

DISTRIBUTION SHEET

To Distribution	From Grout Facilities Engineering	Page 1 of 1
		Date 8/25/94
Project Title/Work Order Work Plan AP-102 Mixer Pump Removal and Pump Replacement		EDT No. 605533
		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
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Reason

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R. F. Carlstrom	3	G2-02	X
J. W. Daughtry	3	H4-64	X
R. D. House	3	R1-05	X
R. N. Kyle	3	S2-01	X
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J. J. Sisk	3	S2-03	X
J. W. Thornton	3	G2-03	X
H. Toffer	3	H0-38	X
J. E. Van Beek	3	R3-27	X
R. J. VanVleet	3	H4-63	X
K. A. White	3	R2-70	X
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ENGINEERING DATA TRANSMITTAL

Page 1 of 1
1. EDT 605533

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Grout Facilities Engineering	4. Related EDT No.:
5. Proj./Prog./Dept./Div.: Grout Facilities	6. Cog. Engr.: R. F. Jimenez	7. Purchase Order No.: N/A
8. Originator Remarks: The attached work plan is submitted for approval.		9. Equip./Component No.: N/A
11. Receiver Remarks:		10. System/Bldg./Facility: 200E/241AP
		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: N/A

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-WP-283		0	Work Plan AP-102 Mixer Pump Removal and Pump Replacement	SQ	1/3		

16. KEY		
Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)										(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
1	/	Cog.Eng. R. F. Jimenez	<i>R. F. Jimenez</i>	8-29-94	S4-43	C. E. Hanson	<i>C. E. Hanson</i>	8-29-94	H5-09	3	
1	/	Cog. Mgr. J. J. Badden	<i>J. J. Badden</i>	9-1-94	S5-01	M. D. Harding	<i>M. D. Harding</i>	9-1-94	S5-03	3	
1	/	QA M. A. Richman	<i>M. A. Richman</i>	9/1/94	S1-57	M. S. Harris	<i>M. S. Harris</i>	9/1/94	S2-54	3	
1		Safety S. H. Baker	<i>S. H. Baker</i>	9/1/94	R3-08	J. W. Lentsch	<i>J. W. Lentsch</i>	9/1/94	R2-78	3	
1	/	Proj. M. E. McKinney	<i>M. E. McKinney</i>	8/29/94	R3-27	T. C. Mackey	<i>T. C. Mackey</i>	8/29/94	S2-03	3	
1	/	R. D. Claghorn	<i>Ronald D. Claghorn</i>	9/1/94	S4-43	R. J. Murkowski	<i>R. J. Murkowski</i>	9/1/94	R4-01	3	
3		J. G. Field			G2-02	R. Ni			S5-07	3	

18. R. F. Jimenez <i>R. F. Jimenez</i> Signature of EDT Originator Date: 8-29-94	19. Authorized Representative Date for Receiving Organization	20. <i>Ronald D. Claghorn</i> R. D. Claghorn Cognizant/Project Engineer's Manager Date: 9-1-94	21. DOE APPROVAL (if required) Ltr. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
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RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-WP-283, REV 0

Document Title: WORK PLAN, AP-102 MIXER PUMP REMOVAL AND PUMP REPLACEMENT

Release Date: 9/1/94

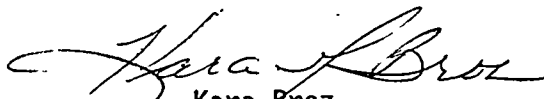
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This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

* * * * *

WHC Information Release Administration Specialist:



Kara Broz

(Signature)

9/1/94

(Date)

SUPPORTING DOCUMENT

1. Total Pages 17

2. Title

Work Plan, AP-102 Mixer Pump Removal and Pump Replacement

3. Number

WHC-SD-WM-WP-283

4. Rev No.

0

5. Key Words

AP-102, Mixer Pump Removal, Mixer Pump Replacement, Mixer Pump Procurement, Flexible Receiver, Spray Shield, Mixer Container

6. Author

Name: R. F. Jimenez

R. F. Jimenez
Signature

Organization/Charge Code 7C540/D435B

7. Abstract

The object of this work plan is to plan the steps and estimate the costs required to remove the failed AP-102 mixer pump, and to plan and estimate the cost of the necessary design and specification work required to order a new, but modified, mixer pump including the pump and pump pit energy absorbing design.

