National Nuclear Security Administration

Department of Energy
National Nuclear Security Administration
Sandia Field Office
P. O. Box 5400
Albuquerque, NM 87185

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NMED
Hazardous Waste Bureau

Mr. John E. Kieling
Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, NM 87505

Subject: Department of Energy/National Nuclear Security Administration, Sandia National Laboratories/New Mexico – Solid Waste Management Unit 52: Filling Tanks 2 and 4 with a Permanent Insoluble Material

Dear Mr. Kieling:

The Department of Energy/National Nuclear Security Administration and Sandia Corporation, are submitting the above-referenced report documenting the filling of Tanks 2 and 4 at Solid Waste Management Unit 52, located within Technical Area V at Sandia National Laboratories/New Mexico (SNL/NM). This work was performed as specified by the New Mexico Environment Department in an October 12, 2012 letter from John E. Kieling, Hazardous Waste Bureau Chief, to Geoffrey L. Beausoleil, Sandia Field Office Manager and Stanley A. Orrell, SNL/NM Division 6000 Director, and in accordance with the schedule provided in a letter from Mr. Beausoleil dated February 26, 2013.

If you have questions, please contact John Weckerle of my staff at (505) 845-6026.

Sincerely,

James W. Todd
Assistant Manager for Engineering

Enclosures
1. Certification Statement For Approval and Final Release of Documents
2. Solid Waste Management Unit 52: Filling Tanks 2 and 4 with a Permanent Insoluble Material

cc: See Page 2

SNL1225

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CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

Document title: **Solid Waste Management Unit (SWMU) 52: Filling Tanks 2 and 4 with a Permanent Insoluble Material**

Document author: **Clinton Lum, Department 06234**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Signature: _____ 9/26/13
Date

Peter B. Davies, Director
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Albuquerque, New Mexico 87185
Operator

and

Signature: _____ 10/9/13
Date

FOR **Daniel Pellegrino**
U.S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
Owner and Co-Operator

Sandia National Laboratories/New Mexico Environmental Restoration Operations

Solid Waste Management Unit (SWMU) 52: Filling Tanks 2 and 4 with a Permanent Insoluble Material

September 2013

United States Department of Energy
Sandia Field Office

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TABLE OF CONTENTS

LIST OF TABLES ii
LIST OF APPENDICES ii
ACRONYMS AND ABBREVIATIONS iii

1.0 INTRODUCTION 1

1.1 Purpose 1
1.2 Site Background 1

2.0 MECHANICAL WORK 2

3.0 TANK FILLING 3

3.1 Flowable Fill 3
3.2 Filling Tank 2 4
3.3 Filling Tank 4 4

4.0 SUMMARY 4

5.0 REFERENCES 5

LIST OF TABLES

Table

3.1-1 Flowable Fill Deliveries 3

LIST OF APPENDICES

Appendix

A Red Line Markups of Design Drawings

B Photo Log of SWMU 52 Filling

ACRONYMS AND ABBREVIATIONS

DOE	Department of Energy
HWB	Hazardous Waste Bureau
LECS	Liquid Effluent Control System
LWDS	Liquid Waste Disposal System
NNSA	National Nuclear Security Administration
NMED	New Mexico Environment Department
Sandia	Sandia Corporation
SERF	Sandia Engineering Reactor Facility
SNL/NM	Sandia National Laboratories/New Mexico
SWMU	Solid Waste Management Unit
TA	Technical Area

1.0 INTRODUCTION

1.1 Purpose

On October 10, 2012 the New Mexico Environment Department (NMED) Hazardous Waste Bureau directed the Department of Energy (DOE)/National Nuclear Security Administration (NNSA) and Sandia Corporation (Sandia) to prevent any releases from Solid Waste Management Unit (SWMU) 52 Tanks 2 and 4 by removing them, or by filling them with a permanent insoluble material such as concrete or hydrated bentonite (Kieling October 2012). On February 26, 2013 DOE/NNSA and Sandia agreed to prevent any releases from SWMU 52 Tanks 2 and 4 by filling them with a permanent insoluble material (Beausoleil February 2013). The response also provided the schedule shown below:

- "Tanks 2 and 4 will be filled with a permanent insoluble material by July 31, 2013."
- "A written report will be submitted to NMED by October 11, 2013."

