

**ACTION MEMORANDUM
WALLOPS FLIGHT FACILITY
C03VA030101**

**WASTE WATER TREATMENT PLANT (WWTP)
TRICKLING FILTER MERCURY REMOVAL
TIME CRITICAL REMOVAL ACTION (TCRA)**

1. PURPOSE

The purpose of this Action Memorandum is to describe a Time Critical Removal Action (TCRA) the U.S. Army Corps of Engineers (USACE), Norfolk District is planning to conduct at the NASA Wallops Flight Facility in Accomack County, Virginia. This TCRA is required to prevent further migration of mercury contamination.

2. CURRENT SITE CONDITIONS

On December 9, 2005, USACE representatives and their Contractor, Weston Solutions of Raleigh North Carolina, conducted a reconnaissance visit for an upcoming Site Investigation (SI) at the former WWTP for the FUDS site known as NAAS Chincoteague. The site is located and currently owned by the NASA Goddard Space Flight Center's Wallops Flight Facility. The site is heavily overgrown and has never been used by NASA. It is located northwest of the intersection of Runway 17-35 and the taxiway that parallels runway 10-28. The WWTP includes a trickling filter that operated from 1942 to 1959. During the visit, beads of elemental mercury were discovered several inches below the surface immediately adjacent to the pedestal of a rotary arm trickling filter. The trickling filter pedestal was already an area of concern to be included in the upcoming SI due to known potential of mercury in the pedestal seal.

While inspecting the trickling filter, a clogged and uncapped pipe was noted in the location where the seal drain should have been. The drain pipe appeared to be clogged with a rusty sludge material. Just below the surface of the stone filter media, beads of elemental mercury were observed several inches from the pedestal. The locked drain valve was also found lying on the ground nearby.

The upcoming SI Scope of Work will be revised following this removal to more adequately address the impact this mercury may have had to the WWTP and the surrounding area. No previous actions have taken place at the Site to mitigate this hazard.

Filter Description

The trickling filter is 24 feet in diameter. A 1 inch to 2 inch diameter stone filter media is bedded in the filter to a depth of approximately 4 feet and an underdrain system exists below the filter media. Underdrain systems in similar filters are constructed of perforated terracotta.

The trickling filter, Serial Number 7828, was manufactured by Dorr Inc., during the early 1940s. According to a Dorr-Oliver representative, the filter seal contains 11.5 pounds of mercury. Mechanical plans for an identical, but larger (48 foot diameter) filter were acquired by the USACE. These plans show the pedestal in exact detail as it appears in the field (Attachment #1). The drain from the filter appears to pass through a wet well immediately to the south of the filter wall. Construction drawings were located by Wallops personnel (Attachment #2) which shows a cross sections of the filter structure, the under drain system and the effluent wet well. The date on these construction drawings is 1942. Assuming the filter was in operation until the base closure in 1959; this gives an operational life of approximately 17 years.

Dismantling and demolishing the 24' filter would yield approximately 67 cubic yards of stone media is currently placed in the filter bed. The filter represents approximately 75 tons of concrete debris and approximately 2 tons of steel debris.

Assumption of Mercury Impact

The filter is known to contain 11.5 pounds of mercury. The seal valve and lock were found in close proximity to the seal drain (Attachment #1), It is assumed that they had corroded off and the mercury leaked out of the seal after operations of the filter had ceased around the time of the closure of the base in 1959. Once out of the seal, elemental mercury is free to flow to the bottom of the trickling filter and out the effluent wet well. Any cracks or degraded joints in the concrete filter or wet well represent a pathway for mercury impact to the soils and shallow (<10' below grade) aquifer below the site.

No records have been located regarding operation and maintenance of the filter to determine if mercury leaked during operation. Adding in the variability of mercury volatilization, it can not be determined at this time how much elemental mercury may be recovered. It is important to note that a soil sample from the sludge drying beds resulted in a mercury level of 32.2 mg/kg. This mercury sample was part of the decision making process to conduct the original SI.

Assuming that the mercury impact is confined to the immediate area along the pedestal and the bottom of the filter, as shown in Attachment #2, approximately 20% of the stone media may be directly impacted.

To further assess the impact of a mercury release to the environment, the Site Investigation originally planned for WWTP will be performed as soon as possible after this removal action and will be redirected toward mercury delineation.

Site Access

The site is in a heavily wooded area immediately adjacent to an active runway at the Wallops Flight Facility. Access to the site is restricted to authorized personnel. Additionally, the site is in direct observation by the runway control tower. The area above and under the seal drain pipe has been isolated with plastic to prevent further spillage of mercury and to prevent migration of released mercury further down into the filter.