APPROVED FOR
PUBLIC RELEASE

KMB 9/1/94

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10. RELEASE STAMP

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DATE SEP 01 1994
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9. Impact Level SQ

MASTER

Work Plan

AP-102 MIXER PUMP REMOVAL AND PUMP REPLACEMENT

(8/25/94)

Prepared By

R. F. Jimenez
Grout Facilities

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WORK PLAN FOR AP-102 MIXER PUMP REMOVAL AND PUMP REPLACEMENT

1.0 OBJECTIVE

The objective of this work plan is: to plan the steps and estimate the costs required to remove the failed AP-102 mixer pump; and to plan and estimate the cost of, the necessary design and specification work required to order a new but modified mixer pump.

This work package has now been designated PROJECT U-100, 241-AP-102 MIXER REMOVAL AND STORAGE SYSTEM.

1.1 BACKGROUND

As stated in Engineering Study WHC-SD-WM-ES-296, "Grout Emergency Restart - Feed Transfer System," the reason for removing the mixer pump is two-fold: Because it has failed it must ultimately be removed; and it's removal is necessary at this time in order to meet possible Grout restart commitments.

Since preparations are underway to remove the SY-101 mixer pump should it fail and because the SY and AP pumps are similar, some of the same pump removal machinery (i.e. the truck, trailer, and strongback) will be available to remove either the SY mixer pump or the AP mixer pump (APMP). Additionally, since the design of single use equipment (i.e. equipment which must be furnished separately for each project) is now being completed for the SY project, the AP project can make use of the same engineers, designers and fabricators for the: Flexible Receiver and Blast Shield; the APMP Container; and the pump removal procedures as are now being prepared for the SY project.

The same reasoning applies to the modified design and specifications required for a replacement mixer pump. The Engineers responsible for SY pump replacement are the logical candidates to do similar work on the AP project.

1.2 SCOPE

This plan covers the removal of the AP-102 failed mixer pump including the following necessary steps: Design; Construction; and Removal Steps. The required design and fabrication tasks and the estimated costs are shown in Appendices A, B, and C. The pump removal related Appendices contain the following information:

- Appendix A - APMP Removal Procedure including Removal Hardware and Associated Sketches.
- Appendix B - APMP Removal - Design, Fabrication and Removal - Costs & Schedule.
- Appendix C - APMP Replacement - Design, Fabrication and Placement - Costs and Schedules.

The cost and the design, procurement and placement schedule for the AP replacement pump is shown in Appendix C. Only the pump design and specifications and the design of the pump pit energy absorbing system will be

completed at this time, but the remaining tasks and respective costs associated with buying, testing and placing the replacement pump are included in the schedule for clarity and for an understanding of the startup times involved.

It may be necessary to install a temporary pump impact limiter in order to minimize the probability of tank penetration should the pump be dropped during the pump lift - and the design and installation cost of this impact limiter has been included in the schedule.

A simplified description of the mixer pump removal task is summarized in Appendix A. The Engineering tasks are described in Appendix B along with the schedule for the following: the design of the removal hardware; equipment fabrication; the release of appropriate documents; and the pump removal. Appendix C contains the task list and cost estimate for the APMP replacement.

The Safety and QA representatives will have access to drawings, specifications and other project documents from the "DRAFT" stage to document approval.

The design of the water spray decontamination system will be done, if required, by WHC's Central Engineering. Presently, a spray system exists at the top of the 42" riser in the pump pit but it is not known if it is adequate. It will be tested, and if it does not function or is otherwise inadequate, it will be redesigned and replaced.

The current plan is to coordinate the design and fabrication work with the WHC Special Projects Group who are now designing the: the lifting yoke; the flexible receiver; and the container required for the removal of the SY-101 pump. We will make use of the same lifting yoke, truck, trailer, and strongback as will be used for the SY pump removal work. Their design, fabrication and procurement work could possibly be completed by early Fall of 1994 and the design and fabrication work required for AP pump removal should be completed within a few months after this.

2.0 DELIVERABLES

The deliverables are as follows: designs; equipment fabrication; field construction; document preparation and field activities such as pump removal and pump transporting to the Central Waste Facility as shown in the schedules of Appendices B and C. Some road construction work is required in order to eliminate short radius turns so that the trailer shown on Page A-5 can traverse the roadway.