This report documents completion of the filling of SWMU 52 Tanks 2 and 4 by July 31, 2013.

1.2 Site Background

Sandia National Laboratories, New Mexico (SNL/NM) is a government-owned, contractor-operated DOE/NNSA facility, located on the Kirtland Air Force Base military reservation in Albuquerque, New Mexico. The Liquid Waste Disposal System (LWDS) Holding Tanks 1, 2, and 4 encompasses approximately 0.6 acre within Technical Area (TA-V). TA-V is a fenced, secured, research and testing area located northeast of TA-III. The holding tanks are located under a paved and curbed area west of Building 6580. LWDS "Tank 3" is a drainfield that was removed from service in 1967 when it collapsed and is managed as SWMU 5.

SWMU 52 consists of three underground tanks, numbered 1, 2, and 4 and piping (See Figures in Appendix A). Since the Liquid Effluent Control System (LECS) was constructed in 1994 the use of the LWDS has been restricted to Tank 1. Tank 2 was cleaned out, isolated, and has not been used since 2007. Tank 4 contained approximately 24 inches of water in the absence of any intentional addition or removal of water since 2006. Tank 1 and 2 are cement tanks with volumes of 2000 and 6000 gallons, respectively. Tank 4 is a 30,000 gallon steel tank.

Sandia Engineering Reactor Facility (SERF) wastewater was discharged to the SWMU 52 holding tanks, and then to the drainfield (SWMU 5) from 1963 to 1967. After the drainfield collapsed in 1967, the holding tanks effluent was discharged to the surface impoundments (SWMU 4) until 1971. Since the decommissioning of the SERF in 1971, nonradioactive discharges from various buildings in TA-V continued to drain to the SWMU 52 holding tanks. The tanks were periodically pumped to the surface impoundments from 1971 until October 1992, when all discharges to the surface impoundments were stopped. Currently, water accumulates in Tank 1, and is then discharged to the LECS where it is held and sampled prior to discharge to the Albuquerque-Bernalillo County Water Utility Authority's publicly-owned treatment works.

2.0 MECHANICAL WORK

In preparation for filling Tanks 2 and 4, the following tasks were completed:

- Water from Tank 4 was sampled and analyzed for: metals (Al, As, B, Ca, Cr, Cu, Pb, Mo, Ni, Se, Ag, Zn), fluoride, gross alpha and beta, gamma spectroscopy, tritium, VOCs, SVOCs, ammonia, oil and grease, total petroleum hydrocarbon, pH, gasoline range organics, diesel range organics, PCBs, pesticides, hardness, and mercury (AR/COC: 614624).

- Based on the analytical results the water from Tank 4 met the standards for discharge to the sanitary sewer system (Discharge Authorization 13-93).

- Tank 4 vertical turbine pump, riser, and motor was disconnected and removed. Removal of the Tank 4 vertical turbine pump, riser, and motor required a crane and was performed in a single lift. The individual sections were then unbolted or cut and palletized for characterization and disposal. Removal of the Tank 4 vertical turbine pump permitted access to the tank interior. Through this opening a temporary submersible pump was lowered and used to remove the residual water from Tank 4 to the LECS for disposal.

- The residual water in Tank 4 was pumped to the LECS.

- All pipes entering Tanks 2 and 4 were disconnected by closing valves, capping, or sealing. Additional details of this process are provided below.

  The valves and piping that discharged from Tanks 1, and input and discharge pipes for Tanks 2 and 4 to the disposal points were disconnected, removed, or sealed. Closed connections were verified that they were sealed to ensure that flowable fill from Tanks 2 and 4 would not enter the remainder of the system. Verification of valve closure was performed by entering the Tank 4 valve pit and the Tank 2 pump pit to identify cross connection points. This visual inspection along with the design drawings were used to develop a plan to isolate the components of Tanks 2 and 4 from the remainder of the system. At all required locations, the following systems were isolated:

  - A two inch skillet blind was installed in the pipeline from Tank 4 to the pump pit;

  - A six inch skillet blind was installed at the pump pit in the pipeline connecting Tanks 1 and 2;

  - Skillet blinds were also installed inside the valve pit on the 2 three inch lines connecting to Tank 4;

  - In the vertical turbine pump vault, a 4 inch blind flange was installed on the three inch pipeline that connected to the pump; and,

  - All valves associated with Tanks 2 and 4 that remained in place were either air tested or dismantled and visually inspected prior to filling the tanks.

