool prior to using bolt removal tool.
4. Replace step 6.11 to add a leak check using pressurization tool with plant air.
5. Add step 6.12 to repeat steps 6.2 through 6.6 to remove lid without crimping.
6. Add steps 6.13 and 6.14 to test scraper tool.
7. Add performance criteria for scraper tool to ATTACHMENT 1 and add to equipment list on ATTACHMENT 2.

13a. Justification (mark one)

Criteria Change	[X]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[]

13b. Justification Details

Personnel responsible for testing have changed and the test plan must be updated to reflect these changes. Also, changes to the test procedure steps are needed to reflect changes in equipment design.

14. Distribution (include name, MSIN, and no. of copies)

R. B. Baker	H0-40	N. R. Roe*	H0-40
D. W. Bergmann	R3-86	G. A. Ritter*	H0-32
A. E. Bridges	H0-40	M. J. Schliebe	L6-13
J. J. Jernberg	H0-40	J. A. Tittle	X3-78
R. P. Omberg	H0-40	Central Files	A3-88

*Advanced copy

RELEASE STAMP
JUN 24 1996
DATE:
STA: 21
HANFORD RELEASE
ID: 21

A-7900-013-2 (11/94) GEF095

A-7900-013-1 (06/92)

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ENGINEERING CHANGE NOTICE

Page 2 of ~~11~~ KN

1. ECN (use no. from pg. 1): 605192

15. Design Verification Required: [X] Yes [ ] No

16. Cost Impact

ENGINEERING			CONSTRUCTION		
Additional	[ ]	$ N/A	Additional	[ ]	$
Savings	[ ]	$	Savings	[ ]	$

17. Schedule Impact (days)

Improvement [ ]
Delay [ ] N/A

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[ ]	Seismic/Stress Analysis	[ ]	Tank Calibration Manual	[ ]
Functional Design Criteria	[ ]	Stress/Design Report	[ ]	Health Physics Procedure	[ ]
Operating Specification	[ ]	Interface Control Drawing	[ ]	Spares Multiple Unit Listing	[ ]
Criticality Specification	[ ]	Calibration Procedure	[ ]	Test Procedures/Specification	[ ]
Conceptual Design Report	[ ]	Installation Procedure	[ ]	Component Index	[ ]
Equipment Spec.	[ ]	Maintenance Procedure	[ ]	ASME Coded Item	[ ]
Const. Spec.	[ ]	Engineering Procedure	[ ]	Human Factor Consideration	[ ]
Procurement Spec.	[ ]	Operating Instruction	[ ]	Computer Software	[ ]
Vendor Information	[ ]	Operating Procedure	[ ]	Electric Circuit Schedule	[ ]
OM Manual	[ ]	Operational Safety Requirement	[ ]	ICRS Procedure	[ ]
FSAR/SAR	[ ]	IEFD Drawing	[ ]	Process Control Manual/Plan	[ ]
Safety Equipment List	[ ]	Cell Arrangement Drawing	[ ]	Process Flow Chart	[ ]
Radiation Work Permit	[ ]	Essential Material Specification	[ ]	Purchase Requisition	[ ]
Environmental Impact Statement	[ ]	Fac. Proc. Samp. Schedule	[ ]	Tickler File	[ ]
Environmental Report	[ ]	Inspection Plan	[ ]	N/A	[X]
Environmental Permit	[ ]	Inventory Adjustment Request	[ ]		[ ]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
none.		

20. Approvals

Signature	Date
OPERATIONS AND ENGINEERING	
Cog. Eng. G. A. Ritter G. A. Ritter	6/19/96
Cog. Mgr. R. P. Ombers RPOmbers for RPO	6/20/96
QA J. A. Tittle for GM Davis (GM Davis)	6/21/96
Safety	
Environ.	
Other	
Informal Review N. R. Roe N R Roe	6/20/96
A. E. Bridges Glenn E. Bridges	6/20/96
D. W. Bergmann D W Bergmann	6/20/96
R. B. Baker R B Baker	6/21/96

Signature	Date
ARCHITECT-ENGINEER	
PE	
QA	
Safety	
Design	
Environ.	
Other	
DEPARTMENT OF ENERGY	
Signature or a Control Number that tracks the Approval Signature	
ADDITIONAL	

A-7900-013-3 (11/94) GEF096

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RECORD OF REVISION	(1) Document Number WHC-SD-TP-TP-006	Page 1

(2) Title
Test Plan for Prototype K Basin Mark I Lid Removal Tools

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	Authorized for Release (6) Cog. Mgr. Date
0	(7) Initial Revision, Approval EDT 608486 dated May 19, 1995.	M. D. Clements	J. G. Field
0A RS	Made following changes per ECN 605192: - changed approval authority for test report to "Spent Nuclear Fuels Evaluation Design Authority" to reflect changes in personnel responsible for testing tools. - added test procedure steps to the Test Traveler sheets in Appendix E to reflect changes in equipment design. ADD PAGE E-6.	G. A. Ritter G.A. Ritter 6/19/96	R. P. Omberg R B Baker for RPO 6/24/96

A-7320-005 (08/91) WEF168

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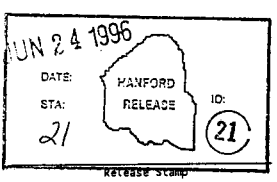
Test Plan for K Basin Prototype Mark I Lid Removal Tools

Glenn A. Ritter
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 605192 UC: 2070
Org Code: 8M720 Charge Code: LB024
B&R Code: EW3135040 Total Pages: 52

Key Words: Mark I Canister, Lid removal tools, K Basin

Abstract: This test plan defines the procedure with which to test the prototype tooling designed and fabricated to remove and replace Mark I canister lids. The testing will take place in the mock-up basin in the 305 Facility.



Release Approval Date

Approved for Public Release

A-6400-073 (10/95) GEF321

Test Control Copy

SUPPORTING DOCUMENT

1. Total Pages: KN 51

2. Title	3. Number	4. Rev No.
Test Plan for Prototype K Basin Mark I Lid Removal Tools	WHC-SD-TP-TP-006	0

5. Key Words	6. Author
Prototype, Mark I Canister, Lid Removal Tooling, K Basin	Name: M. D. Clements Signature: M.D. Clements Organization/Charge Code: E37204 84100/~~LD118~~

7. Abstract

This test plan defines the procedure with which to test the prototype tooling designed and fabricated to remove and replace Mark I canister lids. The testing will take place in the 305 testing facility.

8. RELEASE STAMP

OFFICIAL RELEASE BY WHC
DATE MAY 19 1995
Sta. 21 (21)

A-6400-073 (08/94) WEF124

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RELEASE AUTHORIZATION

Document Number:	WHC-SD-TP-TP-006, Rev. 0
Document Title:	Test Plan for Prototype K Basin Mark I Lid Removal Tools
Release Date:	May 19, 1995

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

V.L. Birkland — May 19, 1995

V.L. Birkland

A-6001-400.2 (09/94) WEF256

WHC-SD-TP-TP-006, Rev. 0
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TEST PLAN FOR K BASIN PROTOTYPE MARK I LID REMOVAL TOOLS

May 1995

PREPARED BY:

M. D. Clements
Packaging Engineering

TEST PLAN CONTROL COPY

CONTENTS

WHC-SD-TP-TP-006, Rev. 0
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CONTENTS (cont.)

APPENDICES

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LIST OF TERMS

JHA	Job Hazard Analysis
MSDS	Material Safety Data Sheet
WHC	Westinghouse Hanford Company

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WHC-SD-TP-TP-006, Rev. 0

TEST CONTROL COPY

TEST PLAN FOR K BASIN PROTOTYPE MARK I LID REMOVAL TOOLS

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to provide the test plan and procedures for the acceptance testing of the prototype Mark I canister lid removal/replacement tools. These prototype tools have been developed as part of the system for the removal of N Reactor fuel elements from Mark I storage canisters in the K Basin storage pool and insertion into the Single Fuel Element Can for subsequent shipment to a Hot Cell for examination. Examination of these N Reactor fuel elements is part of the overall characterization effort. New lid removal tools were required since previous tooling was either not available or very cumbersome in the limited confines of the loading area. The prototype tools will become plant units if they perform satisfactorily in these tests.

1.2 SCOPE

The primary objective of this test plan is to complete acceptance testing of the prototype lid removal/replacement tools for the K Basin operators to use in removing N Reactor fuel elements from Mark I storage canisters and place them in Single Fuel Element cans for subsequent shipping to a Hot Cell. The prototype tools were designed to Safety Class 3 with safety and quality assurance approvals, in accordance with WHC-CM-3-5, *Document Control and Records Management Manual*, Section 12.7, "Approval of Environmental, Safety, and Quality Affecting Documents."

2.0 APPLICABLE/REQUIRED DOCUMENTS

The following documents are applicable and/or required for the acceptance testing of the fuel handling tools:

- WHC-SD-SNF-PCP-001, Rev. 1, *305 Building Cold Test Facility Management Plan* (Feigenbutz 1994a)
- WHC-SD-SNF-FRD-005, *305 Building K Basin Mockup Facility Functions and Requirements* (Steele 1994)
- WHC-CM-6-1, *Standard Engineering Practices*
- WHC-IP-1026, *Engineering Practice Guidelines* (WHC 1994)
- WHC-CM-2-1, *Procurement Manual and Procedures*, PP 1, "Purchase Requisition"

- WHC-CM-3-5, Section 12.7, "Approval of Environmental, Safety, and Quality Affecting Documents"
- WHC-CM-4-2, *Quality Assurance Manual*
- WHC-CM-4-3, *Industrial Safety Manual*
- Signature Verification Data Sheet (Appendix A)
- Test Configuration Documentation List (Appendix B).

3.0 DEFINITIONS

The engineering practice EP-4.2, "Testing Requirements," of WHC-CM-6-1 lists applicable definitions for testing of the fuel handling tools. The following additional definitions were taken from WHC-SD-SNF-TP-007, *Test Plan for Sludge Retrieval and Packaging* (Feigenbutz 1994b), and WHC-SD-SNF-TC-001, *Test Procedure Forms for Sludge Retrieval and Packaging* (Feigenbutz 1994c).

- Signature Verification--The act of acknowledging the completion of a step, response, action, data, recording, etc., by signature (or initial) as required by a test procedure.
- Development Testing--Development testing is performed to provide or develop ideas, concepts, design information, or criteria. Development testing shall require a 305 Building Work Plan and a Job Hazard Analysis (JHA) if testing is beyond the normal routine of the facility.
- Feature Testing--Feature testing is performed to test certain features of a piece of equipment or system to demonstrate that fabrication, assembly, installation, and/or operation requirements have been met for that feature. Feature testing shall require a 305 Building Work Plan and a JHA if testing is beyond the normal routine of the facility.
- Functional Test--Functional testing is performed to test the final equipment configuration or system of assembled equipment items in preparation for acceptance testing. During functional testing, all components of the equipment or system are operated as a whole to determine that the equipment or system satisfactorily meets the overall functional, operational, and design requirements. Functional testing is used to determine if final changes are required before acceptance testing. Functional testing shall utilize this test plan and require a test procedure.
- Acceptance Test--Acceptance testing is performed with the equipment or system in the final in-service configuration (in the Cold Test Facility) to verify that functional, operational, and design requirements have been met. Acceptance testing shall utilize this test plan and require a test procedure. This testing may be

TEST CONTROL COPY

performed by Cold Test Facility personnel or by K Basin Operations. This acceptance testing may be performed in conjunction with operation training. For equipment destined for K Basin, the acceptance criteria for use in K Basin will be delineated and approved by K Basin Operations.