In these schedules the deliverables are identified by Activity Number and each activity has a descriptive title. The name of the person responsible for each of these activities is listed in the "RESP" column. The "responsible" person's initials above his name means that the task responsibility has been accepted.

3.0 DESIGN AND PLANNING

3.1 DESIGN

Because it is the intent to use the same designers as are currently being used for the SY-101 pump removal task, and because both pumps are almost identical, the design and fabrication tasks for AP will be easier than they are for SY. The design shall meet all DOE and WHC standards. All welders will be certified and welds will meet the proper safety class requirements (for example, the pump lifting lugs will have a safety factor of 3 or more based upon the material yield strength and critical welds will be NDE tested). In addition, AP tank farm requirements must be adhered to (for example, tank load structural limits, tank pH limits, radioactivity controls etc.).

The AP-102 Safety and QA requirements shall meet those required for SY-101 except that the probability of tank rupture as the result of a pump drop shall not exceed 1×10^{-6} . This requirement will probably result in a temporary Impact Limiting Device being required during the pump lift.

The following three tasks take precedence time-wise in the Task Schedule:

1. Calculations for the Impact Limiting Device.
2. Equipment Layout and Tank Farm Structural Analysis (to make sure that tank loads are within safe limits).
3. Radiation Source and Radiation Dose Calculations (worst case and best estimate).

A monthly report will be issued showing project progress.

Design reviews will be held at 70% and 95% completion. These design reviews will not only serve as a normal design review but will also function as a means to facilitate interfacing between designers (for example, between the Engineer's responsible for the Flexible Receiver and the Container). The respective designers are responsible for coordinating their designs with the designs done by others so that the overall design is integrated.

3.2 PROJECT PROGRESS MEETINGS

In addition to design review meetings, bi-weekly Progress Meetings (as a minimum) are planned to review design and fabrication progress and to prevent schedule slips. Progress on project documents and pump removal planning will also be reviewed at these overall progress meetings.

4.0 ORGANIZATIONAL RESPONSIBILITIES

The tasks required to complete this work plan will be implemented in accordance with the schedules of Appendix B and Appendix C. The individuals responsible for each task are shown on the appropriate schedules. Initials next to the individuals name on the schedule indicate concurrence that the task and schedule are accepted by the responsible individual/organization.

While only the responsible individuals are identified on the Appendix B and C schedules, it is the organizations to which these individuals belong who are ultimately responsible for the timely and satisfactory completion of each task.

4.1 CUSTOMER

Customer: Low Level Waste Program - R. J. Murkowski, Manager
R. F. Jimenez, Representative

The customer will approve the requirements and direction for the Work Plan Tasks shown on the Appendix B and C schedules. The customer will also provide funding for the activity.

4.2 COGNIZANT MANAGER AND ENGINEER

Cognizant Manager: J.J. Badden (Tank Farms)
Cognizant Engineer: R.F. Jimenez (Tank Farms)

The cognizant organization has overall responsibility for implementing the tasks shown in the Appendix B and C schedules. The following are the major tasks of the cognizant organization.

4.2.1 Provide overall project management, coordination and direction of the various Work Plan tasks.

4.2.2 Overall design and document review of the various tasks (the various tasks must also be reviewed internally in accordance with WHC requirements).

4.2.3 Overall project scheduling and budget development.

4.3 PERSON IN CHARGE (PIC) MANAGER AND REPRESENTATIVE

PIC Manager: J.E. Van Beek (WHC Projects)
PIC Representative: M.E. McKinney (WHC Projects)

The PIC representative is charged with the field responsibilities relating to pump removal. Additionally, he has responsibility for any off-site fabrication work and for fabrication and construction work done by KEH.

5.0 SCHEDULE AND COST ESTIMATE

The schedules and cost estimates for removing the APMP and for replacing this pump are shown in Appendix B and Appendix C respectively.

6.0 QUALITY ASSURANCE AND SAFETY

The impact level of this pump removal work is SQ. All engineering drawings and ECN's will be approved by Quality Assurance and Safety.

Quality Assurance requirements for the activities in this Work Plan shall be in accordance with the U.S. Department of Energy, Richland Operations Office Order 5700.1A, and WHC Quality Assurance Manual WHC-CM-4-2.