3. THREAT TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT & STATUTORY/REGULATORY AUTHORITIES

Local Environment

The town of Chincoteague, VA, which is less than 3 miles from the Site, has a population of approximately 4,500. The harvesting of shellfish and crabs is common in the area of Chincoteague and Wallops Island, as well as commercial and recreational fishing.

The closest surface water body is Mosquito Creek, and is approximately 1,000 feet to the north of the site.

Regulatory Guidance

The Site is under the jurisdiction of the EPA Region III. There is no Region III Risk Based Concentration for Mercury. The EPA Region IX specifies a residential level of 23 mg/kg and an industrial level of 62 mg/kg. Currently, the highest mercury level measured onsite is in the sludge drying beds at 32.2 mg/kg. This level was measured in 2004 prior to the discovery of elemental mercury in the trickling filter.

Health effects of mercury

Mercury exposure at high levels can harm the brain, heart, kidneys, lungs, and immune system of people of all ages. Research shows that most people's fish consumption does not cause a health concern. However, it has been demonstrated that high levels of methylmercury in the bloodstream of unborn babies and young children may harm the developing nervous system, making the child less able to think and learn.

Ecological effects of mercury.

Birds and mammals that eat fish are more exposed to mercury than other animals in water ecosystems. Similarly, predators that eat fish-eating animals may be highly exposed. At high levels of exposure, methylmercury's harmful effects on these animals include death, reduced reproduction, slower growth and development, and abnormal behavior.

4. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances, pollutants, and/or contaminants from this site may present an endangerment to public health and welfare or to the environment if not addressed by implementing the Response Action selected in this Action Memorandum. Elemental mercury contamination will continue to work its way to the bottom of the filter and find a pathway to the soils and groundwater below. Humans and wildlife may be exposed to the contaminated soils, sediments and surface waters through dermal, or inhalation pathways, particularly during any further CERCLA site delineation or cleanup work.

5. PROPOSED ACTION AND ESTIMATED COSTS

The USACE is planning for the screening and complete removal of the trickling filter.

The sampling of sediments in the trickling filter wet well and in the outfall of the treatment plant outfall is also planned. More specific details on this removal action are included below.

Staging

A hot zone will be established in the area of the filter and Level C Personal Protective Equipment (PPE) will be required at all times while mercury removal operations are being conducted. Air monitoring will be employed to monitoring of down gradient air quality and to ensure appropriate use of PPE. A staging area for decontamination and rolloffs will be established to avoid cross contamination out of the hot zone.

Pedestal Removal

The upper steel pedestal and distribution arms will be removed and inspected to determine if any mercury remains in the seal. Sediment in the distribution arms and pedestal equipment will be scanned for the presence of mercury,

Stone Removal

The USACE will acquire the services of a remedial contractor experienced with the cleanup and handling of mercury contaminated waste.

Due to the molecular weight and insolubility of mercury, it is anticipated that only the stone in close proximity to the pedestal is impacted with mercury. In order to avoid unnecessary hazardous waste disposal charges, the stone on the outer edges of the filter will be excavated and screened with a Lumex RA-915 Mercury Vapor analyzer. This meter offers an almost instantaneous, real time detection period through the use of atomic absorption down to the nanograms/m³. Stone that has no apparent mercury impact shall be loaded into rolloffs for characterization and disposal as non-hazardous waste. Removal of this un-impacted stone from the site is at the request of the landowner and other stakeholders.

During stone removal, visible mercury will be removed with a mercury vacuum. A mercury amalgamation powder such as MercSorb[®] will be applied to the impacted area or stones and also vacuumed clean. Confirmation of effective removal will be accomplished by screening with the Lumex meter. Mercury and sludge / sediments impacted with mercury that cannot be effectively decontaminated will be drummed for disposal as a hazardous waste by microencapsulating.

Underdrain System

Following removal of the stone, the underdrain system will be removed and all mercury will be vacuumed and removed. The underdrain system will be totally removed to expose the concrete bottom of the filter. Sludge and sediment removed from the underdrain system will be screened for mercury and containerized for disposal.

Filter Demolition

Concrete samples shall be chipped away from select areas (to be determined by the project team) of the bottom and sides of the filter and sampled for TCLP mercury. The filter shall then be demolished and disposed of appropriately.