- Test Index Logbook--A controlled logbook for recording the test number, description, and date of each test or activity in sequence, whether controlled by a work plan or test procedure.
- Test Logbook--A logbook for recording all data and observations by the test performer which are not included in a test procedure.
- Test Control Copy--The single copy of all record documentation maintained at the test facility and used for all required signatures, approvals, and data recording.
- Performance Criteria--All functions, requirements and operating criteria for measuring the successful performance of test equipment.
- Work Instruction--What is to be accomplished.
- Approvals--Test engineer and building administrator approval is required on all 305 Building Work Plans.
- Restrictions/Conditions--Any mechanical/electrical safety concern that may affect personnel. Equipment operating limitations.
- Hold Points/Inspections/Verifications--Test witnesses required, quality control/quality assurance involvement, material, drawing or dimensional checks.
- Supporting Documents--Drawings, procedures, vendor specifications, test plans, etc.
- Materials Required--Material for fabrication or testing.
- Special Tools, Building Modifications--Lifting or handling equipment or anything unique to the work requested.
- Test Layout/Schematic--A layout showing configuration of test setup, including all mechanical, electrical, and instrumentation systems. This layout should simulate, where possible, the actual operating conditions of the test.
- Equipment List--A list of all materials, equipment, instrumentation, and tools required to complete the test.
- Acceptance Criteria--Requirements for equipment destined for use in K Basin to be used for accepting the equipment, to be delineated and approved by K Basin Operations.

4.0 MANAGEMENT/PERSONNEL RESPONSIBILITIES

4.1 MANAGER, PACKAGING ENGINEERING

Approve the test plan, test procedure, and final test report.

4.2 COGNIZANT ENGINEER

Superceded BY GAM ECN 605192 6/25/96

NOTE: The cognizant engineer may perform test engineer activities.

- Provide specific equipment for cold testing.
- Provide all documentation of equipment being tested.
- Provide a hazards list for equipment being tested.
- Prepare performance criteria for equipment.
- Prepare and approve test procedures.
- Review and evaluate test results.
- Review and approve outside vendor test procedures and test data.

4.3 TEST ENGINEER

- Oversee maintenance and control of testing.
- Provide liaison with facility used for testing.
- Provide liaison with Safety and Quality Assurance for testing activities and reviews of JHA related to testing, as required.
- Assist in preparing test procedures.
- Obtain test documentation identification numbers.
- Direct overall testing and assign responsibilities.
- Review test results and prepare and issue test report.
- Monitor testing for compliance with the test procedures.

4.4 TEST PERFORMER

- Perform test in accordance with approved test plan and procedure.
- Maintain a file of documented information pertinent to the test(s).

4.5 QUALITY ASSURANCE ENGINEER

- Review and approve the test plan, test procedure, and test report for both Westinghouse Hanford Company (WHC) and outside vendor testing.
- Ensure that quality requirements are defined and satisfied for the test.
- Ensure that inspection planning is adequate for the test.

4.6 QUALITY CONTROL INSPECTORS

Monitor test activities and provide signature verification, as required, at WHC and outside vendor facilities.

4.7 SAFETY

- Provide review of JHA per WHC-CM-4-3, Standard A-3, "Pre-Job Planning/Job Hazard Analysis."
- Review and approve all test-related documents in accordance with WHC-CM-3-5, Section 12.7, "Approval of Environment, Safety, and Quality Affecting Documents."

5.0 TESTING REQUIREMENTS

5.1 TEST CONTROLS

All persons responsible for signature verification(s) during testing will complete a portion of the Signature Verification Data Sheet (Appendix A).

5.2 TEST DATA

- Data shall be recorded on the data sheets provided in this document using ink.
- All changes to the configuration of tested items will be documented by markups of the controlled design documentation (drawings, procedures, etc.) using ink. Changes will be approved by the test engineer who will initial and date the markup item. It is not necessary for the test performer to stop the testing when the test engineer is not available to approve these changes. Elimination or addition of a step which requires quality control verification will require a hold point for quality assurance review and approval.

4.0 MANAGEMENT/PERSONNEL RESPONSIBILITIES

4.1 SPENT NUCLEAR FUEL EVALUATIONS DESIGN AUTHORITY

Approve the test plan, test procedure, and final test report.

4.2 COGNIZANT ENGINEER

NOTE: The cognizant engineer may perform test engineer activities.

- Provide specific equipment for cold testing.
- Provide all documentation of equipment being tested.
- Provide a hazards list for equipment being tested.
- Prepare performance criteria for equipment.
- Prepare and approve test procedures.
- Review and evaluate test results.
- Review and approve outside vendor test procedures and test data.

4.3 TEST ENGINEER

- Oversee maintenance and control of testing.
- Provide liaison with facility used for testing.
- Provide liaison with Safety and Quality Assurance for testing activities and reviews of JHA related to testing, as required.
- Assist in preparing test procedures.
- Obtain test documentation identification numbers.
- Direct overall testing and assign responsibilities.
- Review test results and prepare and issue test report.
- Monitor testing for compliance with the test procedures.

4.4 TEST PERFORMER

- Perform test in accordance with approved test plan and procedure.
- Maintain a file of documented information pertinent to the test(s).

- The test performer shall maintain a test logbook which will contain all pertinent observations, off-normal events, sketches, photographs, test data, etc. This logbook should list the testing in chronological order with the logged entries signed and dated.

5.3 TEST CONFIGURATION

- Engineering documents, such as drawings and sketches that define the test configuration, shall be recorded on the Test Configuration Documentation List (Appendix B).

- Documents that are not released at the time of the test shall be marked TEST CONTROL COPY and included in the test procedure package.

5.4 PROCEDURE CONTROL

- A controlled test procedure package shall be used in the conduct of the testing described in this document. This package shall include (1) this test plan and procedure; (2) items identified in Section 5.3 as necessary for defining the test configuration; (3) the test logbook; and (4) other data sheets, travelers, etc., that provide information necessary for conducting the test. The test procedure package will be stamped TEST CONTROL COPY.

- The items in the test procedure package shall be dated prior to completing the Test Readiness Review Checklist required in Section 8.0. All items that are deficient shall be noted on the checklist.

5.5 RETEST PROCEDURE CONTROL

- Retesting is permitted by using either additional copies of this test plan and procedure or by using new procedures per Section 8.0.

- Any new procedures required for retesting shall be included in this test plan and procedure as Appendix F, "Retest Procedure and Data Sheets." These sheets must be stamped TEST CONTROL COPY.

- Minor changes or revisions to the test plan and procedure may be made by redlining the text or figure and having the test engineer initial and date it.

- Only documentation marked TEST CONTROL COPY shall be used in the testing area.

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5.6 OPEN ITEMS

Items or actions identified during the conduct of the testing which require future resolution/completion shall be noted on the data sheets and in the test logbook. These open items shall be identified in the test completion report.

6.0 TEST DESCRIPTION

6.1 TEST EQUIPMENT

Test equipment lists, descriptions, and drawings/sketches shall be included with the Test Traveler (Appendix C) if they are not released items (see Appendix B).

6.2 ANCILLARY EQUIPMENT AND TOOLS

All ancillary equipment and tools required for the conduct of the test will be listed in an attachment to the Test Traveler (Appendix E).

7.0 TEST FACILITY

The 305 Building Cold Test Facility will be used to conduct the acceptance testing of the Mark I Canister Lid Removal Tools. Upon completion of this acceptance testing and any subsequent training of operators, the tools will be transferred to the 105 KW Basin for installation and use.

8.0 SAFETY

The following items describing safety requirements are based on the document WHC-SD-SNF-TC-001 (19XX).

- A JHA form specific to this test may be required in accordance with WHC-CM-4-3, Standard A-3. Existing JHAs may also be applicable.
- The applicable JHAs for this test are listed in Appendix D, "Job Hazard Analysis and Material Safety Data Sheets" (MSDS).
- The applicable MSDSs for this test are listed in Appendix D.
- All applicable JHAs and MSDSs shall be posted or located in the Cold Test Facility test area.

- All test area personnel shall observe all safety precautions outlined in the MSDS and JHA.
- Pre-job briefings for personnel involved in the testing shall be conducted and documented in Appendix G, "Pre-Job Briefing Attendance Form."

9.0 TEST PROCEDURE

9.1 TEST PERFORMER ASSIGNMENT

The test performer for this test plan and procedure is NR ROE / QA RITTER.

9.2 TEST READINESS REVIEW

The Test Readiness Review shall be conducted in accordance to the checklist in Appendix C, "Test Readiness Review Checklist," prior to proceeding with Section 9.3.

9.3 TEST PROCEDURE STEPS

The Test Traveler forms that are required in the following steps are in Appendix E.

1. Perform the pre-operational checkout steps per Test Traveler operation 1.0, "Pre-operational Checkout."

   Completed: GC Ritter 6/25/96
   Test Performer Date

2. Perform calibration steps per Test Traveler operation 2.0, "Calibration Checks."

3. Attach equipment list per Test Traveler operation 3.0.

   Completed: GC Ritter 6/25/96
   Test Performer Date

4. Attach Test Layout/Schematic per Test Traveler operation 4.0.

   Completed: GC Ritter 6/25/96
   Test Performer Date

5. Perform equipment setup per Test Traveler operation 5.0.

   Completed: [illegible] 6/25/96
   Test Performer Date

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6. Perform test per Test Traveler operation 6.0.

   Completed: _____ 6/25/96
   Test Performer Date

7. Perform final verification per Test Traveler operation 7.0.

   Completed: ~~N/A~~ N/A 6/25/96 _____
   Test Performer Date

   _____ 6/25/96

8. Training objectives may be accomplished during the conduct of this test plan and procedure. The Test Traveler shall include a hold point on equipment removal to assure completion of the training objectives.

   Completed: N/A N/A 6/25/96 _____
   ~~N/A~~
   Test Performer Date

10.0 REFERENCES

Feigenbutz, L. V., 1994a, *305 Building Cold Test Facility Management Plan*, WHC-SD-SNF-PCP-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

Feigenbutz, L. V., 1994b, *Test Plan for Sludge Retrieval and Packaging*, WHC-SD-SNF-TP-007, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Feigenbutz, L. V., 1994c, *Test Procedure Forms for Sludge Retrieval and Packaging*, WHC-SD-SNF-TC-001, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Steele, R. M., 1994, *305 Building K Basin Mockup Facility Functions and Requirements*, WHC-SD-SNF-FRD-005, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-2-1, *Procurement Manual and Procedures*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-3-5, *Document Control and Records Management Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-2, *Quality Assurance Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-3, *Industrial Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

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WHC-CM-6-1, *Standard Engineering Practices*, Westinghouse Hanford Company, Richland, Washington.

WHC, 1994, *Engineering Practice Guidelines*, WHC-TP-1026, Westinghouse Hanford Company, Richland, Washington.

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APPENDIX A

SIGNATURE VERIFICATION DATA SHEET

NAME (PRINT)	POSITION	COMPANY	SIGNATURE	INITIALS	DATE
GLENN A RITTER	TEST ENGINEER/ PERFORMER	WHC	G L A Ritter	G.A.R.	6/25/96
Nathan R. Roe	Test Eng./ Performer	WHC	N R Roe	N. R. R.	6/25/96
J.A. Tittle	QA ENG.	WHC	J A Tittle	JAT	6-25-96
C.D. Kirk	OPS Rep	WHC	C D Kirk	CDK	6/25/96
J.J. Lenberg	PROJ ENG	WHC	J J Lenberg	JJL	6/25/96
E. CAMPOS	OPS	WHC	E. Campos	EC	6-25-96
R.L. Loper	ENG. Tech	WHC	R L Loper	RLL	6-25-96
B.J. HUTCHINS	ENG	WHC	B J Hutchins	BJH	6/25/96

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APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

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APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

Item: This may be major equipment, tooling, instrumentation, facility, etc. Use equipment name (and number if assigned).