Safety requirements for the activities in this work plan shall be in accordance with the U.S. Department of Energy, Richland Operations Office Order 5700.1A, and WHC Industrial Safety Manual WHC-CM-4-3.

7.0 REFERENCES

1. Engineering Study, Grout Emergency Restart - Feed Transfer System, WHC-SD-WM-ES-296, Rev. 0, dated June 22, 1994.

APPENDIX A

AP MIXER PUMP REMOVAL PROCEDURE INCLUDING REMOVAL HARDWARE AND SKETCHES

The main hardware required for the removal of the mixer is as follows:

- A. A Flexible Receiver and Blast Shield as shown in Sketch A.
- B. A Metal Container for the pulled Mixer Pump as shown in Sketch B.
- C. A Trailer and Strongback to haul and manipulate the Container as shown in Sketch C (the SY-101 Trailer and Strongback will be used).

Additionally:

- A gamma scanning device will be needed to detect the radioactivity emanating from the mixer as it is pulled from the tank.
- A water spray system will be required to remove tank waste from the surface of the mixer as it is pulled from the AP-102 tank.
- A Lifting Yoke to lift the mixer from the pump pit (the SY-101 Mixer Lifting Yoke will be used).

A "green house" will have to be erected over the AP-102 pump pit and an experienced Hoisting and Rigging crew must be assembled and trained in mixer pump removal methods before the actual removal is undertaken. The Training required for the SY-101 mixer removal should be helpful in AP-102 training if it can take place before the AP work is done.

A synopsis of the mixer removal procedure is provided below.

1. Prior to pump lift

- a. Disconnect electrical and instrument lines and remove material attached above the pump top plate (i.e. electrical & control boxes, rotational motor & associated gearing).
- b. Cut off lifting ears which project horizontally beyond the 53 inch diameter top plate. Weld new lifting plates to the vertical plate(s) of the existing lifting ears.
- c. Place flexible receiver and associated hardware in place.
- d. Place radiation sensing equipment in place and test the spray system.
- e. Remove six top plate nuts.

