ATTACHMENT K

AFFIDAVIT OF ROBERT CLIFFORD MASON

1. I, Robert Clifford Mason, am an employee of Los Alamos National Security, LLC at the Los Alamos National Laboratory (LANL). I have been employed at LANL since 2006.

2. I am currently employed as the Facility Operations Director (FOD) for nuclear and support facilities at LANL Technical Areas (TA) 03, 50, 55, and 63. I have served in this capacity for 12 years.

3. As a FOD, I am responsible for managing and overseeing operations at the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF). I am responsible for facility-related engineering, maintenance, and treatment operations, as well as RLWTF safety, environmental, and waste services.

4. I am familiar with Outfall 051 associated with RLWTF. The Laboratory has been operating the RLWTF under NPDES Permit #NM0028355 (NPDES Permit) since 1978. The permit is issued by the U.S. Environmental Protection Agency to the U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (LANS) as co-permittees for the Los Alamos National Laboratory. The NPDES Permit authorizes the Laboratory to discharge from eleven (11) sanitary and/or industrial outfalls, including the discharge of treated radioactive liquid waste from the RLWTF through Outfall 051 into Effluent Canyon, a tributary to Mortandad Canyon. The NPDES Permit has been renewed multiple times and was last re-issued on August 12, 2014.

5. As stated in the 2012 NPDES Permit Re-Application Outfall Fact Sheet, permit coverage for Outfall 051 explicitly included "*re-permit the outfall so that the RLWTF can maintain the capability to discharge should the Mechanical Evaporator and/or Zero Liquid Discharge (ZLD) Solar Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission*" (See page 5 of the 2012 Permit Re-Application Outfall Fact Sheet, which is included as Attachment 1).

6. Outfall 051 is also regulated by New Mexico Environment Department (NMED) under the New Mexico Water Quality Act at NMSA 1978, §§76-6-1 *et. seq.*, and New Mexico Water Quality Regulations at 20.6.2.1 NMAC through issuance of a Ground Water Discharge Permit. In 2012, the Laboratory submitted a renewal application for a Ground-Water Discharge Permit (DP-1132). The application cited the same discharge paths as are discussed in the NPDES 2012 application: the Mechanical Evaporator System (MES), Solar Evaporator Tank System (SET) also referred to as the Zero Liquid Discharge Tanks, and Outfall 051. The DP-1132 requires the Laboratory to meet the requirements of Permit Condition VI.A.8, which include, among other items, contains water tightness testing of the conveyance pipelines from the RLWTF to the SET and Outfall 051.

7. RLWTF is a mission-critical LANL facility that treats low-level and transuranic liquid wastewater from processes at various generator facilities throughout the Laboratory. Outfall 051 is an integral component of RLWTF, and the Laboratory intends to discharge from this

outfall. Discharge through the outfall is necessary for operational flexibility so that the RLWTF can maintain the capability to discharge should the Mechanical Evaporator System (MES) and/or Solar Evaporation Tank (SET) become unavailable due to maintenance or malfunction and/or should there be an increase in treatment capacity caused by changes in LANL scope/mission. RLWTF must maintain operational flexibility and readiness to meet the Laboratory's mission demands.

FURTHER AFFIANT SAYETH NAUGHT.

Robert C. Mason

STATE OF NEW MEXICO)
) ss.
COUNTY OF LOS ALAMOS)

SUBSCRIBED, SWORN TO AND ACKNOWLEDGED before me this 29th day of March 2018, by Robert C. Mason.

Michelle Alarid
NOTARY PUBLIC

My Commission Expires:

OFFICIAL SEAL
MICHELLE M. ALARID
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 7/23/18

2012 NPDES PERMIT RE-APPLICATION
OUTFALL FACT SHEET

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
051	TA-50-1	Radioactive Liquid Waste Treatment Facility (RLWTF)	Effluent Canyon, a Tributary to Mortandad Canyon

SOURCE OF DISCHARGE

Outfall 051 is located at TA-50 and discharges treated radioactive liquid wastewater effluent from the Radioactive Liquid Waste Treatment Facility (RLWTF) at TA-50-1 into Effluent Canyon, a tributary of Mortandad Canyon. Table 1 identifies the location of the RLWTF and provides a description of influent sources that it receives.