Screening Criteria

No EPA Region III RBCs exist for Mercury to establish an action level for soil impact. At the Request of the VDEQ, the USACE will defer to guidance from an identical project performed at Armed Forces Experimental Training Activity – Camp Peary in late 2003. During that removal, 20 mg/kg was used as an action level for mercury in soil below the filter. This action level is based on the Kansas Department of Health and Environment document entitled “Mercury Contamination Remediation at Gas Pipeline Sites – SOW October 1994” that recommended this action level for residential soil greater than 12 inches below grade. This action level was recognized and accepted by the VDEQ for the Camp Peary project. This action level is also consistent with the EPA Region IX residential level of 23 mg/kg and other environmental industry cleanup practices.

For the purposes of waste disposal, mercury waste carries a D009 waste code and a regulatory TCLP Level of 0.2 mg/L. TCLP Samples over this level will be considered a hazardous waste to be disposed of by microencapsulating or retorting. Material under this level will be disposed of at a subtitle D landfill.

Air monitoring during site operations will utilize an action level of 0.05mg/m³ as per National Institute for Occupational Safety and Health (NIOSH) regulations. This action level will also be used to establish any downgrades in PPE that may be appropriate at different stages of work.

The measure of mercury removal effectiveness will be by use of a Lumex Meter screening over cleaned areas. Levels above ambient background will be considered to still be impacted by mercury.

At this time, further remediation goals are not being prepared as the site is still

undergoing cleanup through the FUDS CERCLA process.

Confirmation Sampling

Discreet samples from sediment in the trickling filter wet well and the main plant outfall will be collected and sampled for Total Mercury. Soils beneath the filter and the wet well at the location of cracks and joints will also be sampled for Total Mercury. All wastes generated will be sampled for TCLP mercury and any additional parameters that may be required for the disposal facility.

Areas in and around the Pump House will also be screened with the Lumex meter for the presence of mercury. Impacted material will be removed and containerized for disposal.

Restoration

The entire structure will be demolished and removed from the site. The site will be backfilled and brought to grad with certified and sampled clean fill. The site will be planted and straw mulched with native species. The stone construction entrance and cleared area will remain to facilitate additional investigations at the site.

Costs

Estimated costs for this TCRA that included all elements stated above is approximately \$200,000. This is based on an Independent Government Estimate and confirmed with the scaled costs for the Camp Peary filter demolition.

State and Local Authorities' Roles

Wallops Flight Facility, the Virginia DEQ and the U.S. Environmental Protection Agency (USEPA), Region III will work with the USACE on the final workplan and review the After Action Report to ensure that immediate site hazards are mitigated and the follow-up SI is completed with appropriate emphasis on the mercury release.

Applicable or Relevant and Appropriate Requirements (ARARs) will not be considered before activities undertaken during the emergency removal.

Anticipated Project Schedule

Contracting is anticipated to be complete in February 2006. A workplan will be requested from the contractor with 21 days of the notice to proceed. Mobilization to the filed is expected in April of 2006 with demobilization to occur by May 2006.

6. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

This area is located in a diverse salt water tidal habitat. Leaving elemental mercury in that environment will not only threaten that habitat, but also skew results for future investigative work at the site. Not taking action will also require a higher level of personnel protective equipment for all future delineation or cleanup at the site.

7. OUTSTANDING POLICY ISSUES

The site is FUDS eligible because it was found to be under the jurisdiction of the Secretary of Defense from 1943 to 1959. The WWTP was not beneficially used by the current property owner, NASA. There is no future use of the site identified by NASA at this time.

This TCRA will be done in accordance with the FUDS ER 200-3-1 as well as all State and Federal regulations.

8. ENFORCEMENT

The EPA, Region III and the VDEQ have enforcement authority over actions at the site.