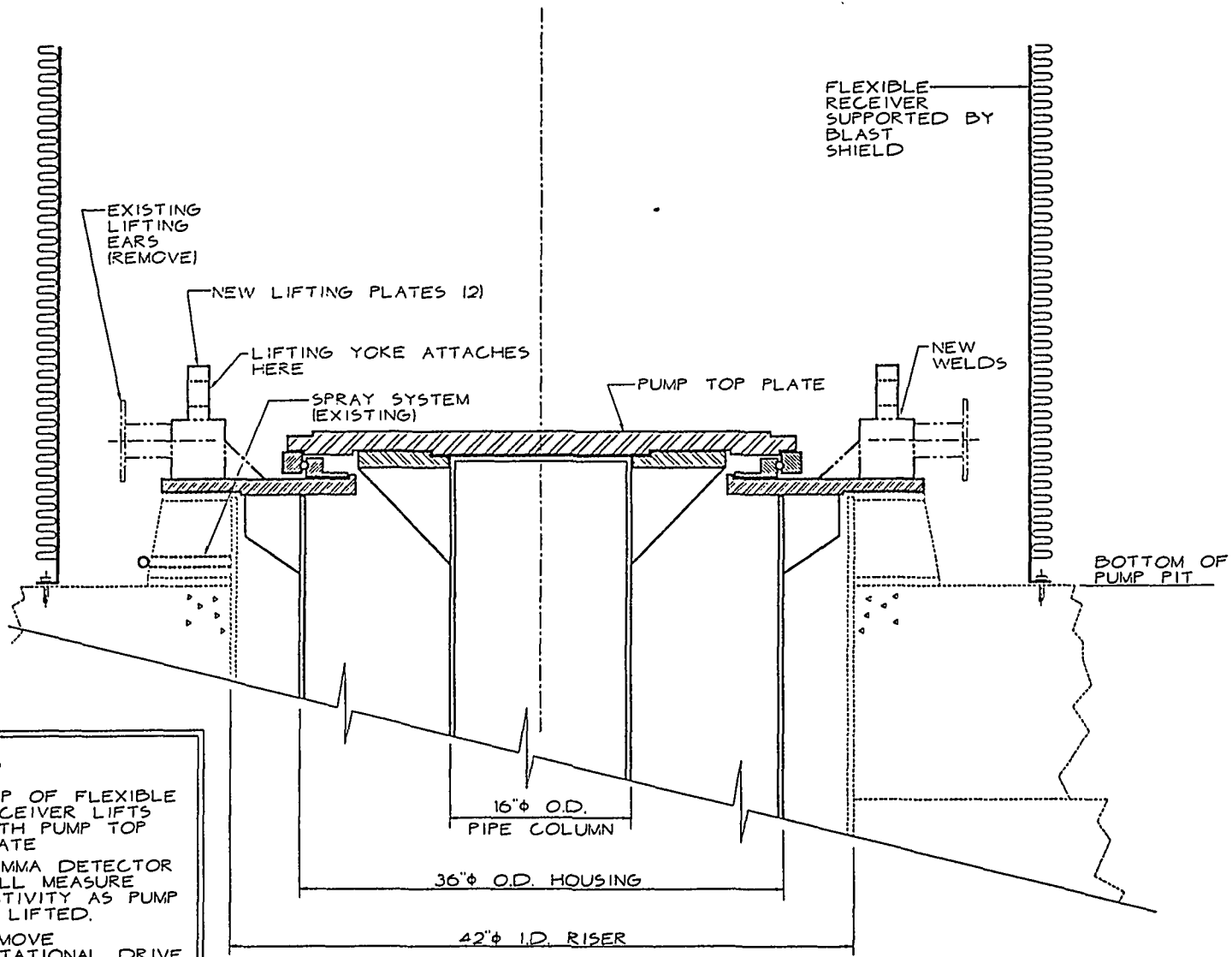
2. Pump vertical lift

- a. Attach lifting yoke to new lifting plates (2).
- b. Radiation sensor is monitored and spray system is turned on.

- c. Begin pump lift and monitor the action of the flexible receiver equipment; the radioactivity; and the spray system.
 - d. If activity is within acceptable limits - continue with lift until the pump can clear the pump pit.
 - e. Place riser plug in riser to shield pit from tank.
3. Pump horizontal movement and placement in vertical container
- a. Rotate the container, which is on the pre-positioned trailer, into a vertical position
 - b. Have flexible receiver clear the top of pump pit - then swing the pump so that it is no longer above the AP tank.
 - c. Lift the pump so that it can clear the vertical container.
 - d. Swing the pump slowly into place directly over the container.
 - e. Lower the pump into the container.
4. Lowering the container, bolting the top plate, and storing the pump
- a. Rotate the strongback to a horizontal position (see Appendix B)
 - b. Fasten the closure plate over the top end of the container.
 - c. Move the container to an appropriate storage place and unload.
 - d. If required, place lead or steel shot into the container shielding annulus spaces (either before or after storing).