Document Title: Title of drawing, sketch, figure, publication, vendor information, etc. More than one document may be applicable to a given item. List each document separately.

Document Number: Drawing, sketch, figure, vendor publication numbers, etc. Include revision if released.

Released: Enter YES, NO, or N/A (Not Applicable).

Included: Enter YES or NO. Copies of all documents not released shall be included.

ITEM	DOCUMENT TITLE	DOCUMENT NO.	RELEASED	INCLUDED
DRAWING	MK1 LID HANDLING TOOL ASSEMBLY	H-1-81197	NO	YES
DRAWING	VALVE STEM HANDLING TOOL ASSY + DETAILS	H-1-81198	NO	YES
DRAWING	NUT HANDLING TOOL ASSEMBLY + DETAILS	H-1-81199	NO	YES
DRAWING	LID REMOVAL TOOL PRESSURE SYSTEM ASSY	H-1-81200	NO	YES
DRAWING	TUBE CRIMPING TO ASSEMBLY	H-1-81202	NO	YES
DRAWING	AIR TRAP CANISTER ASSEMBLY + DETAILS	H-1-81203	NO	YES
DRAWING	K-BASIN LID REMOVAL PRESSURE SYSTEM CART CONFIGURATION	H-1-81204	NO	YES
ECN	SUPPLEMENTAL ECN / REV. 0-A TO WHC-SD-TP-TP-006	605192	YES	YES

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APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST (cont.)

ITEM	DOCUMENT TITLE	DOCUMENT NO.	RELEASED	INCLUDED

B-2

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APPENDIX C

TEST READINESS REVIEW CHECKLIST

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APPENDIX C

TEST READINESS REVIEW CHECKLIST

Date: 6/25/96

REVIEWERS

NAME (PRINT)	POSITION	SIGNATURE	DATE
GLENN A. RITTER	TEST ENGINEER/ PERFORMER	GL A Ritter	6/25/96
Nathan R. Rose	Test Engineer/ Performer	Nathan R Rose	6/25/96
J.A Tittle	QA ENG.	J.A Tittle	6.25.96
J.J. Jessen	Project Engr.	J.J. Jessen	6/25/96

CHECKLIST

1. Is this test procedure released?

   Yes X No ____

   Comments: ALSO SUPPLEMENTAL ECN 605192 DATED 6/24/96.

2. Are there any open items which need to be addressed prior to start of testing?

   Yes ____ No X

   Comments: ____

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TEST READINESS REVIEW CHECKLIST (cont.)

3. Is the test procedure package complete per Section 5.4 and are all pages, attachments, etc., marked TEST CONTROL COPY?

   Yes X No ____

   Comments: HAND WRITTEN

4. Are all Job Hazard Analyses and Material Safety Data Sheets required by the procedure posted or located in the test area?

   Yes X No ____

   Comments: SEE ATTACHED 305 JOB SAFETY REVIEW FORM

5. Is all equipment per Section 6.1 installed or available at the test area for installation?

   Yes X No ____

   Comments:

6. Are all test materials per Section 6.2 available at the test area?

   Yes X No ____

   Comments:

7. Are the facility support systems available in the test area?

   Yes X No ____

   Comments:

C-2

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TEST READINESS REVIEW CHECKLIST (cont.)

8. Pre-job briefing complete.

Yes X No ____

Comments: COMPLETED 945, 6/25/96

C-3

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APPENDIX D

JOB HAZARD ANALYSIS AND MATERIAL SAFETY DATA SHEETS

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APPENDIX D

JOB HAZARD ANALYSIS AND MATERIAL SAFETY DATA SHEETS

The following Job Hazard Analyses and Material Safety Data Sheets are posted in the test area:

(List by title and number as applicable; this may be a hand-written entry, initialed, and dated.)

NUMBER	TITLE	DATE
NA	SEE ATTACHED JHA / JOB SAFETY REVIEW FORM DATED 10/26/95.	~~10/26/95~~ G.A.R. 6/25/96

WHC-SD-TP-TP-006, Rev. 0

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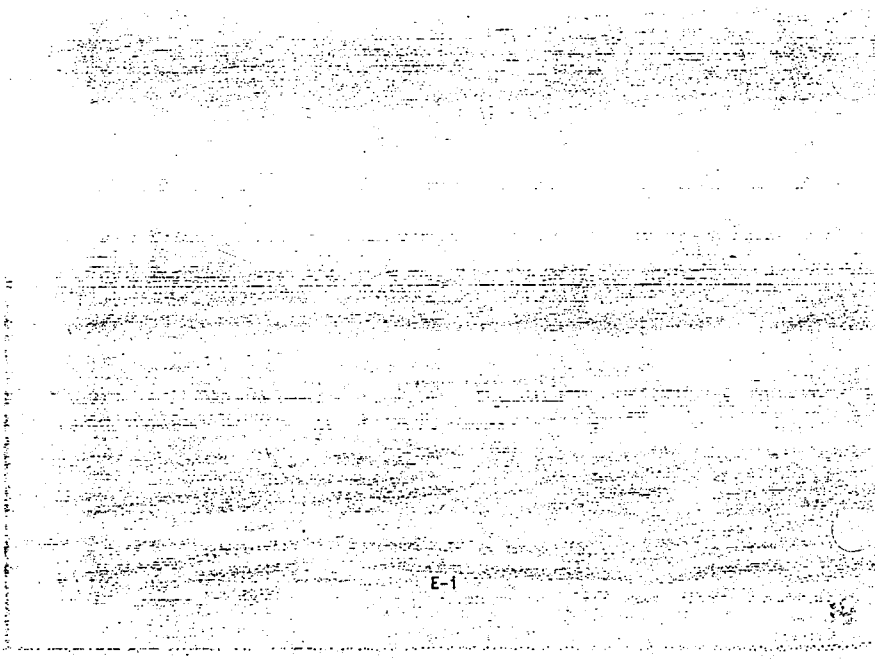
APPENDIX E

TRAVELER FORM



TEST CONTROL COPY

APPENDIX E
TRAVELER FORM

TEST TRAVELER				Page 1 of 6		Number # 1	
Job Description: MK I ATP				Work Order No. N/A		Prepared by: N.R. Roe	
System Engineer Approval: [signature]	Phone: 3-5037	Date Required:		Approval Designator: SQ		QA Approval: [signature]	Date: 6/25/96
System Manager Approval: [signature]	Phone: 3-3059	Bldg Manager Approval: [signature]		Date: 6/25/96		Safety Approval: [signature]	Date: 6/25/96

Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamps	Date	Notes
1.0	Pre-operational Checkout	NA	Q JAT T [signature] N NA E [signature] C NA	6/25/96	WALK-DOWN TOOLS - DESCRIBED FUNCTION OF EACH TOOL
1.1	Verify all test performer blanks in Section 8.0 and Appendices A, B, C, and D are completed. Stamp "TEST CONTROL COPY" on entire procedure per Section 5.4.	NA	Q JAT T [signature] N NA E [signature] C NA	6/25/96	
1.2	Conduct the "pre-job briefing" of operations, including a review of all procedures, drawings, and other engineering documents required to complete the test. Signoff Appendix G.	SEE ATTACHED JOB SAFETY REVIEW FORM	Q JAT T [signature] N NA E [signature] C NA	6/25/96	
1.3	Verify that the performance criteria is included as Attachment 1 of this traveler.	SEE ATTACHED	Q JAT T [signature] N NA E [signature] C NA	6/25/96	

Q = Quality control inspector; T = Technician; N = Nondestructive examination inspector; E = Engineer, C = Craft

TEST CONTROL COPY

TRAVELER FORM (cont.)

TEST TRAVELER (Continuation Sheet) | Page 2 of 6 | Number #1

Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamps	Date	Notes
2.0	Calibration Checks: Verify that all instruments and equipment have current calibration stickers.	NA	Q N/A T N NA E C NA	6/25/96	N/A No calibrated Equipment for MTR ~~The torque wrench is not calibrated~~
3.0	Verify the equipment list (Attachment 2).	See Attached	Q NA T N NA E BH C NA	6/25/96	
4.0	Complete and verify the test layout/schematic (Attachment 3).	See Attached	Q NA T N NA E BH C NA	6/25/96	
5.0	Set up the test equipment per the test layout/schematic. Set up prototype canister by filling the prototype canister 3/4 full with water. Seal the prototype lid on the canister. Place canister at the bottom of the test pool and center below opening in grating.	NA	Q T N NA E BH C	6/25/96	

Q = Quality control inspector; T = Technician; N = Nonlestructive examination inspector; E = Engineer, C = Craft

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TRAVELER FORM (cont.)

TEST TRAVELER (Continuation Sheet)		Page 3 of __		Number	
Operation Number	**Test Instruction**	**Ref., Dwg., Proc. Spec.**	**Completion Sign/Stamps**	**Date**	**Notes**
6.0	Perform Test(s)				
6.1	The following steps will be performed with the Mark I canister on the bottom of the K Basin mockup. Set up camera for the best view of the canister lid and start the recorder.		Q NA T ___ N NA E ___ C NA		SUPERSEDED BY ECN 605192 G.M. 6/25/91
6.2	Use valve stem removal tool and tongs (if necessary) to remove the valve stem from the center valve in the canister. Use the bolt removal tool to back off the three lid nuts.		Q NA T ___ N NA E ___ C NA		
6.3	Attach pressurization tool to pump hose and prime tool. Thread the pressurization tool into the center valve of the canister (hand tight).		Q ___ T ___ N NA E ___ C NA		
6.4	Open by-pass/pressurization system valve on pressurization tool. Open feed valve and start pump. Throttle back on by-pass valve until closed. Watch for bubbles to stop escaping from canister. Shut feed valve. Turn off pump.		Q ___ T ___ N NA E ___ C NA		

Q = Quality control inspector; T = Technician; N = Nondestructive examination inspector; E = Engineer; C = Craft

TEST CONTROL COPY

TRAVELER FORM (cont.)

TEST TRAVELER (Continuation Sheet) Page 4 of ___ Number

Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamps	Date	Notes
6.5	Use crimping tool to crimp the vent tube. Verify with video camera that the tube has been crimped.		Q ___ T ___ N NA E ___ C NA		
6.6	Open both valves on pressurization system. Turn on pump; slowly throttle back (close) by-pass valve. Once the lid "pops off," shut feed valve and turn off pump. Caution: Personnel should not stand directly above pressurization tool during pressurization.		Q ___ T ___ N NA E ___ C NA		Superseded by ECN 605192 G.Ar 6/25/96
6.7	Remove lid with attached tool and take to assigned spot to leave lid. Unscrew pressurization tool from lid.		Q ___ T ___ N NA E ___ C NA		
6.8	Prepare new lid assembly for placement on the canister and stage at bottom of mock-up pool.		Q ___ T ___ N NA E ___ C NA		
6.9	Attach lid replacement tool to the lid at the valves.		Q ___ T ___ N NA E ___ C NA		

Q = Quality control inspector; T = Technician; N = Nondestructive examination inspector; E = Engineer; C = Craft

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TRAVELER FORM (cont.)