Table 1
Sources for Discharge to Outfall 051

TA	Bldg	Description
50	1	Radioactive Liquid Waste Treatment Facility - Process water from radiochemistry laboratories, duct washing systems, radiological areas, boilers, and process areas. - Cooling water from systems located in radiological areas. - Storm and surface water (including samples) collected from sumps, manholes, and vaults. - Environmental Restoration (ER) waste water generated by groundwater monitoring and sampling activities at performed at LANL.

Figure 1 provides a process flow diagram for the RLWTF.

WATER TREATMENT PROCESS

The RLWTF treats low-level and transuranic (TRU) radioactive liquid wastewater delivered from processes at various generator facilities to TA-50 by underground collection system or by tanker truck. All wastewater discharged into the RLWTF must comply with the facility's Waste Acceptance Criteria and must have a completed/approved Waste Profile Form (Appendix N). The NPDES sample point for this outfall allows for the collection of a sample after the final treatment process. The RLWTF includes two different treatment processes as follows:

- **Low-Level RLW Treatment Process** - Low-level influent is received at the facility through the Radioactive Liquid Waste Collection System (see Appendix J, K) where it is routed through a pH adjustment chamber and collected in the influent tanks. RLW is fed from the influent tanks to the clarifiers where it is treated by chemical precipitation and flocculation (sodium hydroxide, magnesium hydroxide, ferric chloride, sulfate, or other chemicals) to remove silica and radionuclides. The clarified water is drawn off and filtered. The RLW may then be treated by ion exchange or is sent to a Reverse Osmosis (RO) unit. The RO permeate (treated water) is routed to effluent storage tanks prior to being discharged to the effluent evaporator, TA-52 solar evaporation tanks (anticipated to be operational within the next 5 years), or the NPDES outfall. Effluent may also be shipped by tanker truck to the TA-53 solar evaporation basins/tanks. If the effluent is discharged to Outfall 051 it is further treated with ion exchange to remove copper/zinc and may have magnesium/calcium salts added to adjust the hardness prior to discharge. Secondary waste treatment processes are also included for RO concentrate (Secondary RO) and sludge (vacuum filter/dewatering). These

processes result in recycle streams back to the influent tanks and to other process units, and concentrated and solid waste streams shipped as low-level radioactive waste.

- **TRU RLW Treatment Process -** TRU RLW is received at the facility through an underground, doubled walled pipe collection system from TA-55 (see Appendix J, K) and is collected at the TA-50-66 influent tanks. The TRU influent is routed from TA-50-66 to the treatment tank in Room 60 where it is treated by chemical precipitation (sodium hydroxide) to remove radionuclides. Solids from the tank are collected in a sludge tank, allowed to settle, and are then solidified with cement in a drum tumbler. The cement drums are shipped and disposed of as TRU waste. The treated water is routed to the low-level treatment plant for either additional treatment or for storage pending shipment off-site for LLW disposal.

The water treatment codes provided in Table 2 have been assigned to this outfall.

Table 2
Water Treatment Codes Assigned to the RLWTF and Outfall 051

Treatment Code	Treatment Process	Description
1F	Evaporation	Waste Reduction Evaporator, Effluent Evaporator, and Solar Evaporation Tanks
1G	Flocculation	Clarifiers
1O	Mixing	Various
1S	Reverse Osmosis (Hyperfiltration)	RO Units
1U	Sedimentation (Settling)	Sludge
1Q	Multimedia Filtration	Pressure and Cartridge Filters used for Particulate Removal
1R	Rapid Sand Filtration	Gravity Media Filter for Particulate Removal
2C	Chemical Precipitation	Sodium hydroxide, magnesium hydroxide, magnesium sulfate, sodium aluminate, co-polymer, and ferric sulfate are used to promote precipitation of radionuclides and silica removal
2G	Coagulation	Clarifiers
2J	Ion Exchange	Perchlorate, copper, and zinc removal
2K	Neutralization	Influent and Room 60 Neutralization
5Q	Landfill	Drums of TRU and LLW Waste
5U	Vacuum Filtration	Vacuum filter for LLW sludge

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment processes identified in Table 2 utilize chemicals to control pH, promote precipitation, and flocculation. Table 3 identifies the treatment chemicals that are used at the RLWTF.