APPENDIX A

CATWRS123J.DWG



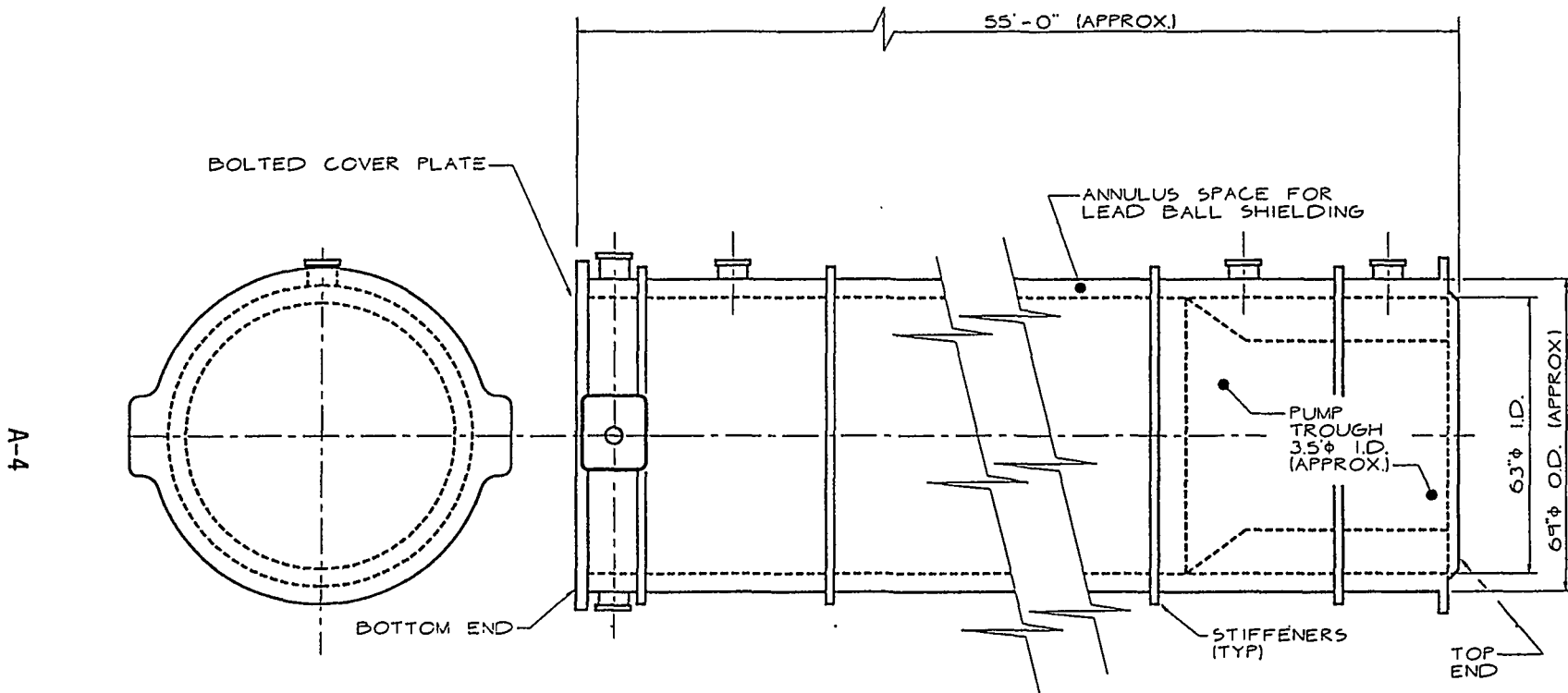
- NOTES:
1. TOP OF FLEXIBLE RECEIVER LIFTS WITH PUMP TOP PLATE
 2. GAMMA DETECTOR WILL MEASURE ACTIVITY AS PUMP IS LIFTED.
 3. REMOVE ROTATIONAL DRIVE MOTOR AND ELECTRICAL BOXES BEFORE LIFTING PUMP.