9. RECOMMENDATION

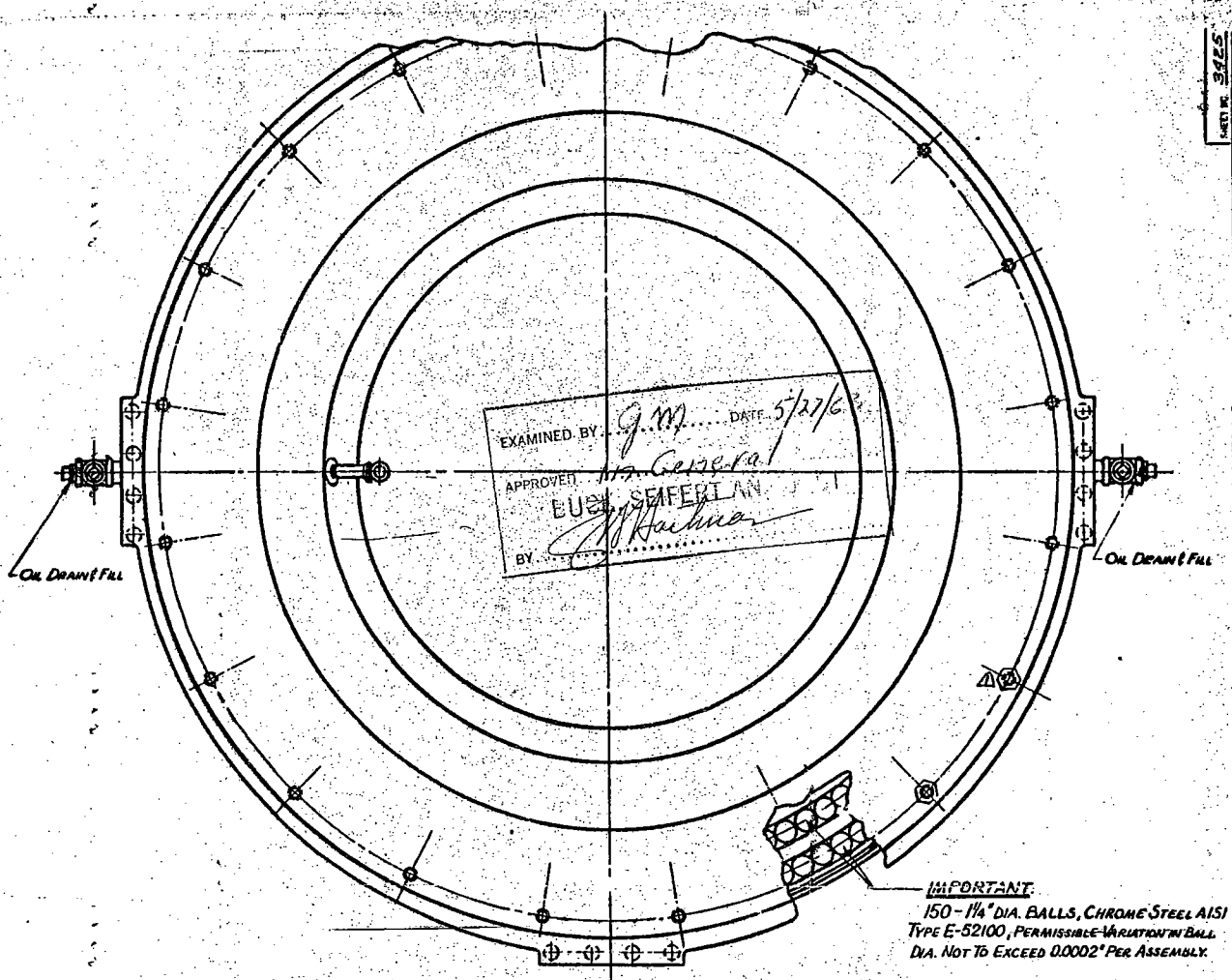
USACE recommends implementation of the proposed TCRA.

10. REFERENCES

- October 2005, U.S. EPA Region III, Risk-Based Concentrations.
- US EPA Region 9, Mercury Cleanup Levels
- Kansas Department of Health and Environment document entitled “Mercury Contamination Remediation at Gas Pipeline Sites – SOW October 1994”
- Project Plan – TCRA Site 41B Camp Peary November 2003

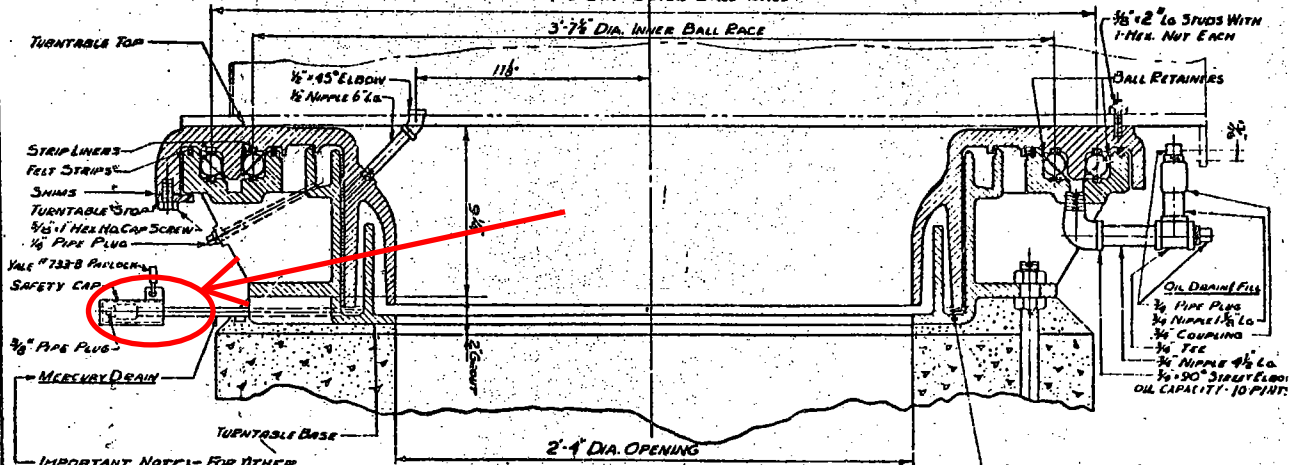
ATTACHMENT #1
Pedestal Mechanical Drawings for a 48 foot Diameter
Trickling Filter of the Same Design