Table 3
Treatment Chemicals Used at the RLWTF

Source	Reason for Use/Frequency	Hazardous Substances from Form 2C, Table 2C-4
Sodium Hydroxide 25%	pH Adjustment, Promote Precipitation/Flocculation, and Membrane Cleaning	Sodium Hydroxide
Ferric Sulfate	Promote Precipitation/Flocculation	Ferric Sulfate
Magnesium Hydroxide	Promote Precipitation/Flocculation	NA
Carbon Dioxide	Adjust pH	NA
Magnesium Sulfate	Precipitation/Flocculation	NA

Table 3 (continued)
Treatment Chemicals Used at the RLWTF

Source	Reason for Use/Frequency	Hazardous Substances from Form 2C, Table 2C-4
EDTA	Membrane Cleaning	EDTA
Sodium bisulfite	Membrane Cleaning	Sodium Bisulfite
Dishwashing Soap	Membrane Cleaning	NA
Ionac SR-6	Ion Exchange Resin	NA
Hydrochloric Acid	Reduce pH	Hydrochloric Acid
Solid Sodium Hydroxide	Precipitation/Flocculation	Sodium Hydroxide
SCU	Ion Exchange Media	NA
SCP	Ion Exchange Media	NA
Sodium Aluminate	Precipitation/Flocculation	NA
WEST W-126	Ionic Co-polymer used as a Flocculent	2-Propanoic Acid

Table 4 identifies the contaminants listed on the Waste Profile Forms for the influent waste streams received by the RLWTF for treatment.

Table 4
Potential Contaminants Associated with the RLWTF Influent

Waste Stream Type	Description	Hazardous Substances from Form 2C, Table 2C-4 Identified on WPFs[1]		Detected in Outfall 051 Discharge (Aug 07 – Jun 10)
Process	Discharged from laboratories, radiological areas and process areas.	acetic acid ammonia ammonium bifluoride ammonium carbonate ammonium chloride ammonium fluoride ammonium hydroxide benzene chloroform chromic acid cupric chloride cupric sulfate endrin EDTA ferric chloride ferric nitrate ferric sulfate ferrous ammonium sulfate ferrous chloride ferrous sulfate formaldehyde formic acid	heptachlor hydrochloric acid hydrofluoric acid lead nitrate nitric acid phenol phosphoric acid potassium dichromate potassium hydroxide potassium permanganate sodium dodecylbenzenesulfonate sodium fluoride sodium hydroxide sodium hypochlorite sodium nitrite sodium phosphate (dibasic) sulfuric acid uranyl nitrate zinc chloride zinc nitrate zinc sulfate	Chloroform [2] Chromium [3] Copper [4] Lead [5]
ER	Discharged from groundwater drilling and remediation projects.	acrolein ammonia aniline benzoic acid Dieldrin endosulfan	endrin ethyl benzene Naphthalene Phenol Toluene xylene	Naphthalene [6] Phenol [7]

Table 4 (continued)
Potential Contaminants Associated with the RLWTF Influent

Waste Stream Type	Description	Hazardous Substances from Form 2C, Table 2C-4 Identified on WPFs[1]		Detected in Outfall 051 Discharge (Aug 07 – Jun 10)
Storm Water	Discharged from sumps, manholes, and vaults. [8, 9]	Ammonia chloroform	nitric acid trichloroethylene	Chloroform [2]