The locations where blinds were installed in the pipes associated with the isolation of Tanks 2 and 4 are shown in Appendix A. Daily field reports were completed during the project and a photographic log of the field activities is provided in Appendix B.

3.0 TANK FILLING

3.1 Flowable Fill

Flowable fill is a lean cement mixture that is self-compacting, self-leveling, has a flowable consistency, and is an economic fill or backfill material alternative to compacted granular fill. Flowable fill was selected for in place filling of Tanks 2 and 4 because it minimizes settlement and safety concerns, and produces a durable high density backfill that does not require compaction. The flowable fill was delivered into the tanks using a cement pump. A mechanical vibrator was used to consolidate the fill mix inside the tanks. Table 3.1-1 below shows the flowable fill delivery dates and the volume pumped into each tank.

Table 3.1-1
Flowable Fill Deliveries

Date	Concrete Delivery Ticket Number	Quantity (Cubic Yards)	Placement
7/25/2013	15098264	10	Tank 2
7/25/2013	15098266	10	Tank 2
7/25/2013	15098267	10	Tank 2
7/25/2013	15098268	10	Tank 2
7/25/2013	15098271	10	Tank 4
7/25/2013	15098273	10	Tank 4
7/25/2013	15098274	10	Tank 4
7/25/2013	15098277	10	Tank 4
7/25/2013	15098279	10	Tank 4
7/25/2013	15098285	10	Tank 4
7/25/2013	15098288	10	Tank 4
7/25/2013	15098292	10	Tank 4
7/26/2013	15098337	10	Tank 4
7/26/2013	15098340	10	Tank 4
7/26/2013	15098341	10	Tank 4
7/26/2013	15098346	10	Tank 4
7/26/2013	15098355	10	Tank 4
7/26/2013	15098362	10	Tank 4
7/30/2013	15098481	10	Tank 4
7/30/2013	15098502	10	Tank 4
Total Cubic Yards Used		200	

3.2 Filling Tank 2

Tank 2 and the vertical access manway were filled with flowable fill using a pumper truck to transfer the fill from concrete trucks to the tank. Approximately 40 cubic yards (8000 gallons) of flowable fill was required to fill the tank and the manway. Filling Tank 2 was completed in one day by using the pumper truck to deliver the flowable fill. Photographs of the filling are included in Appendix B.

3.3 Filling Tank 4

Tank 4 and the vertical access manway, where the vertical turbine pump had been located, were filled with flowable fill using a pumper truck to transfer the flowable fill from concrete trucks to the tank. Approximately 160 cubic yards (32,000 gallons) of flowable fill were required to fill the tank and the manway. Filling Tank 4 was accomplished over three days. On the first day of filling, approximately 80 cubic yards of the fill was pumped into the tank. On the second day, approximately 60 cubic yards of the flowable fill was pumped into the tank. Due to delivery delays the flowable fill started to set up and did not settle properly. Therefore, filling Tank 4 was not completed before access to the tank from the manway was sealed off. On the third day Tank 4 was completely filled with flowable fill by pumping down the two 3 inch vertical vent pipes located at either end of the tank using a pumper truck. Flowable fill was pumped into each vent pipe until they were completely filled. As shown in Table 3.1-1 filling Tank 4 was completed on July 30, 2013.