SHEET NO. 34257



IMPORTANT:
 150 - 1/4" DIA. BALLS, CHROME STEEL AISI
 TYPE E-52100, PERMISSIBLE VARIATION IN BALL
 DIA. NOT TO EXCEED 0.0002" PER ASSEMBLY.

4'-0" DIA. OUTER BALL RACE
 3'-7 1/2" DIA. INNER BALL RACE



SECTIONAL ELEVATION

IMPORTANT NOTE - FOR OTHER THAN ROUND CENTER PIERS.
 INSTALL TURNABLE, SO THAT MERCURY DRAIN PIPE EXTENDS BEYOND OUTSIDE OF PIER.

MADE FROM 32171/2

REVISIONS				DATE	BY	TITLE	DORR-OLIVER
1	SPACING OF 1/4" 2" L.O. STUDS ALIGNED, 20 STUDS WERE 24			1-1-60	J.V.K.	THE DORPCO DISTRIBUTOR 48" DIA. T.T.	INCORPORATED STAMFORD, CONNECTICUT U.S.A.
2	ADDED SPEC'S FOR BALLS	0-3	W.A.C.C.G.	7-17-60	E.Z.	TURNABLE ASSEMBLY	
MATERIAL LIST				DATE	BY	SCALE	SHEET NO. 34257
MERCURY 44 LBS.				1-1-60	J.V.K.	3"	

ARACO COMPANY FOR APPROVAL
 MAY 14 1963

THIS DRAWING REPRESENTS THE UNIT WE OFFERED IN OUR PROPOSAL. ALTERATIONS OR DELAY OF RETURN OF DRAWINGS MAY AFFECT THE PRICE AND DELAY SHIPMENT.