1. NOTE: The wastewater influent received by the RLWTF is not RCRA listed hazardous waste.
2. Chloroform was detected twelve (12) times at concentrations ranging from 0.000283 – 0.0546 mg/L.
3. Chromium was detected one (1) time at a concentration of 0.001 mg/L.
4. Copper was detected thirty five (35) times at concentrations ranging from 0.0102 – 0.24 mg/L.
5. Lead was detected on (1) time at a concentration of 0.0076 mg/L.
6. Naphthalene was detected two (2) times at concentrations of 0.000372 – 0.000933 mg/L.
7. Phenol was detected on (1) time at a concentration of 0.0177 mg/L.
8. Ammonia, chloroform, and trichloroethylene were detected in storm water collected from TRU/LLW storage dome sumps located at TA-54 and sent to the RLWTF for treatment. These detections are likely due to residual cleaning chemicals and/or the presence of asphalt.
9. The nitric acid is used as a preservation chemical for storm water and surface water samples that are managed at TA-59. Unused sample material is poured down the RLW drain to the collection system.

POTENTIAL POLLUTANTS

The treatment chemicals and treated RLWTF effluent constitute the pollutant load that could potential discharge to Outfall 051. Table 5 identifies the Table 2C-4 constituents that will potentially be discharged to the outfall.

Table 5
Potential Pollutants Discharged to Outfall 051

Description	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C		
TA-50 RLWTF Treated Effluent Outfall 051	acetic acid	EDTA	potassium hydroxide
	acrolein	ferric chloride	potassium permanganate
	ammonia	ferric nitrate	sodium bisulfite
	ammonium bifluoride	ferric sulfate	sodium dodecylbenzenesulfonate
	ammonium carbonate	ferrous ammonium sulfate	sodium fluoride
	ammonium chloride	ferrous chloride	sodium hydroxide
	ammonium fluoride	ferrous sulfate	sodium hypochlorite
	ammonium hydroxide	formaldehyde	sodium nitrite
	aniline	formic acid	sodium phosphate (dibasic)
	benzene	heptachlor	sulfuric acid
	benzoic acid	hydrochloric acid	toluene
	chloroform	hydrofluoric acid	trichloroethylene
	chromic acid	lead nitrate	uranyl nitrate
	cupric chloride	naphthalene	xylene
	cupric sulfate	nitric acid	zinc chloride
	dieldrin	phenol	zinc nitrate
	endosulfan	phosphoric acid	zinc sulfate
	endrin	potassium bichromate	2-propanoic acid
	ethylbenzene		

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the sources that discharge to Outfall 051 are provided in Table 6.

Table 6
Source Flow Rates/Frequencies to Outfall 051

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
RLWTF	19,700	1G, 1O, 1S, 1Q, 1R 1U, 2J, 1F, 2K, 2C, 5Q, 5U

SAMPLING AND ANALYSIS FOR RE-APPLICATION

The RLWTF has not discharged to Outfall 051 since November 2010. LANL requests to re-permit the outfall so that the RLWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator and/or ZLD Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 051 when/if the RWLTF discharges effluent to it. See the attached Discharge Monitoring Report Outfall Summary for the analytical data collected prior to November 2010.