TEST TRAVELER (Continuation Sheet)			Page 5 of ___		Number
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamps	Date	Notes
6.10	Take lid over to canister. Hold lid in place and use bolt removal tool with torque wrench adapter to torque the three lid closure nuts to sealing (sequentially tighten with a final torque of 30 ft-lb).		Q ___ T ___ N NA E ___ C NA		SUPERSEDED BY ECN 605192 G.A.K 6/25/96
6.11	Remove lid replacement tool from lid. Remove canister from pool and verify location of the lid.		Q ___ T ___ N NA E ___ C NA		
7.0	Verify that all steps in this traveler have been completed.		Q ___ T ___ N NA E ___ C NA		

List of Required Attachments:

1. Performance Criteria
2. Equipment List
3. Test Layout/Schematic

Optional Attachments:

4. Acceptance Criteria for K Basin Equipment

Q = Quality control inspector; T = Technician; N = Nondestructive examination inspector; E = Engineer; C = Craft

TEST CONTROL COPY

TRAVELER FORM (cont.)

TEST TRAVELER (Continuation Sheet)		Page 3 of 6		Number # 1	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamps	Date	Notes
6.0	Perform Test(s)				
6.1	The following steps will be performed with the Mark I canister on the bottom of the K Basin mockup. Set up camera for the best view of the canister lid and start the recorder.	NA	Q NA T [signature] N NA E [signature] C NA	6/25/96	
6.2	Use valve stem removal tool and tongs to remove the valve stem from the center valve in the canister. Use the bolt removal tool to back off the three lid nuts (if necessary).	H-1-81198	Q NA T [signature] N NA E [signature] C NA	6/25/96	
6.3	Attach pressurization tool to pump hose and prime tool. Thread the pressurization tool into the center valve of the canister (hand tight).	H-1-81200, 81204	Q NA T [signature] N NA E [signature] C NA	6/25/96	
6.4	Verify throttle valve on pressurization tool is closed. Open feed valve and start pump. Slowly open throttle valve to initiate flow to flood can (purge air). Watch for bubbles to stop escaping from canister gas trap. Shut throttle valve and feed valve. Turn off pump.	H-1-81200, 81204	Q NA T [signature] N NA E [signature] C NA	6/25/96	

Q = Quality control inspector; T = Technician; N = Nondestructive examination inspector; E = Engineer; C = Craft

TEST CONTROL COPY

TRAVELER FORM (cont.)

TEST TRAVELER (Continuation Sheet)		Page 4 of 6		Number # 1	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamps	Date	Notes
6.5	Use crimping tool to crimp the vent tube. Verify with video camera that the tube has been crimped.	NA	Q JAT T [signature] N NA E [signature] DH C NA	6/25/96	CRIMPED IN 3 PLACES
6.6	Verify throttle valve is closed. Open feed valve and turn on pump. Slowly open throttle valve to slowly increase pressure and flow. Note the pressure at which the lid "pops off," (as indicated by the pressure gauge on top of the tool). Shut throttle and feed valves and turn off pump. Caution: personnel should not stand directly above pressurization tool during pressurization.		Q JAT T [signature] N NA E [signature] DH C NA	6/25/96	PRESSURE WAS ~ 20 psi AVERAGE (25 psi MAX)
6.7	Remove lid with attached tool and take to assigned spot to leave lid. Unscrew pressurization tool from lid.	NA	Q JAT T [signature] N NA E [signature] DH C NA	6/25/96	
6.8	Prepare new lid assembly for placement on the canister and stage at bottom of mock-up pool.	NA	Q JAT T [signature] N NA E [signature] DH C NA	6/25/96	

Q = Quality control inspector; T = Technician; N = Nondestructive examination inspector; E = Engineer; C = Craft

TEST CONTROL COPY

TRAVELER FORM (cont.)

TEST TRAVELER (Continuation Sheet)		Page 5 of 6			Number #1
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamps	Date	Notes
6.9	Attach lid replacement tool to the lid at the valves. Take lid over to canister and seat lid inside canister barrel.	H-1-81177	Q [signature] T [signature] N NA E [signature] C NA	6/26/96	
6.10	Remove lid replacement tool and use bolt removal tool with torque wrench adapter to torque the three lid closure nuts to sealing (sequentially tighten with a final torque of 30 ft-lb).	H-1-81179	Q [signature] T [signature] N NA E [signature] C NA	6/25/96	TORQUE WRENCH #750-8801-005 DUE 1-10-97
6.11	Verify lid is sealed by performing leak check using the pressurization tool. Connect tool to valve stem on canister lid and connect plant air to pressurization tool. Slowly open tool valves to flow air into canister and verify no air bubbles come out around canister seal. Remove canister from pool and verify location of the lid.	H-1-81200	Q [signature] T [signature] N NA E [signature] C NA	6/25/96	Verification of lid placement was done by camera not by removing can from pool.
6.12	Reinsert canister in pool. Repeat steps 6.2 through 6.6 to remove canister lid but without crimping the vent tube (step 6.5). Note the pressure at which the lid "pops off."	NA	Q [signature] T [signature] N NA E [signature] C NA	6/25/96	Pressure @ 27 psi

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TRAVELER FORM (cont.)

TEST TRAVELER (Continuation Sheet)			Page 6 of 6		Number #1
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamps	Date	Notes
6.13	Prepare new canister for scraper tool test (or remove previous canister from pool) by bonding graphoil seals to the inside of the canister using an adhesive per the Test Engineer's direction. Allow adhesive to dry and insert canister in pool.	NA	Q JAK T TGS N NA E BJH C NA	6-25-96	
6.14	Using scraper tool, remove graphoil seal material from inside of canister. Remove canister from pool and verify scraper adequately removed graphoil material.	NA	Q JAK T TGS N NA E BJH C NA	6-25-96	D:2 visual exam via camera as opposed to sampling can up out of basin
7.0	Verify that all steps in this traveler have been completed.	NA	Q JAK T TGS N NA E BJH C NA	6-25-96	SEE LOGBOOK FOR ADDITIONAL COMMENTS WHC-N-1340 4

List of Required Attachments:

1. Performance Criteria
2. Equipment List
3. Test Layout/Schematic

Optional Attachments:

4. Acceptance Criteria for K Basin Equipment

Q = Quality control inspector; T = Technician; N = Nondestructive examination inspector; E = Engineer; C = Craft

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ATTACHMENT 1

PERFORMANCE CRITERIA

SUPERSEDED BY ECN 605192 G.M. 6/25/96

Criteria	Acceptable	Not Acceptable	Comments
Valve stem tool removes valve stem.			
Wrench adequately mates with nuts and adequately removes and torques nuts.			
Pressurization tool threads into canister lid.			
Pressurization system meets required pressure and flow controls.			
Crimping tool adequately crimps vent tool.			
Pressurization system pressurizes canister and removes lid.			
Lid replacement tool fits up to new lid, adequately positions lid in place, and seals lid.			

TEST CONTROL COPY

ATTACHMENT 2

EQUIPMENT LIST

The following tools and equipment shall be available prior to starting test of prototype K Basin MARK I lid removal tooling:

- Complete MARK I canister, lid, and at least one full set of graphoil seals
- Valve stem removal tool SUPERSEDED BY ECN 605192 G.M.C 6/25/96
- Bolt removal tool
- Pressurization tool
- Crimping tool
- Pressurization system on hand truck
- Lid replacement tool
- Ground fault protector
- Handling tongs
- Video camera and tape
- Replacement lid and new graphoil seals for replacement.

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ATTACHMENT 1

PERFORMANCE CRITERIA

Criteria	Acceptable	Not Acceptable	Comments
Valve stem tool removes valve stem.	✓ MK		
Wrench adequately mates with nuts and adequately removes and torques nuts.	✓ MK		
Pressurization tool threads into canister lid.	✓ MK		
Pressurization system meets required pressure and flow controls.	✓ MK		
Crimping tool adequately crimps vent tube.	✓ MK		
Pressurization system pressurizes canister and removes lid.	✓ MK		
Scraper tool adequately removes remaining graphoil seal material from inside of canister barrel.	✓ MK		
Lid replacement tool fits up to new lid, adequately positions lid in place, and seals lid.	✓ MK		

TEST CONTROL COPY

ATTACHMENT 2

EQUIPMENT LIST

The following tools and equipment shall be available prior to starting test of prototype K Basin MARK I lid removal tooling:

- Complete MARK I canister, lid, and at least one full set of graphoil seals
- Valve stem removal tool
- Bolt removal tool
- Scraper tool
- Pressurization tool
- Crimping tool
- Pressurization system on hand truck
- Lid replacement tool
- Ground fault protector
- Handling tongs
- Video camera and tape
- Replacement lid and new graphoil seals for replacement.

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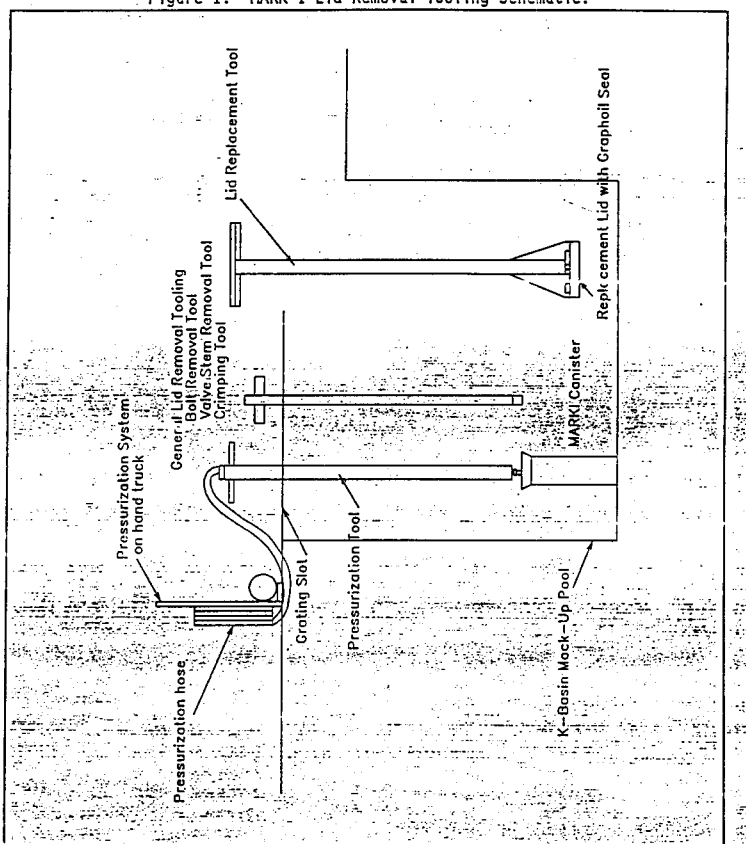
ATTACHMENT 3

TEST LAYOUT/SCHEMATIC

Figure 1. MARK I Lid Removal Tooling Schematic.



E-8

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APPENDIX F

RETEST PROCEDURE AND DATA SHEETS

TEST CONTROL COPY

APPENDIX F

RETEST PROCEDURE AND DATA SHEETS

Q = Quality Assurance T = Technician E = Test Engineer O = Other DEFINED ______

Index additions by hand-written entries, initial, and date.