4.0 SUMMARY

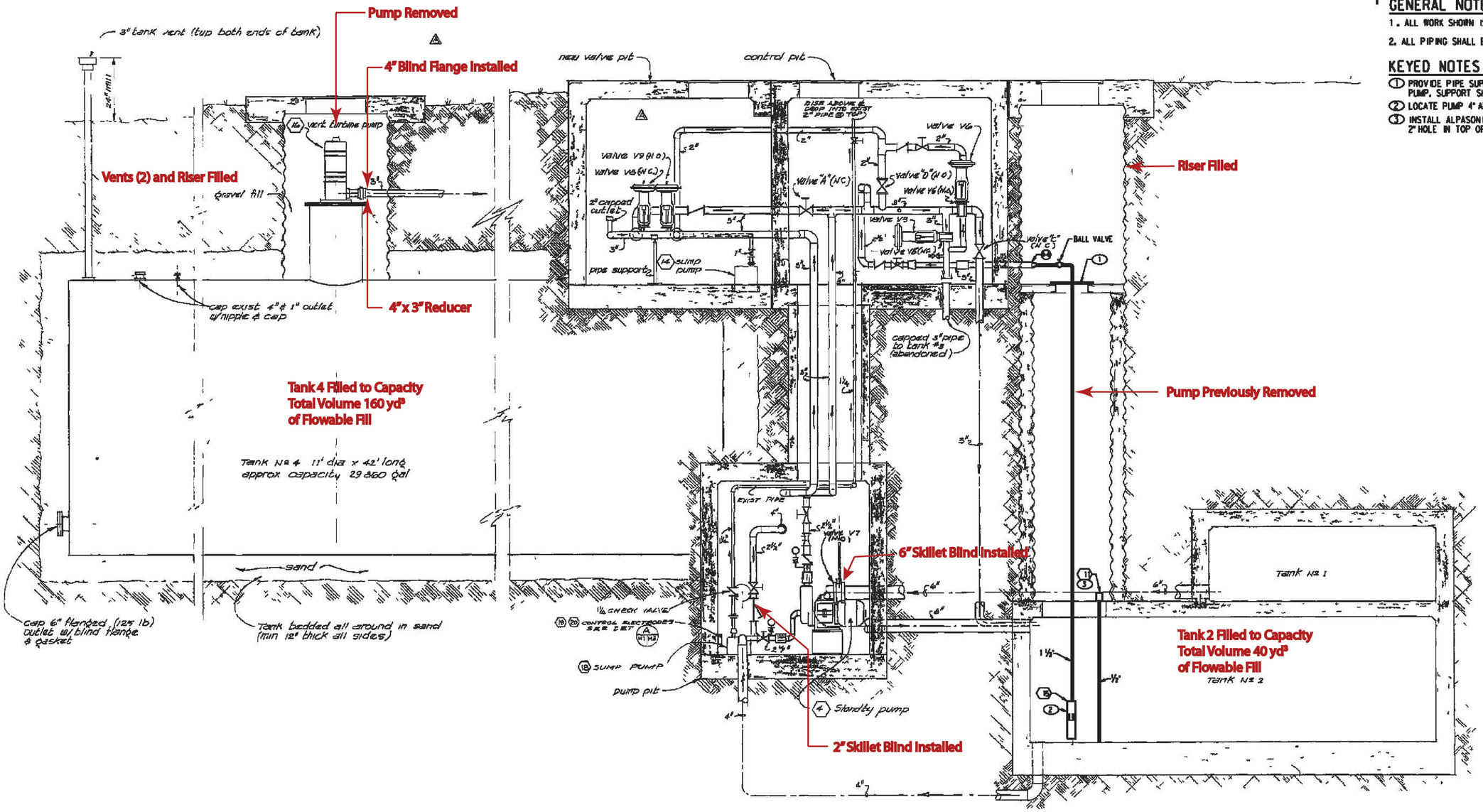
DOE/NNSA and Sandia agreed to prevent any releases from SWMU 52 Tanks 2 and 4 by filling them with a permanent insoluble material by July 31, 2013. Preparation for filling the tanks involved sampling and analyzing water from Tank 4. Tank 4 was found suitable for release to the sanitary sewer and pumped to the LECS for disposal. The Tank 4 vertical pump was removed using a crane. All pipe connection into and out of Tanks 2 and 4 were confirmed closed or sealed. Flowable fill was selected as the fill material and Tank 2 and 4 and their manway accesses, were then filled with approximately 40 and 160 cubic yards, respectively. This report documents that SWMU 52 Tanks 2 and 4 were filled with a permanent insoluble material to prevent any releases as required by NMED/HWB in their letter dated October 10, 2012.