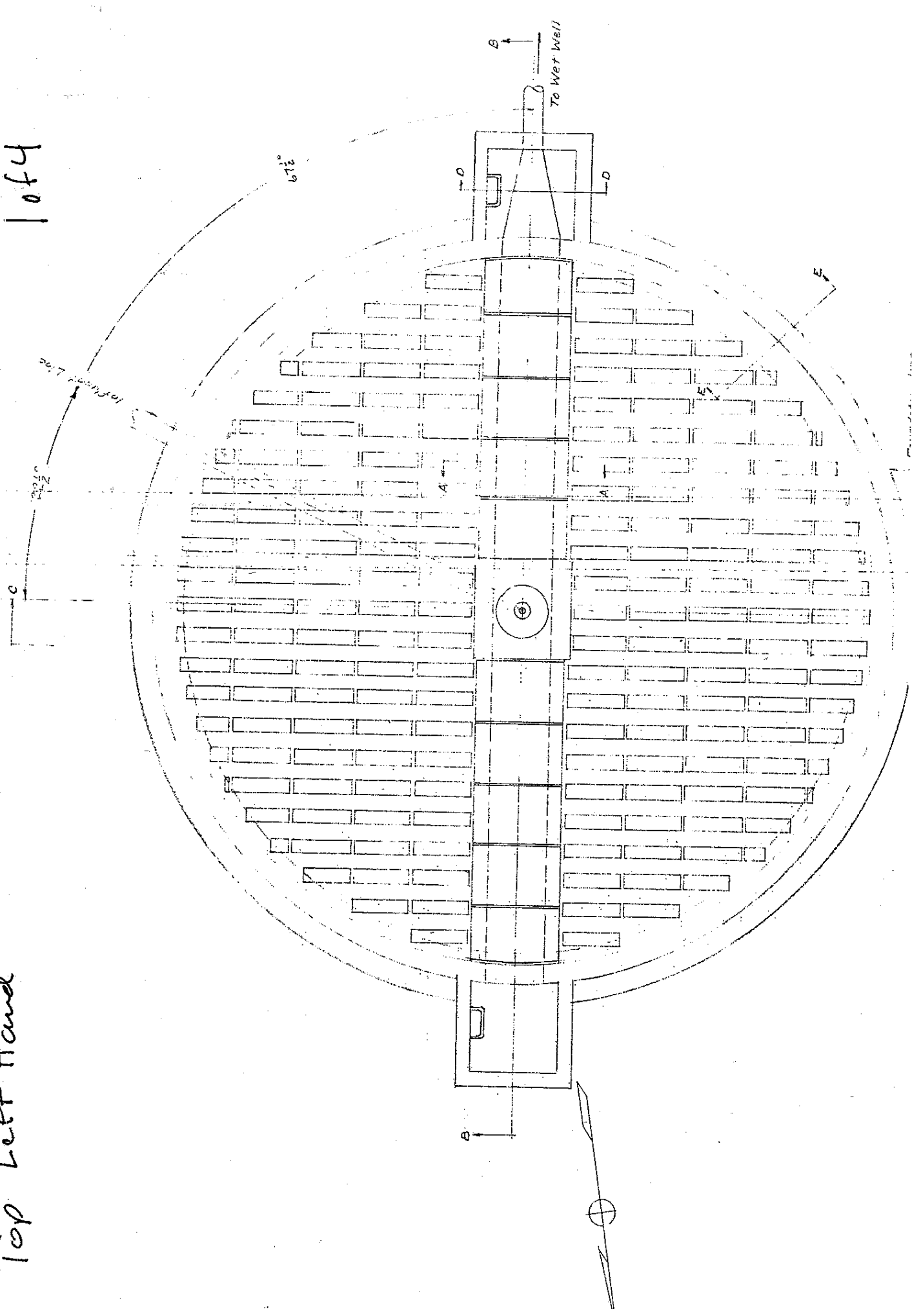
MAY -9 1963 49530

CONSTRUCTION OF SEWAGE TREATMENT PLANT ADDITIONS SECTION K-K BUILDINGS & STRUCTURES BRING-LAWRENCE SEWAGE AUTHORITY MERCER COUNTY, NEW JERSEY 32-7-63

ATTACHMENT #2
Construction Drawings for Wallops Trickling Filter

1 of 4

Top Left Hand



319

Insulation Line

To Wet Well

A

D

D

A

A

G

E

E

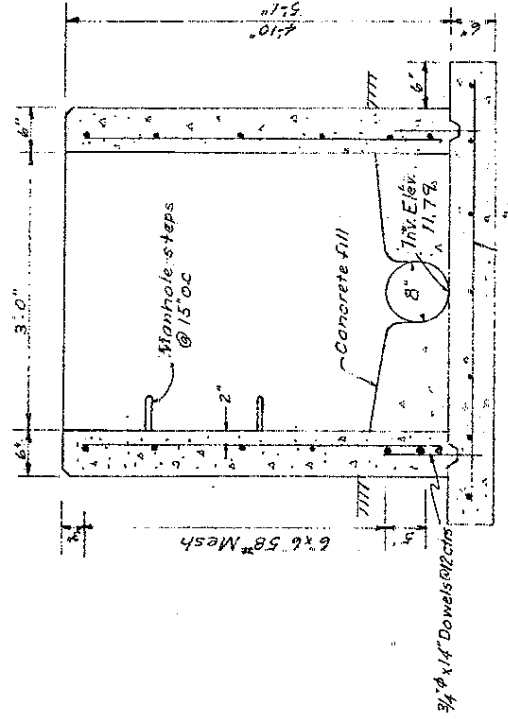
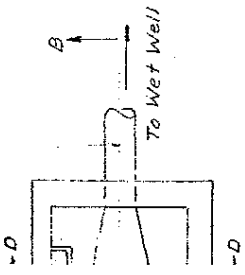
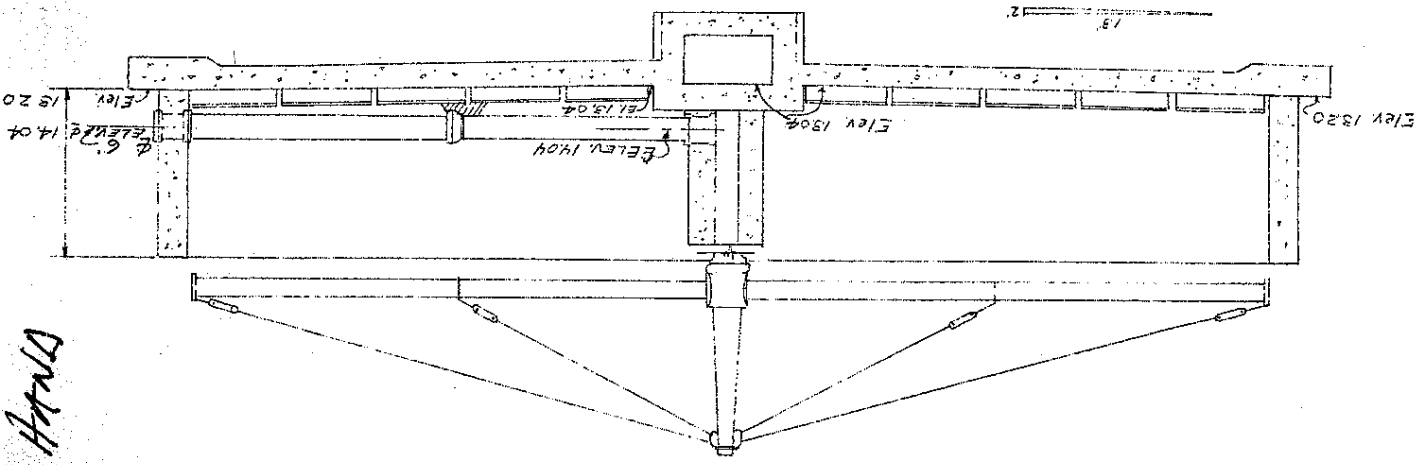
A