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APPENDIX G

PRE-JOB BRIEFING ATTENDANCE FORM

WHC-SD-TP-TP-006, Rev.-0

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APPENDIX G

PRE-JOB BRIEFING ATTENDANCE FORM

(INCLUDING 305 BLDG. ORIENTATION)

Pre-Job Briefing K Basin Lid Remover Tooling

Name	Organization	Phone Number
GLENN A. RITTER	CHARACTERIZATION	376-4669
Neil L. R. Roe	CHARacterization	373-5057
JA Tuttle	SNF RA	373-3149
C.D. Kirk	OPS	373-1680
[illegible]	Project Eng	54-6321
E. CAMPOS	OPS	373-1525
[illegible]	ETL	373-5100
James Sesler	WHC	376-4300
[illegible]	WHC	373-1589
[illegible]	WHC	373-4958

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PRE-JOB SAFETY MEETING FORM

Page 1 of 2

Job Description/Title: MARK I TOOLS ACCEPTANCE TEST

Date: 6/25/96

Work Package No.: NA

Person in Charge (PIC): ROE/RITTER

First Aid Qualified Person:

Check Items Discussed

[X]	Procedures/Plans to be Used	No. WHC-SD-TP-TP-006 REV. 0-A
[ ]	Applicable OSR's	No.
[ ]	Radiation Work Permit	No.
[X]	Job Hazard Analysis	No.
[ ]	Construction Permit (as needed)	No.
[ ]	Additional Permits (i.e., confined space, excavation, etc.)	No.
[X]	Review All Applicable Safety Precautions and Prestart Conditions per Procedures/Plans to be used	
[ ]	Components Locked and Tagged	
[ ]	ALARA Considerations (applicable MSDS's)	
[ ]	Respiratory Protection (fresh air, PAPR's, chemical filters, etc.)	
[ ]	Radioactive Contamination Containment Device	
[ ]	Emergency Response and Actions	
[X]	Summary of Job Sequence (or steps)	
[X]	Work Area Conditions (high/low temperatures, lighting, etc.)	
[X]	All Equipment Functionally Checked and at Work Site	

Special Circumstances or COMMENTS:

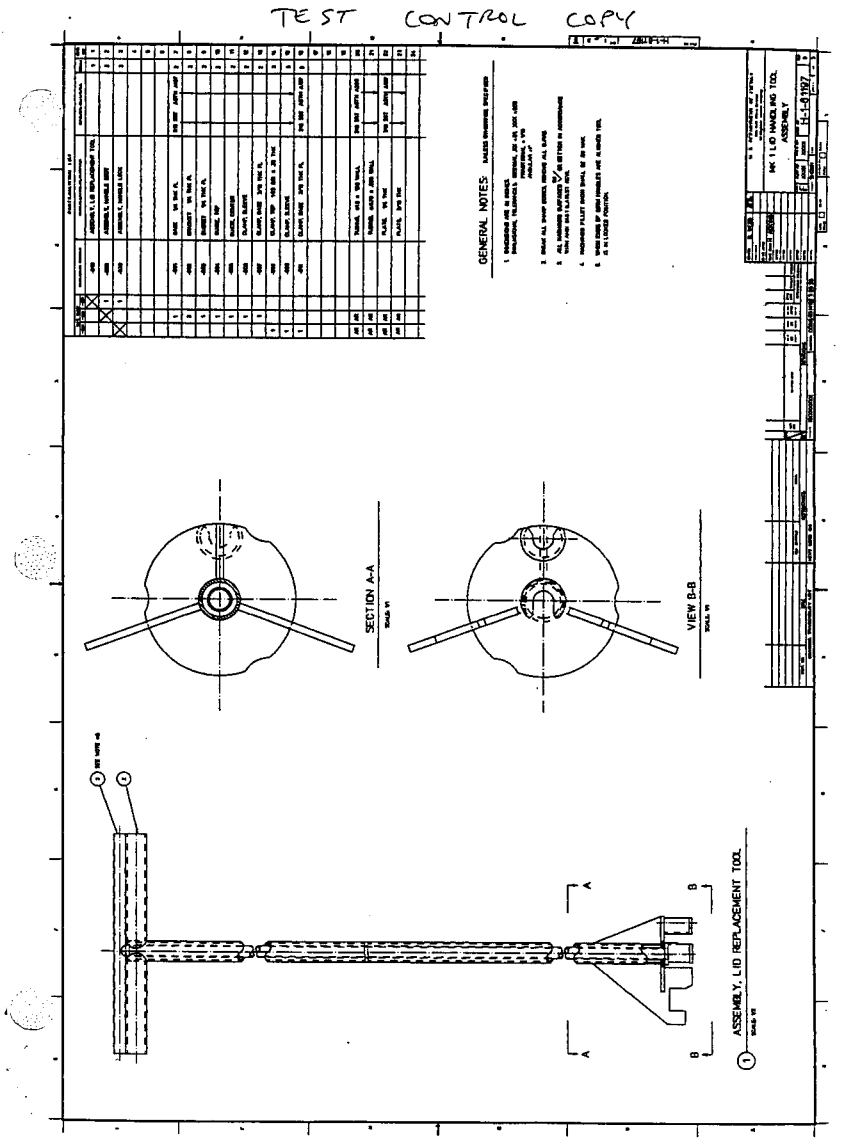
Chairman Signature:

Operations _____

Maintenance _____

Other _____

BD-6000-696.1 (06/94) GEF120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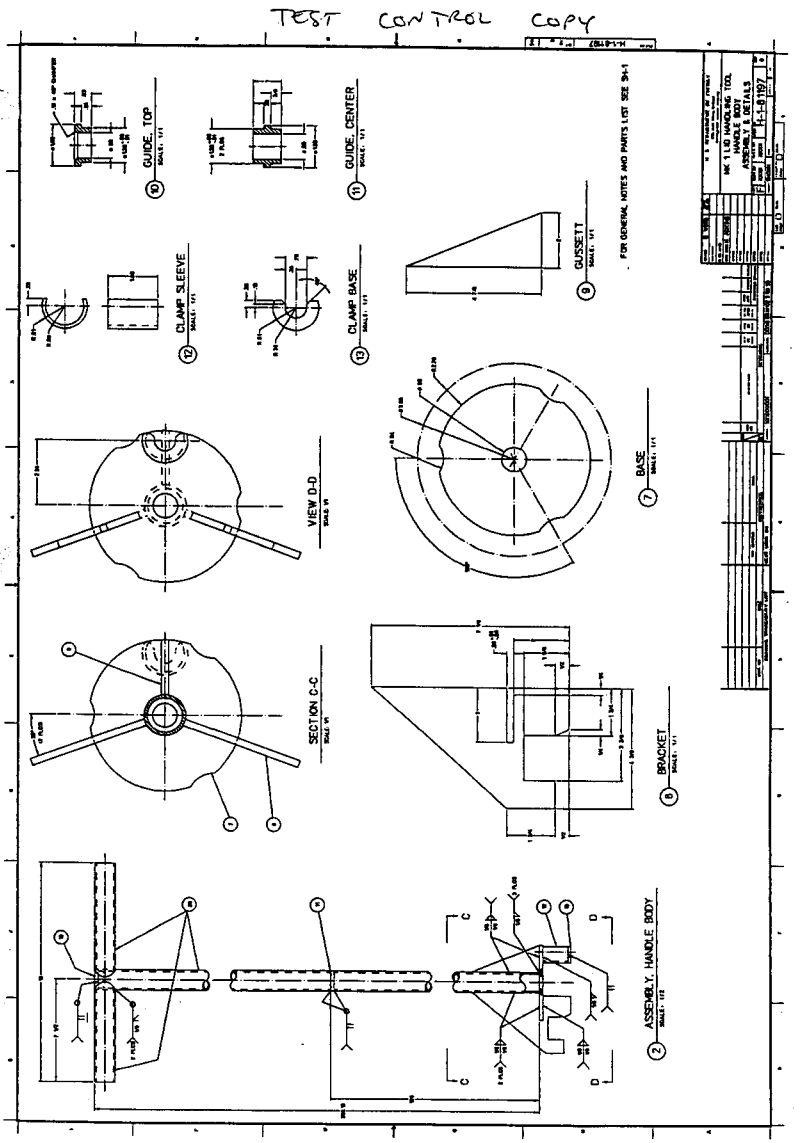
VIEW B-B
ASSEMBLY, LID REPLACEMENT TOOL
HC 1 LID HANDLING TOOL
ASSEMBLY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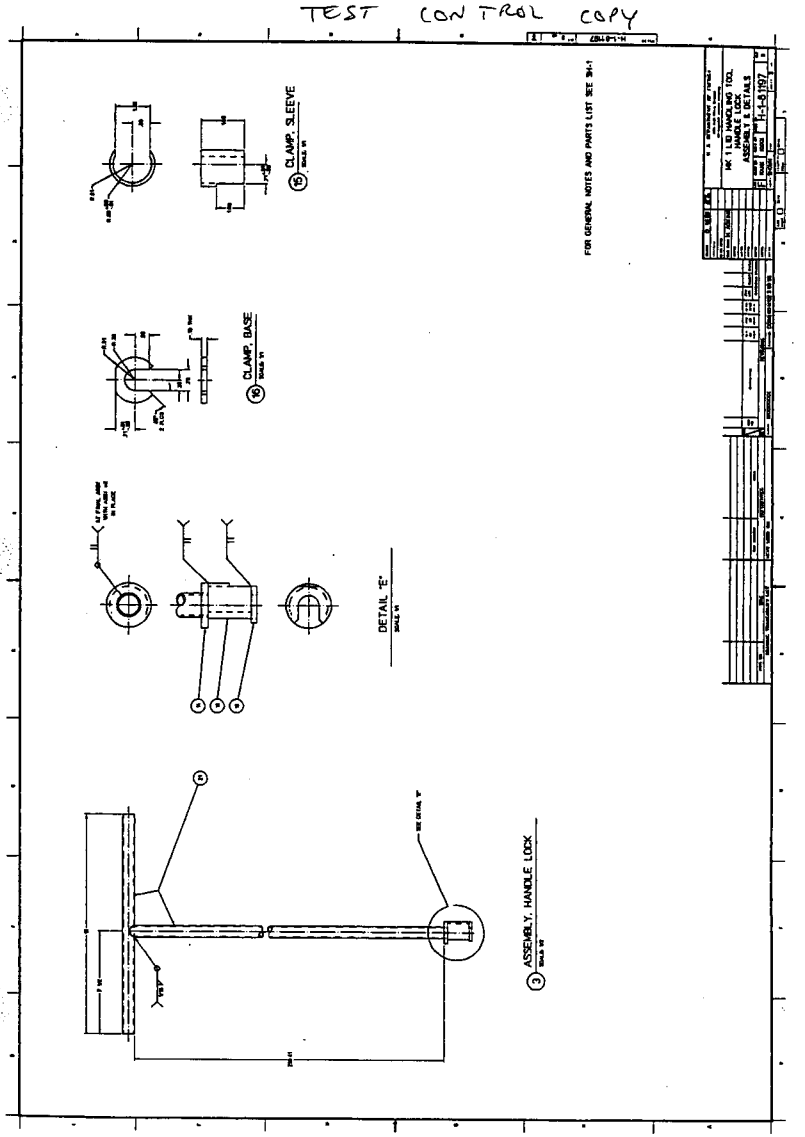
GUIDE, CENTER
CLAMP SLEEVE
CLAMP BASE
GUSSETT
BASE
VIEW D-D
SECTION C-C
BRACKET
ASSEMBLY, HANDLE BODY
FOR GENERAL NOTES AND PARTS LIST SEE SH-1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FOR GENERAL NOTES AND PARTS LIST SEE 3H-1
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16 CLAMP, BASE
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3 ASSEMBLY, HANDLE LOCK
IHC 110 HANDLING TOOL
HANDLE LOCK
ASSEMBLY DETAILS