5.0 REFERENCES

Beausoleil, G.L. (U.S. Department of Energy NNSA/Sandia Field Office), February 2013. Letter to J. Kieling (New Mexico Environment Department), "Schedule for Solid Waste Management Unit 52, Tanks 2 and 4 Department of Energy, National Nuclear Security Administration, Sandia National Laboratories, EPA ID# NM5890110518 HWB-SNL-06-007 and HWB-08-001," February 26, 2013.

Kieling, J.E. (New Mexico Environment Department), October 2012. Letter to G. Beausoleil (U.S. Department of Energy NNSA/Sandia Site Office) and S. Orrell (Sandia National Laboratories/New Mexico), "Solid Waste Management Unit 52, Sandia National Laboratories, EPA ID# NM5890110518 HWB-SNL-06-007 and HWB-08-001," October 10, 2012.

APPENDIX A
Red Line Markups of Design Drawings



1 SECTION
SCALE ½"=1'-0"

GENERAL NOTES

1. ALL WORK SHOWN IS IN THE SCOPE OF PHASE I.
2. ALL PIPING SHALL BE STEEL STRUCTION.

KEYED NOTES

1. PROVIDE PIPE SUPPORT CAPABLE OF SUPPORTING PIPING AND PUMP. SUPPORT SHALL INCLUDE VIBRATION ISOLATION.
2. LOCATE PUMP 4" ABOVE THE BOTTOM OF THE TANK.
3. INSTALL ALPASONIC LEVEL TRANSMITTER ON THE TANK. COORDRILL 2" HOLE IN TOP OF TANK FOR LEVEL TRANSMITTER.

Tank 4 & Tank 2
Closure In Place
July 2013

EQUIPMENT SCHEDULE

	DESCRIPTION
11	LEVEL TRANSMITTER: TWO-WIRE ALPHA SONIC, 0.3 TO 1 0' RANGE, +/- 1 % OF SPAN ACCURACY, 4-20 MA OUTPUT TEMPERATURE COMPENSATING, ½" WAVE GUIDE, POLYPROPYLENE ENCLOSURE. UNIT SHALL BE PROVIDED WITH LCD DISPLAY OF LEVEL IN NEMA 4X ENCLOSURE. FLOWLINE MODEL LA12-1001 LEVEL TRANSMITTER AND L121-1001 DISPLAY.
15 16	SUBMERSIBLE PUMPS: 300 SERIES STAINLESS STEEL CONSTRUCTION. CHECK VALVE AND SEAT. NBR SEALS. MUTI-STAGE PUMPING. GRUNDFOS OR EQUIVALENT.

SYMBOL	GPM	HEAD, FT.	MOTOR HP	POWER	GRUNFOSS MODEL NO.	OPERATING WT. LBS.	SERVICE
15	25	50	.50	208/3/60	25S	26	TANK #2
16	25	50	.50	208/3/60	25S	26	TANK #4

REV	DATE	DESCRIPTION	DWN	CKD	APP
45-3411 364-80-175	7/11/80	INSTALL NEW PUMPS (4) & (18)			
45-3411 364-80-175	7/11/80	REMOVE PUMPS (4) & (18)			
28/79-99	2/9/78	Remove pneumatic controls	CRM		

REV	DATE	DESCRIPTION	DWN	CKD	APP
F	11/82	INSTALL NEW PUMP 15	CAW	SDB	
E	7/80	INSTALL NEW PUMPS 4 & 18	CEC	CRM	
1	1/07	CLEANED FILE FOR VIEWING	DAA		
2	4/09	ROLLUP PROJECT 53756	DAA		

53786
45-3411
364-80-175
53756
BASELINE
P.O.
PROJECT NO.

U.S. DEPARTMENT OF ENERGY
NNSA/SANDIA SITE OFFICE — ALBUQUERQUE, NEW MEXICO

SANDIA NATIONAL LABORATORIES

SECTION - PROCESS WASTE SYSTEM

Reactor Facility

P.O.	
PROJECT NO.	
DRAWN BY	MILLS
CHECKED BY	TE
SNL ENGR	
DATE	8/17/68

DISCP: D SUB-DISCP: P 6580

SIZE D+ DRAWING NO DP30016580.DGN SEQ.