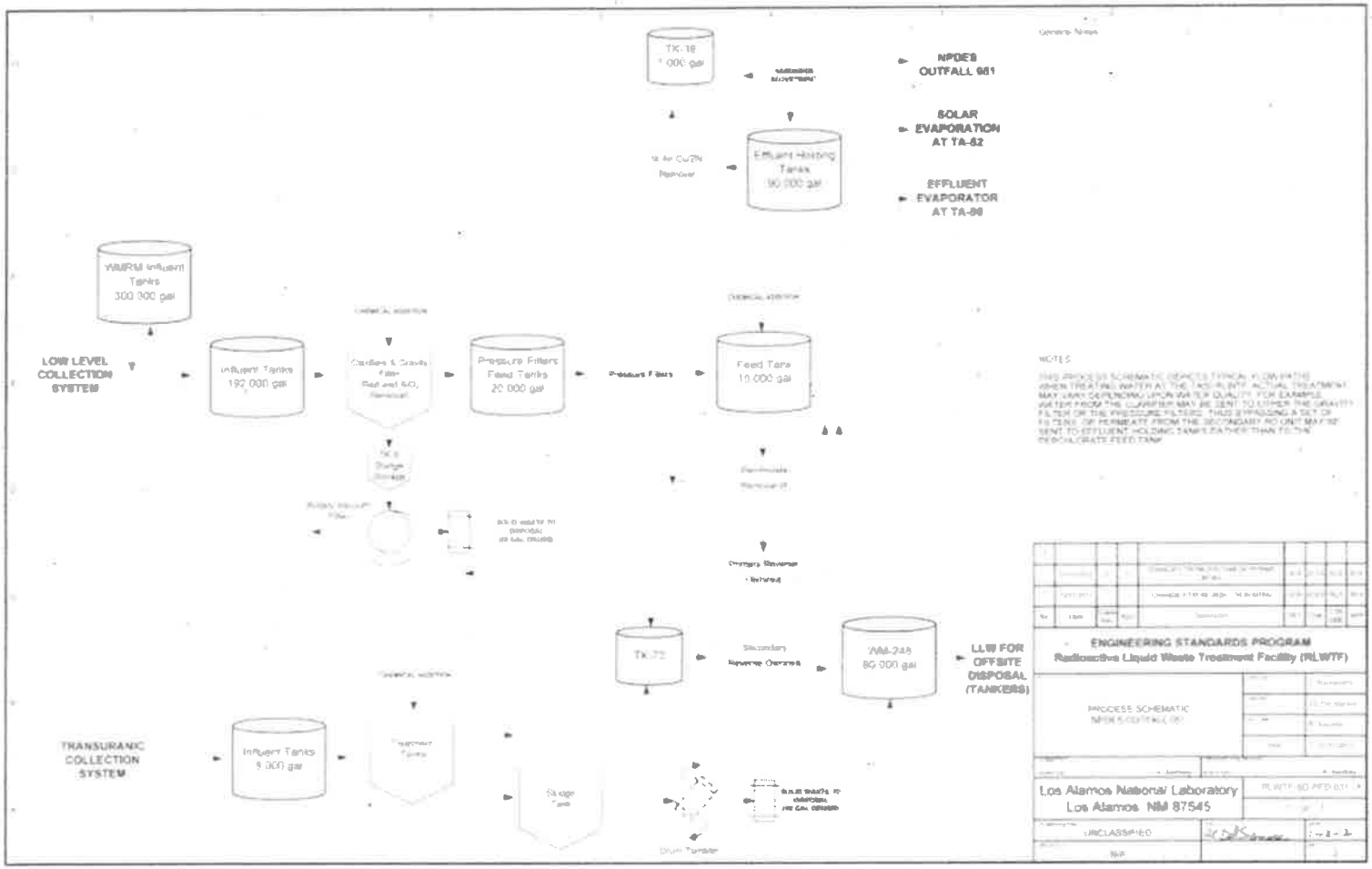
ANALYTICAL RESULTS PROVIDED

- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – July 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35°51'54"
- Longitude – 106°17'54"

Figure 1
Process Flow Diagram for the Radioactive Liquid Waste Treatment Facility



Form 2C Section IV.B - Improvements

ZERO LIQUID DISCHARGE PROJECT

The configuration of the RLWTF and Outfall 051 will be changing in the next 5 years due to the construction of two new Concrete Evaporation Tanks at Technical Area (TA) 52 under the Zero Liquid Discharge Project. These evaporation tanks will receive fully treated effluent from the RLWTF and will reduce the volume of treated effluent discharged to Outfall 051. The evaporation tanks will be connected to the RLWTF by a transfer pipe line that will be approximately 0.75 miles long. Figures 2 and 3 provide copies of the 90% review design drawings for the transfer line and evaporation tanks.