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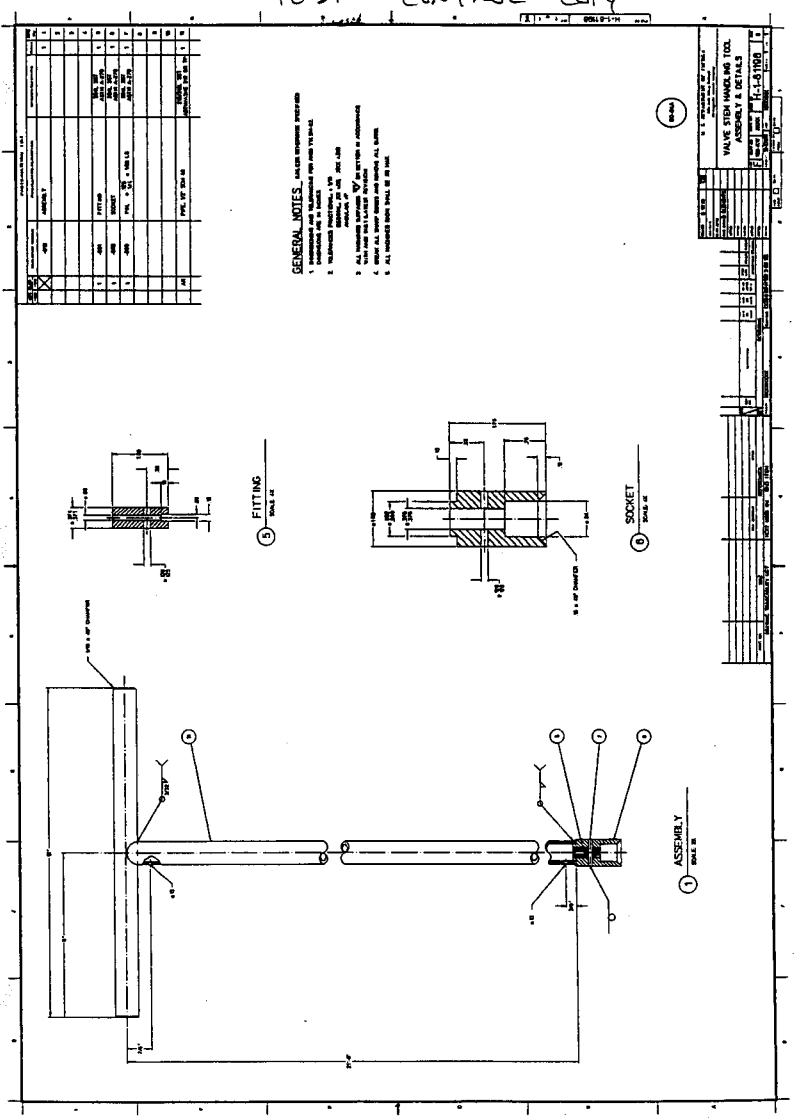