SKETCH A

MIXER PUMP PIT X-SECTION SHOWING FLEXIBLE RECEIVER AND BLAST SHIELD

A-3

APPENDIX A

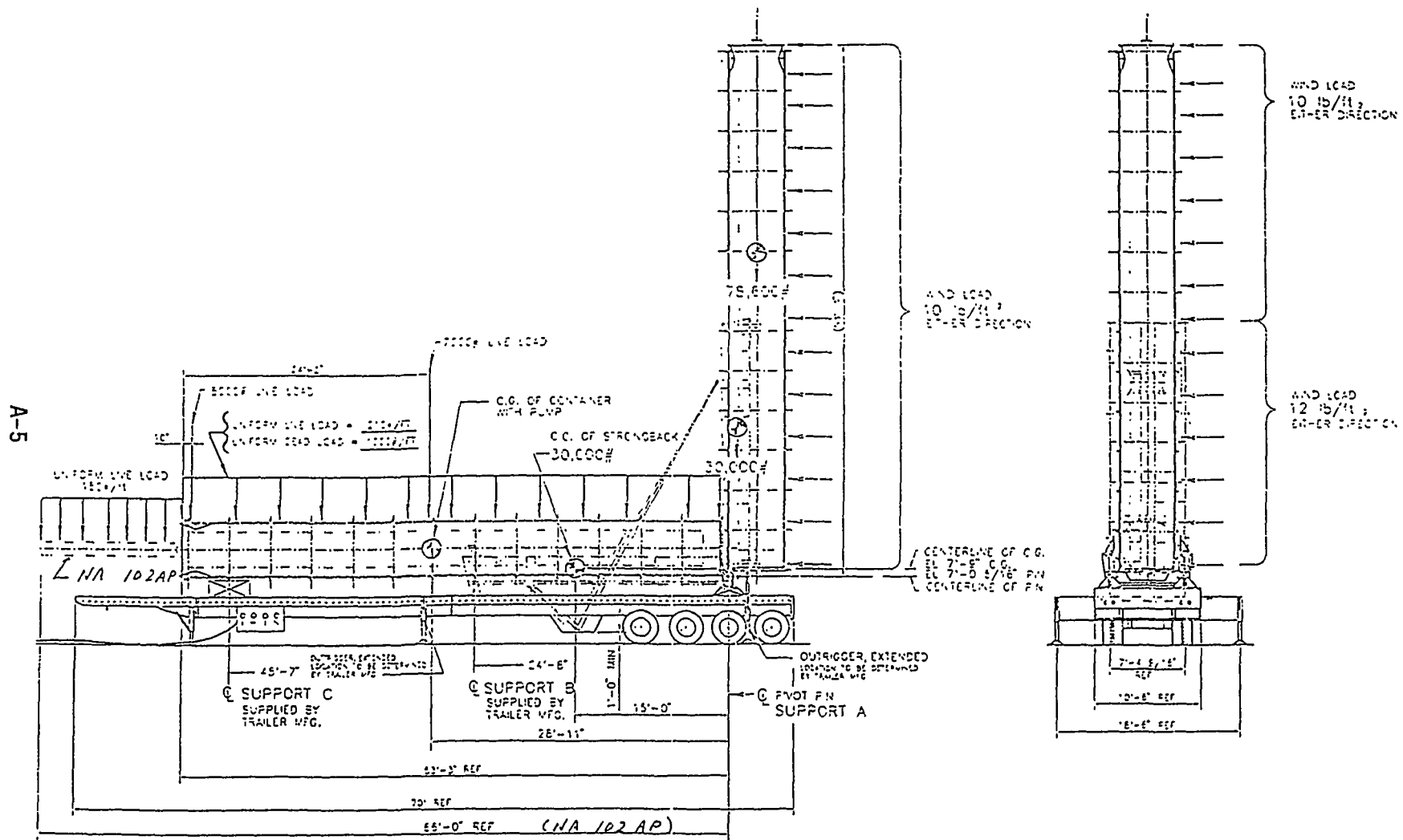


A-4

SKETCH B

METAL CONTAINER - ISOLATES PULLED MIXER PUMP
AND PROVIDES SHIELDING - RESTS ON STRONG BACK
NTS

APPENDIX A



A-5

LOAD CHART, 101SY (102AP IS SIMILAR)
 Sketch C. Schematic Showing Trailer, Strongback,
 and Container (Do not use these dimensions).

APPENDIX B

APMP REMOVAL - DESIGN, FABRICATION, AND REMOVAL - SCHEDULE

ACTIVITY	TASK	RESP	JUL	AUG	SEP	OCT	NOV	DEC	JAN 1995	FEB	MAR	APR
0010	Safety Assessment (Abbreviated SY-101) <i>MM</i>	VAN VLEET										
0020	Packaging Design Criteria (Modify SY-101)	CARLSTROM <i>MM</i>										
0021	Safety Evaluation for Packing (Modify SY-101)	CARLSTROM <i>MM</i>										
0030	Radiation Calcs (Modify SY-101) <i>MM</i>	DAUGHTRY										
0040	Flex RECR, Shield & Gamma	TOFFER <i>MM</i>										
0041	Flex RECR - Design	RITTER										
0042	Flex RECR - Fabrication	RITTER										
0043	Shield - Design	RITTER										
0044	Shield - Fabrication	RITTER										
0045	Gamma Scan - Design	RITTER										
0046	Gamma Scan - Fabrication	RITTER										
0050	Container											
0051	Design	THORNTON <i>MM</i>										
0052	Fabrication MM	PETERSON <i>MM</i>										
0053	Procure Material MM	McKINNEY										
0054	Procure Shielding Balls	McKINNEY										
0060	Pump Lifting Ears and Riser Plug	McKINNEY										
0061	Remove Lifting Ears <i>MM</i>	McKINNEY										
0062	Design New Lifting Ears	PETERSON <i>MM</i>										
0063	Weld New Lifting Ears and MTM <i>MM</i>	McKINNEY										
0064	Riser Plug - Design	PETERSON <i>MM</i>										
0065	Riser Plug - Fabrication MM	McKINNEY										
0066	Tank Farm Structural Analysis <i>MM</i>	STREHLOW										
0067	Equipment Layout <i>MM FOR P.P.S.</i>	SISK										
0068	Impact Limiting Device (Design & Const.)	MACKEY <i>MM</i>										
0070	Spray System											
0071	Spray System - Test	WRIGHT										
0080	Pump Removal (PR)											
0081	PR Plan	OLGUIN <i>MM</i>										
0082	PR Plan - Work Package	KIMBROUGH <i>MM</i>										
0083	Pump Removal Training	HARDING <i>MM</i>										
0084	PR - Erect Greenhouse <i>MM</i>	McKINNEY										
0085	Remove Pump	HARDING <i>MM</i>										
0086	Transport Pump to CWC (Plan) <i>MM</i>	HAUPTMANN										
0087	Transport Pump to CWC (Execution)	HARDING <i>MM</i>										
0090	Readiness Check List	HARDING <i>MM</i>										
0100	Road Construction <i>MM</i>	McKINNEY										
0105	Hoisting and Rigging Consultant	McPHERSON										
0110	Project Management <i>MM</i>	McKINNEY										