Figure 2
Transfer Line from the RLWTF to the Evaporation Tanks at TA-52 (90% Design Drawing)

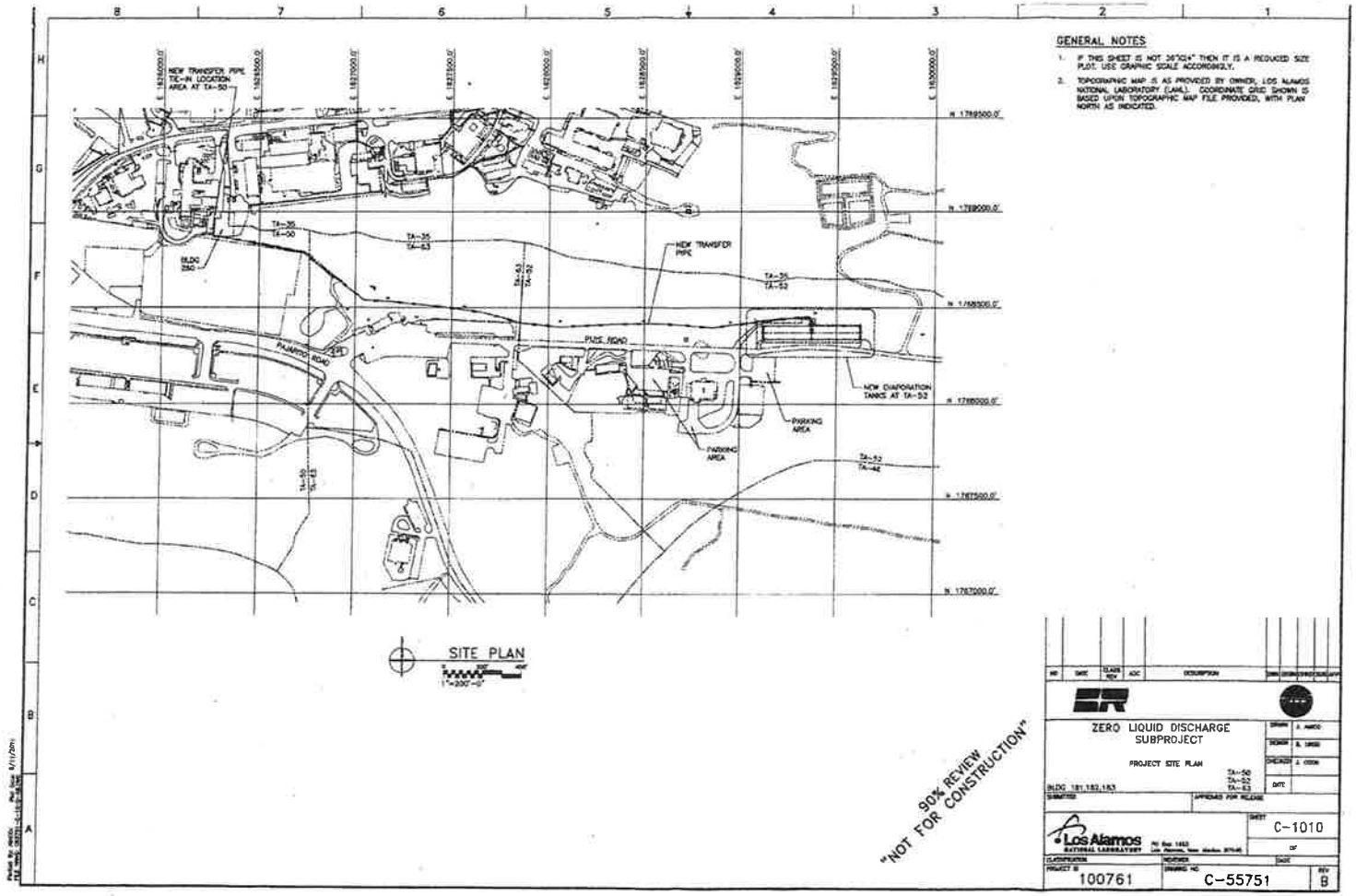


Figure 3
Evaporation Tanks at TA-52 (90% Design Drawing)