North Arrow

2 of 4

Top Right Hand

SECTION C-C
Scale 3/8"=1'-0"



SECTION D-D
Scale 3/4"=1'-0"

1/2" dia. ctrs. Both ways

6 x 6 5/8" Mesh
1/2" dia. Dowels @ 12" cts.

Manhole steps @ 15" OC

Concrete fill

5.7"

3.10"

6.6"

6.6"

6.6"

6.6"

6.6"

6.6"

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6.6"

67E

Bottom Left Hand

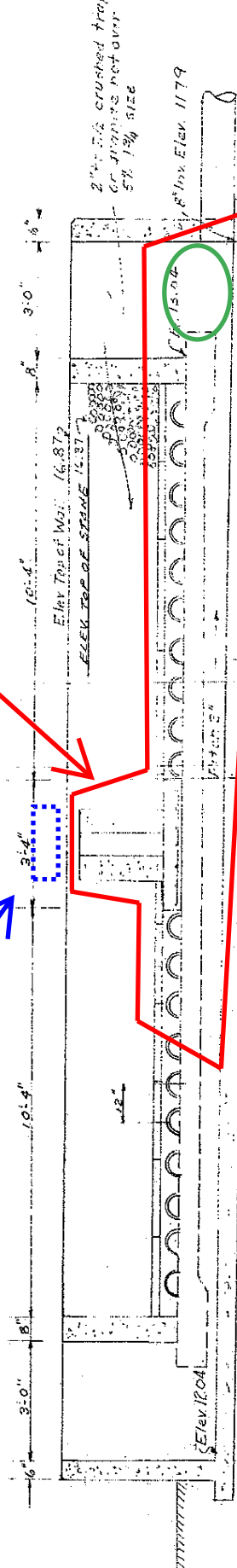
3 of 4

PLAN
Scale 3/8" = 1'-0"



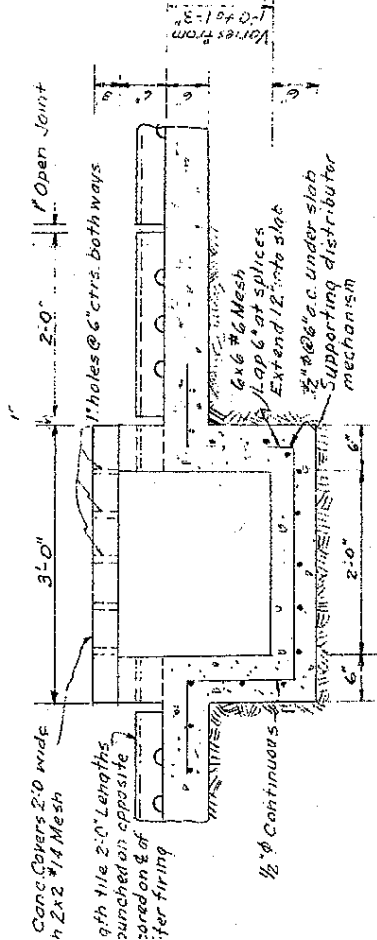
Location of Mercury Seal

Assumed Area of Mercury Impact



SECTION B-B
Scale 3/8" = 1'-0"