APPENDIX B

APMP REMOVAL - DESIGN, FABRICATION, AND REMOVAL - COST ESTIMATE

<u>ACTIVITY</u>	<u>TASK</u>	<u>COST</u>
0010	Safety Assessment (Abbreviated SY-101)	30,000
0020	Packaging Design Criteria (Modify SY-101)	20,000
0021	Safety Evaluation for Packing (Modify SY-101 Report)	40,000
0030	Radiation Calcs (Modify SY-101 Report)	30,000
0041	Flex RECR - Design	25,000
0042	Flex RECR - Fab	60,000
0043	Shield - Design	25,000
0044	Shield - Fab	50,000
0045	Gamma Scan - Design	20,000
0046	Gamma Scan - Fab	30,000
0050	Container	
0051	Design - Container and Misc. Components	60,000
0052	Fabrication - Container and Misc. Components	400,000
0053	Procure Material	100,000
0061	Remove Lifting Ears	5,000
0062	Design New Lifting Ears	10,000
0063	Weld New Lifting Ears and NDT	5,000
0064	Riser Plug Design	5,000
0065	Riser Plug Fabrication	5,000
0066	Tank Farm Structural Analysis	15,000
0067	Equipment Layout	20,000
0068	Impact Limiting Device (Design & Construction)	20,000
0071	Spray System - Test	10,000
0081	PR Plan	20,000
0082	PR Plan - Work Package	10,000
0083	PR Training	15,000
0084	PR-Erect Greenhouse	15,000
0085	Remove Pump	25,000
0086	Transport Pump to CWC (Plan)	15,000
0087	Transport Pump to CWC (Execution)	10,000
0088	CWC Design and Construction	20,000
0090	Readiness Check List	10,000
0100	Additional Road Design and Construction	60,000
0105	Hoisting and Rigging Consultant	15,000
0110	Project Administration	120,000
	SUBTOTAL	1,320,000
	Contingency (-14%)	180,000
	TOTAL	1,500,000

Date: 8/7/94

APPENDIX C

APMP REPLACEMENT - DESIGN, FABRICATION, AND PLACEMENT - SCHEDULE

ACTIVITY	TASK	RESP	1995												
			JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	
0201	Design	ARMATIS & STREHLOW ARMATIS & STREHLOW			[Solid Bar]										
0202	Specification					[Solid Bar]									
0203	Contracting											[Hatched Bar]			
0204	Fabrication & Shipping													[Hatched Bar]	
			1995						1996						
			JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	
0204	Fabrication & Shipping (Continued)		[Hatched Bar]												
0205	Testing (WHC)									[Hatched Bar]					
0206	Placing & Op. Test										[Hatched Bar]				

Note: Cross Hatching Schedule will not be worked until restart is needed

APPENDIX C

APMP REPLACEMENT - DESIGN, FABRICATION, AND REMOVAL - COST ESTIMATE

<u>ACTIVITY</u>	<u>TASK</u>	<u>COST</u>
0201	Design - Pump & Energy Absorber System	60,000
0202	Specification - Pump & Energy Absorber System	<u>40,000</u>
	TOTAL	100,000