OLD FILENAME: D903264.03
FILENAME: DP30016580.DGN

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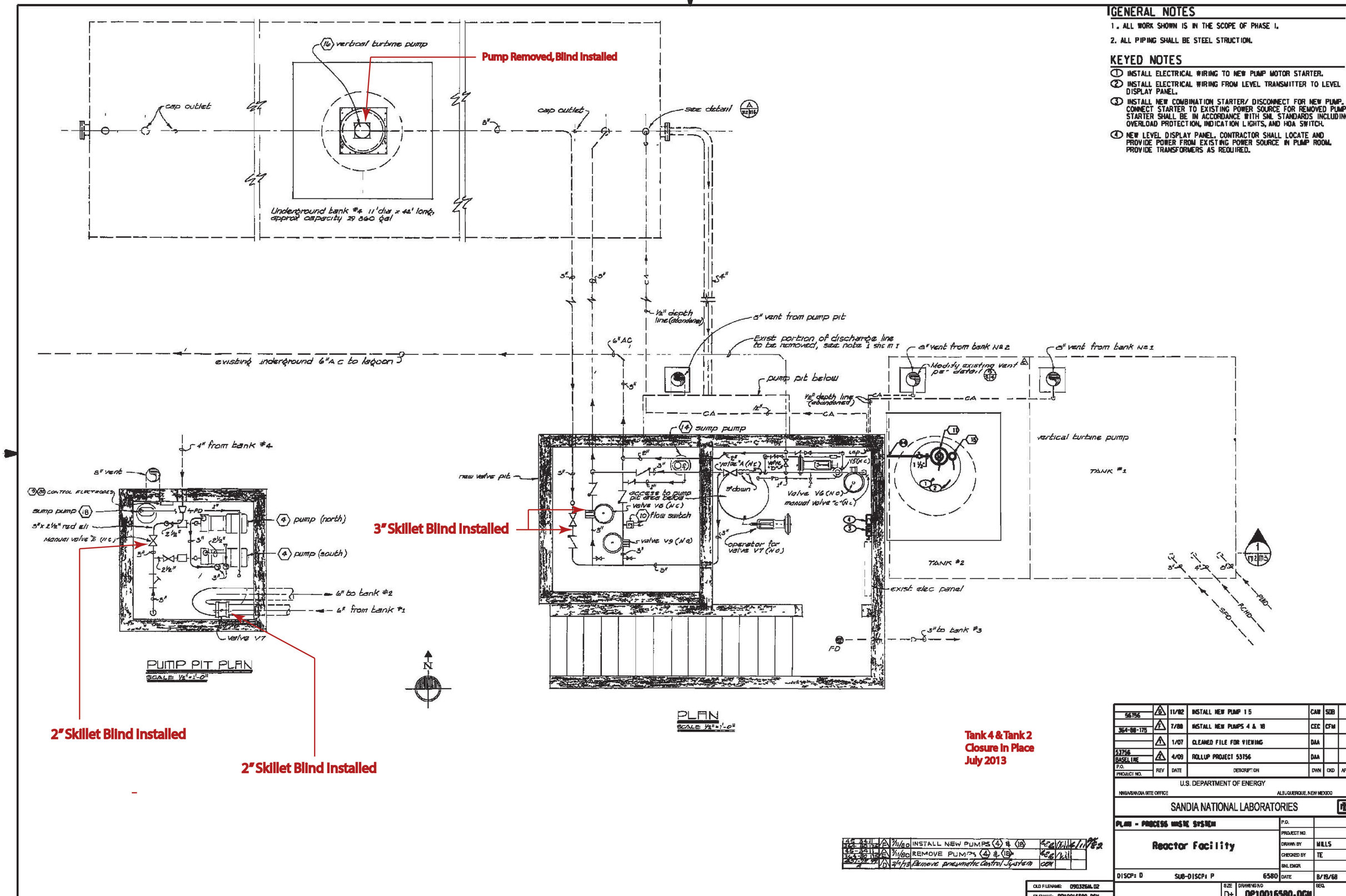