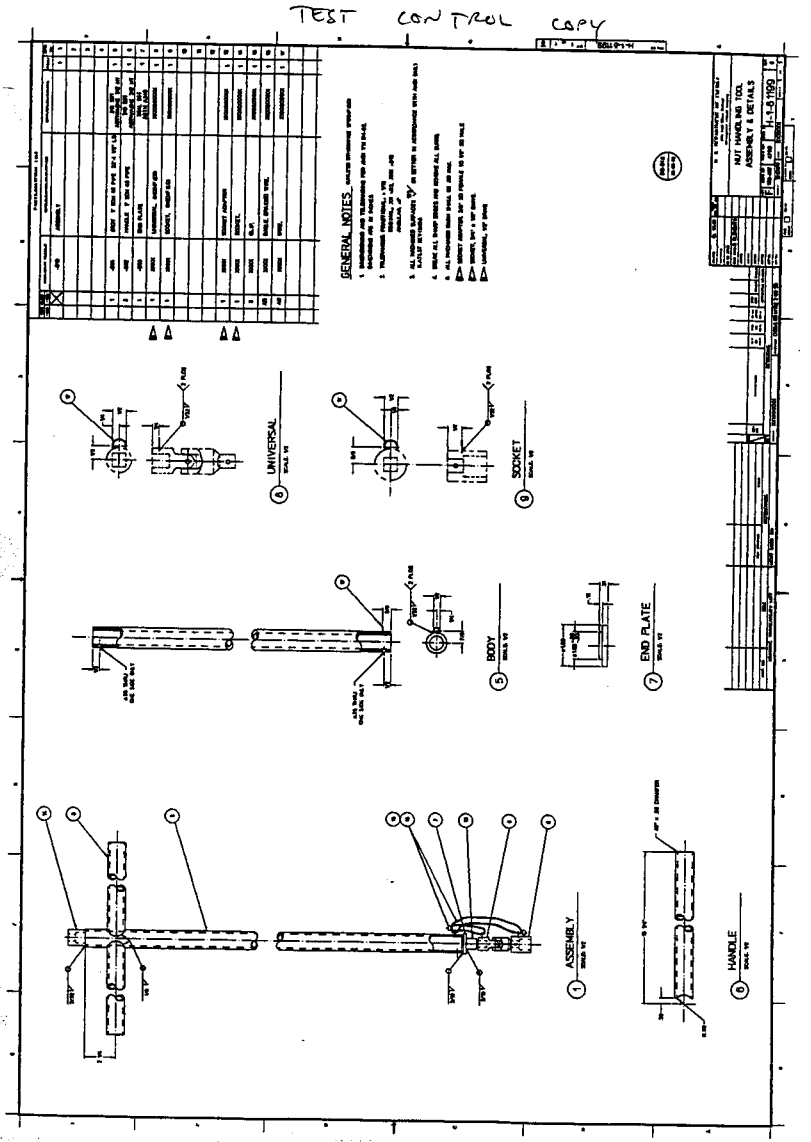
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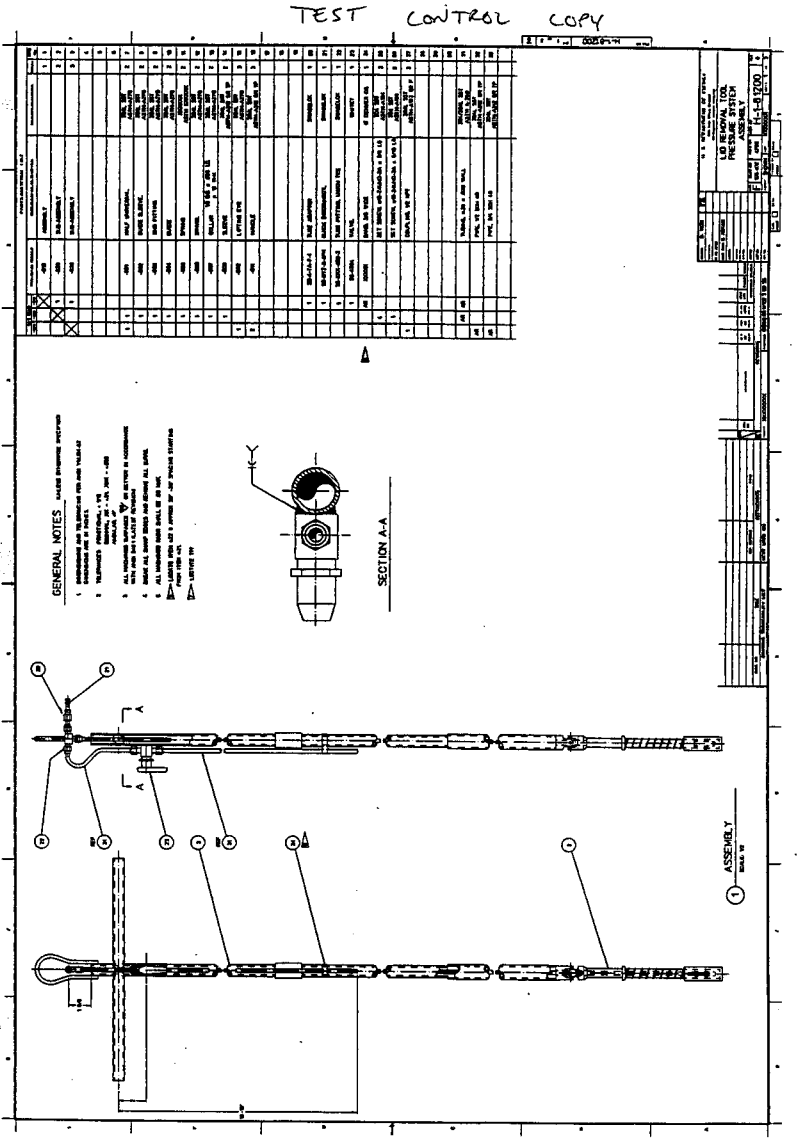
UNIVERSAL
SOCKET
BODY
END PLATE
ASSEMBLY
HANDLE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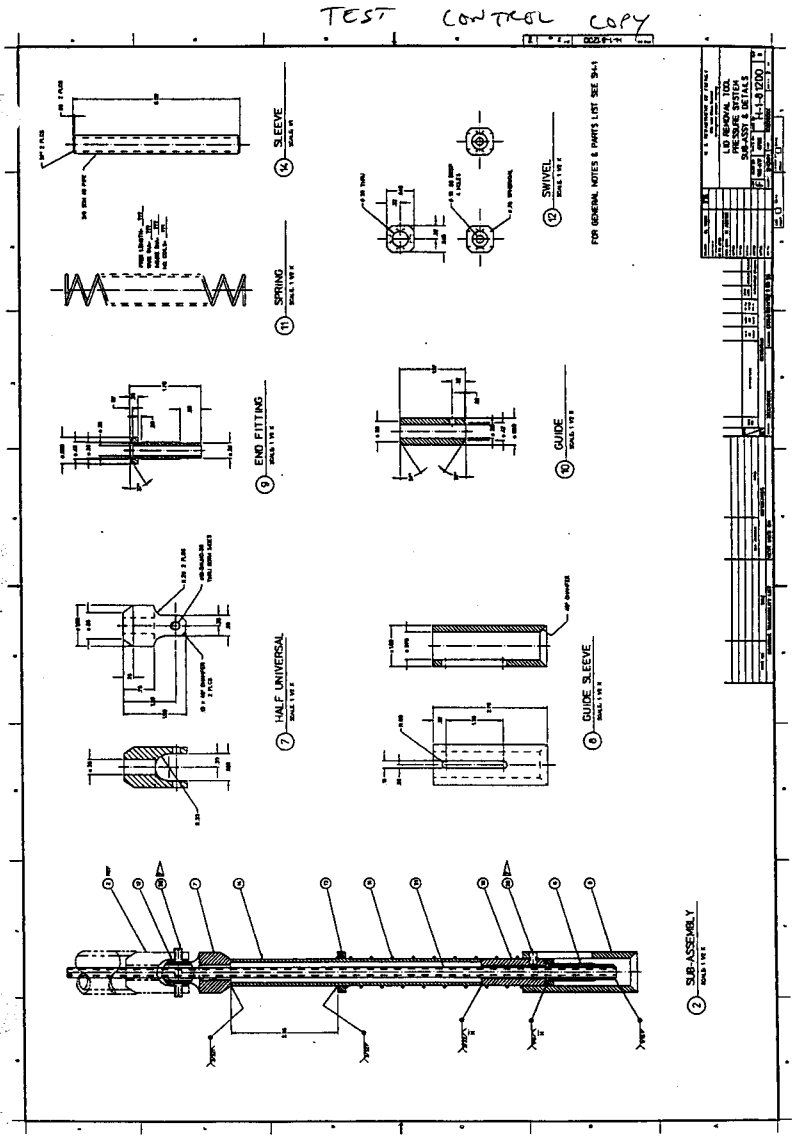
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SWIVEL
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GUIDE
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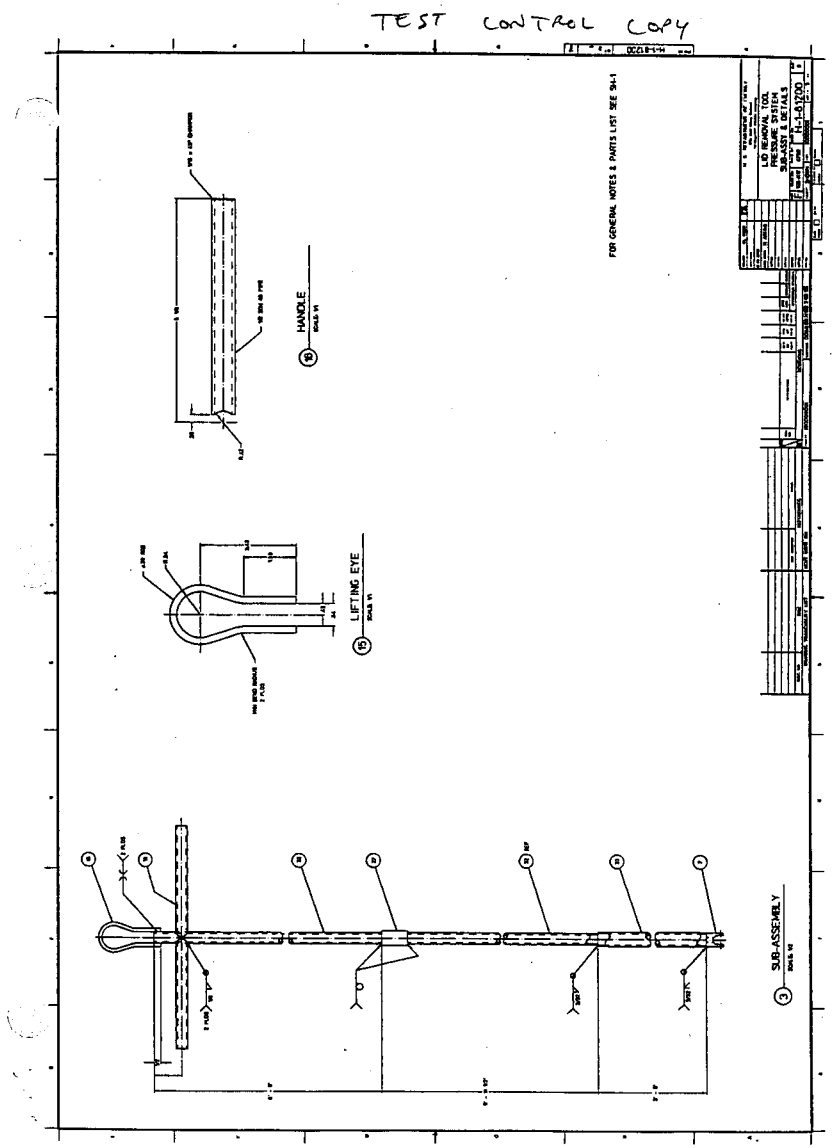
GUIDE SLEEVE
SUB-ASSEMBLY
FOR GENERAL NOTES & PARTS LIST SEE SH-1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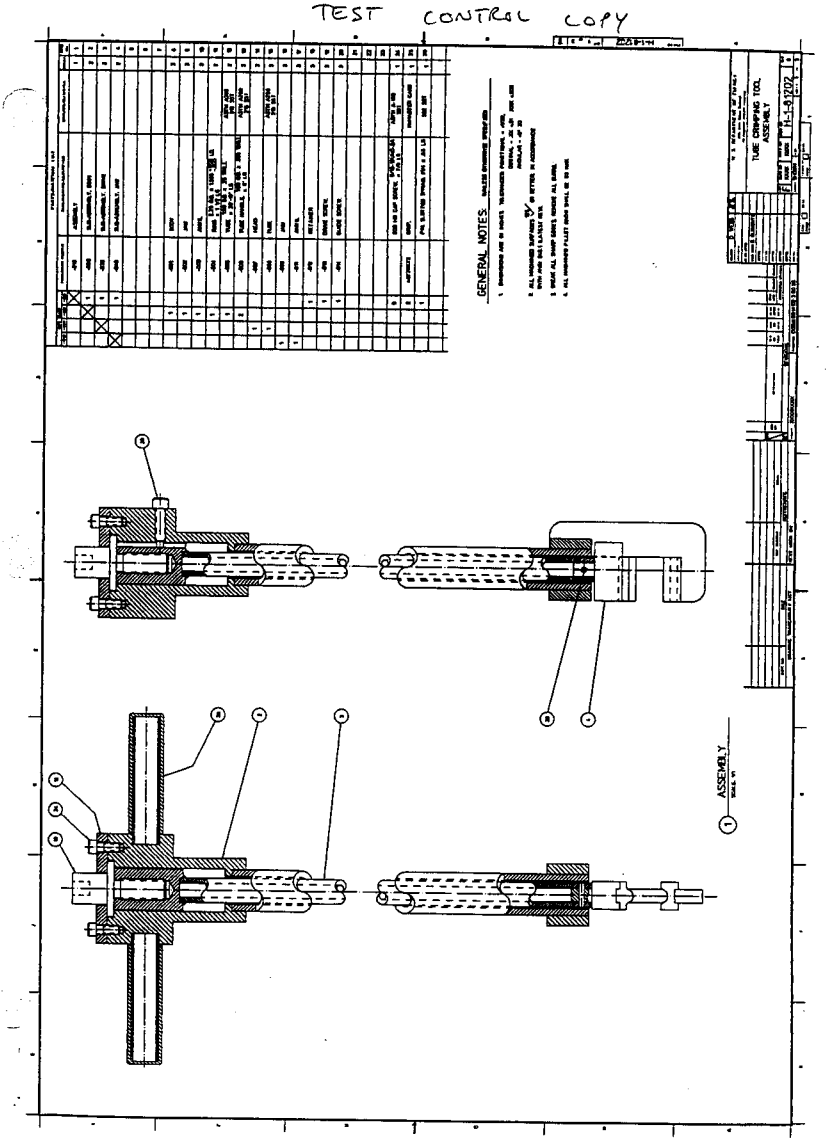
FOR GENERAL NOTES & PARTS LIST SEE SH-1
HANDLE
LIFTING EYE
SUB-ASSEMBLY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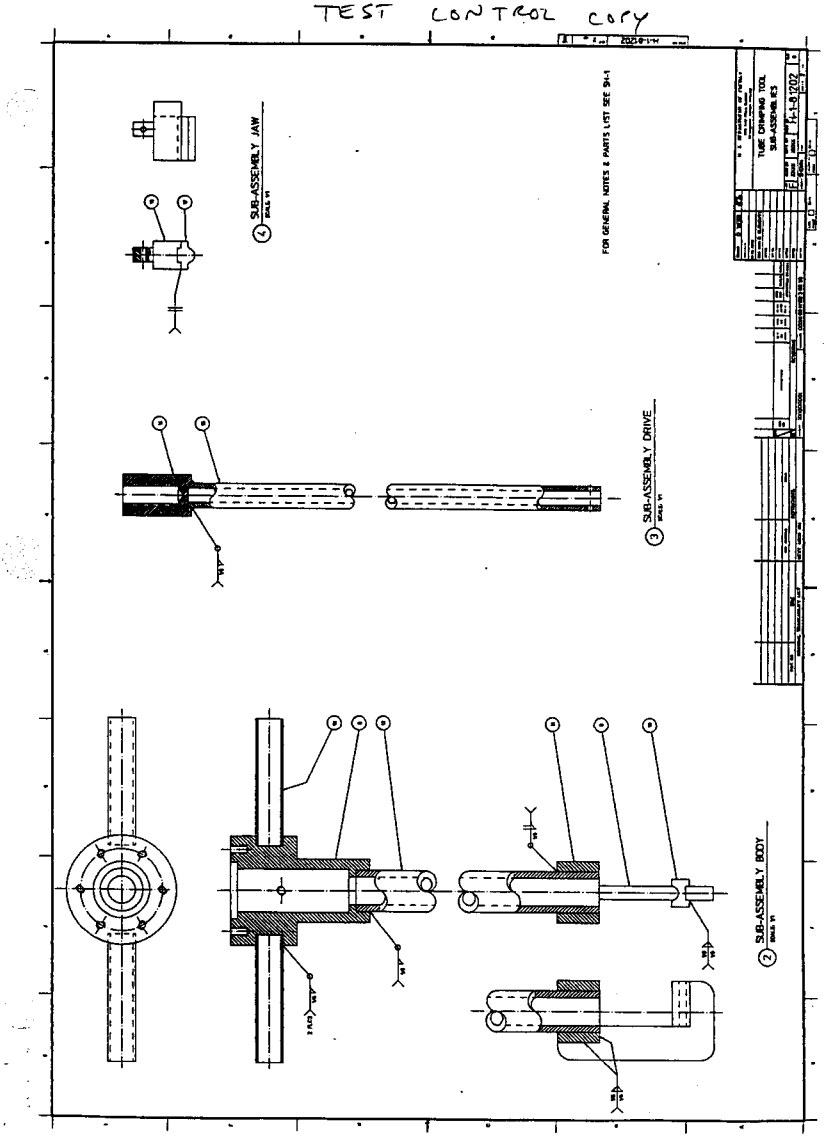
TUBE CRIMPING TOOL
ASSEMBLY
ASSEMBLY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SUB-ASSEMBLY DRIVE
SUB-ASSEMBLY BODY
FOR GENERAL NOTES & PARTS LIST SEE SH-1
TUBE CRIMPING TOOL
SUB-ASSEMBLIES

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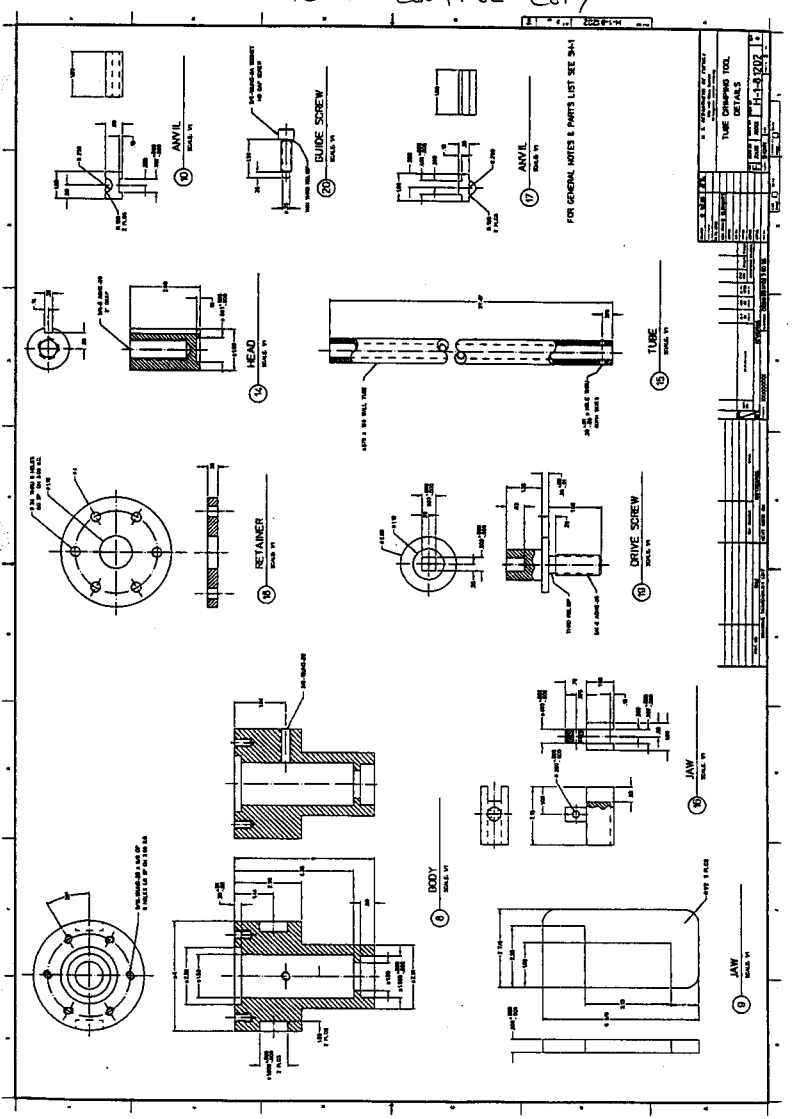