Wet Well Sediment Sampling Location

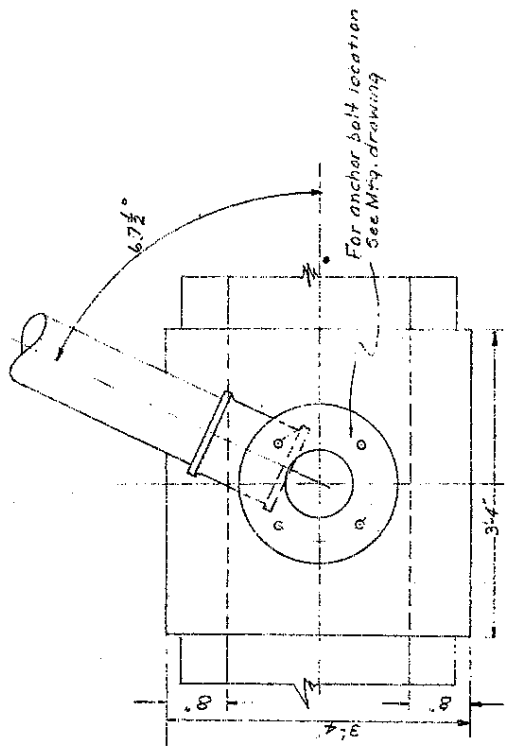


SECTION A-A
Scale 3/4" = 1'-0"

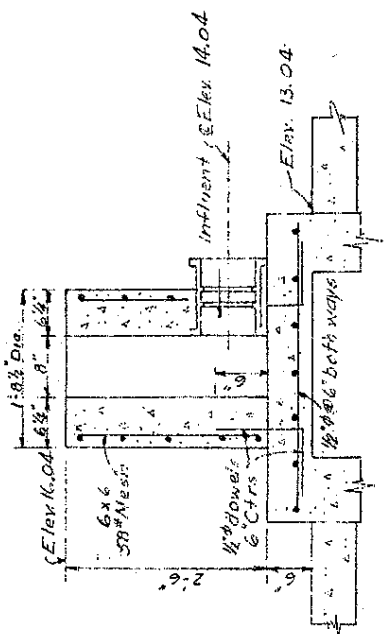
Bottom Right Hand

crushed trap
size ref over
SIZE

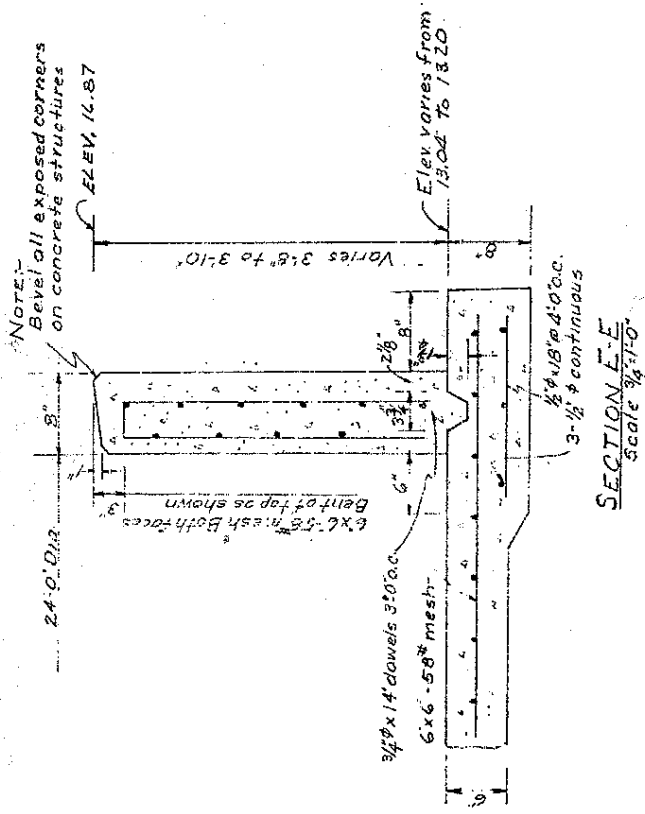
1179



DETAIL G
DISTRIBUTOR DETAIL
Scale 3/4"=1'-0"



4 of 4



SECTION F-F
Scale 3/8"=1'-0"

Revision	By	Date	Brief
	H. J. B.		NAVAL OPERATING BASE NORFOLK, VA
			SHOECRAFT, DRURY AND McNAMEE CONSULTING CIVIL ENGINEERS ANN ARBOR MICHIGAN
			BIOFILTER FOR CHINCOTEAGUE AIR FIELD
			Approved: <i>[Signature]</i> 19 44 S. D. M. No. 12-15 Y. & D. Drawing No. 223052
			Officer in Charge NO. 2158
			P. W. Drawing No.
			Scale: As Noted