GENERAL NOTES

1. ALL WORK SHOWN IS IN THE SCOPE OF PHASE I.
2. ALL PIPING SHALL BE STEEL STRUCTION.

KEYED NOTES

1. INSTALL ELECTRICAL WIRING TO NEW PUMP MOTOR STARTER.
2. INSTALL ELECTRICAL WIRING FROM LEVEL TRANSMITTER TO LEVEL DISPLAY PANEL.
3. INSTALL NEW COMBINATION STARTER/ DISCONNECT FOR NEW PUMP. CONNECT STARTER TO EXISTING POWER SOURCE FOR REMOVED PUMP. STARTER SHALL BE IN ACCORDANCE WITH SNL STANDARDS INCLUDING OVERLOAD PROTECTION, INDICATION LIGHTS, AND HOA SWITCH.
4. NEW LEVEL DISPLAY PANEL. CONTRACTOR SHALL LOCATE AND PROVIDE POWER FROM EXISTING POWER SOURCE IN PUMP ROOM. PROVIDE TRANSFORMERS AS REQUIRED.

REV	DATE	DESCRIPTION	DWN	CKD	APP
6	11/02	INSTALL NEW PUMP 15	CAW	SDB	
5	7/88	INSTALL NEW PUMPS 4 & 18	CEC	CFM	
1	1/07	CLEANED FILE FOR VIEWING	DAA		
2	4/09	ROLLUP PROJECT 53756	DAA		

P.O. 56756 / 364-88-175 / 53756 BASELINE

U.S. DEPARTMENT OF ENERGY

NNSA/SANDIA SITE OFFICE — ALBUQUERQUE, NEW MEXICO

SANDIA NATIONAL LABORATORIES

PLAN - PROCESS WASTE SYSTEM

Reactor Facility

P.O.	
PROJECT NO.	
DRAWN BY	MILLS
CHECKED BY	TE
SNL ENGR	
DATE	8/19/68

DISCP: D — SUB-DISCP: P — 6580

SIZE D+ — DRAWING NO DP10016580.DGN — SEQ.

45-341 / 364-88-175	7/11/80	INSTALL NEW PUMPS 4 & 18	CEC	6/11/82
45-341 / 364-88-175	7/11/80	REMOVE PUMPS 4 & 18	CEC	
45-341 / 364-88-175	2/1/73	Remove pneumatic Control System	CEM	

OLD FILENAME: 090326M.D2

FILENAME: DP10016580.DGN

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APPENDIX B
Photo Log of SWMU 52 Filling

Photo 1

Date: 7/25/13
Description: Pumping flowable fill into tanks

Photo 2

Date: 7/25/13
Description: View of flowable fill being pumped into Tank No. 2 down the manway access.

Photo 3

Date: 7/25/13
Description: Flowable fill being pumped into Tank No. 2 manway access. A mechanical vibrator was used to consolidate the fill inside the tank.

Photo 4

Date: 7/25/13
Description: Cement pump truck filling Tank No. 2.

Photo 5

Date: 7/25/13
Description: Tank No. 2 and manway access filled to the surface with flowable fill.

Photo 6

Date: 7/25/13
Description: Flowable fill being pump into Tank No.4 down the vertical turbine pump shaft and manway access.

Photo 7

Date: 07/26/13
Direction: Filling Tank No. 4 with flowable fill. A mechanical vibrator was used to consolidate the fill.

Photo 8

Date: 7/26/13
Description: Tank No. 4 vertical turbine pump shaft and manway access filled with flowable fill.

Photo 9

Date: 7/30/13
Description: Filling Tank No. 4 with flowable fill using the vent riser.

Photo 10

Date: 7/30/13
Description: Mechanical vibrator being inserted down the Tank No. 4 vent riser.

Photo 11

Date: 7/30/13
Description: Flowable fill completely filling Tank No. 4 vent riser.

Photo 12

Date: 7/30/13
Description: Flowable fill completely filling Tank No. 4 vent riser.