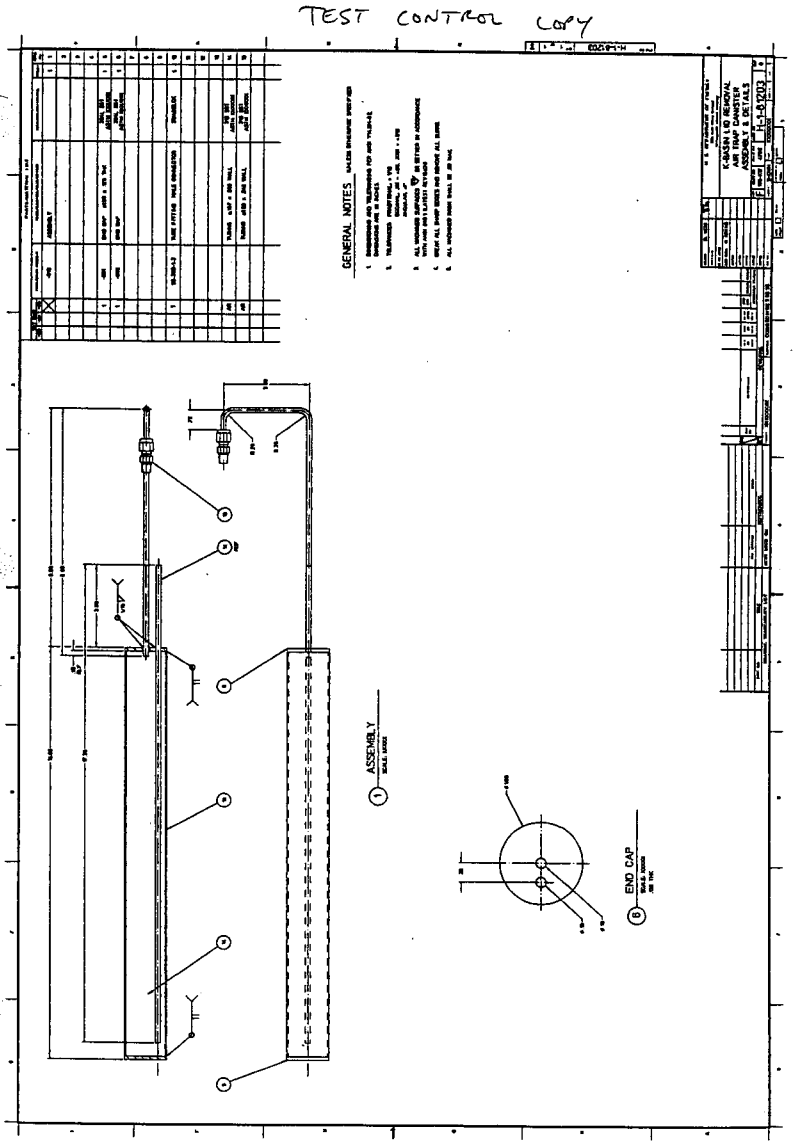
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ASSEMBLY
END CAP

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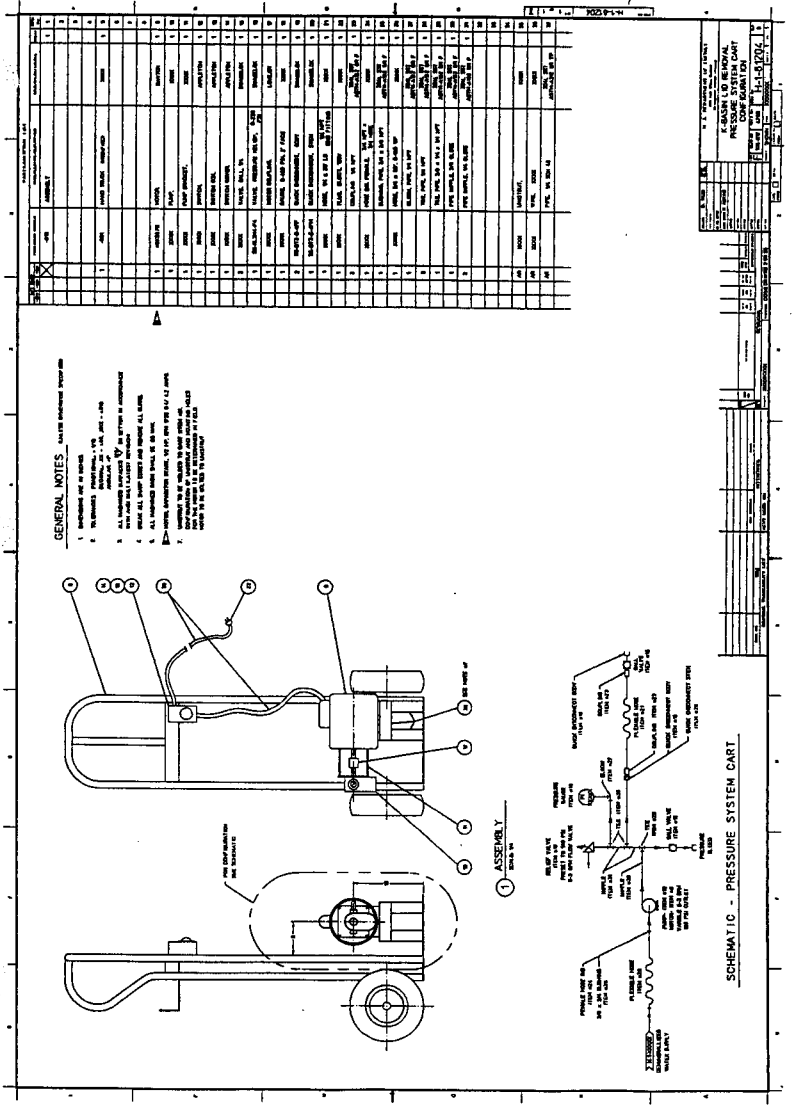

TEST CONTROL COPY WRPN-95-018

305 BUILDING WORK PLAN/INSTRUCTION

Work Title
MARK 1 CANISTER LID REMOVAL/REPLACEMENT HANDLING TOOLS

System	Location	Impact Level
NA	305 BLDG/300	4
Originator	**Date**	**Cost Code**
TE GRIFFIN/N ROE	10/25/95	LB0~~24~~28

Work Instruction

Functional Test the various tools for removing/replacing the Mark 1 canister lids. Testing will follow the steps outlined in Appendix E of the Test Plan for K-Basin Mark 1 Lid Removal Tools. No sign-offs are required.

Perform Acceptance Test after Functional Testing has been completed.

Procure material and fabricate prototype tool holders for use in the 305 building.

Restrictions - Special Conditions - Sequence and End Use

The canister will be water pressurized to assist in lid removal. 30 to 50 PSI normal working pressure. Max pressure can be 100 PSI. Pressurization of the canister will take place at the bottom the pool.

Hold Points - Tests - Inspections - and Other Verification

A Pre-Job Safety Meeting will be held and documented prior to testing. Testing will take place on the platform over the pool in the west thru slot. ATP testing will be performed after functional testing.

Supporting Documents (i.e., Drawings, ECMs, Test Plans, etc.)

Test Plan for Prototype K-Basin Mark 1 Lid Removal Tools - WHC-SD-TP-TP-006
Holder for Manual Tools - H-1-51847

Materials Needed

Stainless sheet/plate for fabrication of tool holders.(ETL)

Special Tools, Building Modifications, (supplied by whom?)

Handling tools, system pressurizing equipment, and Mark 1 canister assemblies supplied by N Roe

Schedule 11/15/95-12/15/95

Requester Signature	Date	Building Administration	Date
	10/26/95		10/31/95

ADDITIONAL INFORMATION

(continued - Safety Review, see back page)

TEST CONTROL COPY

JOB SAFETY REVIEW

		NA	Y	N
ELECTRICAL:	Supply Adequate		X	
	Materials	X		
ENVIRONMENTAL:	Hazardous Waste (contact Hazardous Waste Coordinator)	X		
	Minimization/Alternate Material	X		
	MSDS	X		
	Plan for Disposal	X		
	Noise	X		
	Chemical Mixing Hazards	X		
	Airborne Particulate/Ventilation	X		
FIRE:	Burning and Welding	X		
	Flammable Liquids	X		
	Flammable Gases	X		
MECHANICAL:	Sharp Edges	X		
	Rotating Equipment	X		
	Projectiles	X		
	Pressure		X	
	Temperature	X		
PERSONAL PROTECTION:	Ear Protection	X		
	Breathing Aparatus/Mask	X		
	Special Equipment/Handling	X		
RADIOLOGICAL:	Shielding	X		
	Transportation	X		
	Decontamination	X		
TOOLING:	Special Tools	X		
	Other	X		

DISCUSSION:

This Job Safety Review will be considered equivalent to a JHA. Hoisting and rigging precautions will be reviewed during the A&P and abated appropriately. Hard hats required in work area while Crane is being used.

A-8000-891 (03/92)

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Spent Nuclear Fuel Evaluations 8M710	Date August 19, 1996
Project Title/Work Order		EDT No. 617430
		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
U.S. Department of Energy, Richland Operations Office					
J. Shuen	S7-41	X			
Mac Technical Services Company					
G. Baston	R3-82	X			
Westinghouse Hanford Company					
R. B. Baker	H0-40	X			
D. W. Bergmann	R3-86	X			
K. H. Bergsman	R3-48	X			
A. E. Bridges	H0-40	X			
L. D. Bruggeman	H0-40	X			
W. A. Briggs (3)	H0-40	X			
E. Campos	X3-61	X			
B. S. Carlisle	R3-85	X			
S. A. Chastain	H0-40	X			
C. Defigh-Price	X3-79	X			
J. C. Fulton	R3-11	X			
R. G. Gant	X3-79	X			
B. J. Hutchins	X3-74	X			
J. J. Jernberg	X3-85	X			
C. D. Kirk	X3-72	X			
R. E. Lacey	X3-85	X			
M. J. Langevin	X3-74	X			
L. A. Lawrence	H0-40	X			
R. L. Loper	L6-13	X			
P. J. MacFarlan	H0-40	X			
B. J. Makenas	H0-40	X			
C. T. Miller	X3-72	X			
W. C. Mills	R3-85	X			
R. P. Omberg	H0-40	X			
A. L. Pitner	H0-40	X			
G. A. Ritter	H0-32	X			
N. R. Roe (3)	H0-40	X			
M. J. Schliebe	L6-13	X			
P. J. Sheely	X3-61	X			
S. A. Slinn	X3-74	X			
D. W. Smith	R3-11	X			
J. A. Tittle	X3-80	X			
D. J. Trimble	H0-40	X			
SNF Project Files	R3-11	X			
Central Files	A3-88	X			