Tennessee Valley Authority, 1101 Market Street, LP 5A, Chattanooga, Tennessee 37402-2801

August 4, 2008

10 CFR 52.80

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of	)	Docket Numbers	52-014 and 52-015
Tennessee Valley Authority	)		

BELLEFONTE COMBINED LICENSE APPLICATION – RESPONSE TO ENVIRONMENTAL REPORT REQUEST FOR ADDITIONAL INFORMATION - HYDROLOGY

Reference: Letter from Mallecia Hood (NRC) to Ashok S. Bhatnaker (TVA), Request for Additional Information Regarding the Environmental Review of the Combined License Application for Bellefonte Nuclear Plant, Units 3 and 4, dated July 11, 2008 [ML081840493].

This letter provides the Tennessee Valley Authority's (TVA) response to 11 of the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) items included in the reference letter.

Enclosure 1 to this letter provides a response to ten requests related to Hydrology and one request related to Aquatic Ecology, as well as identifying any associated changes that will be made in a future revision of the BLN application. The status of the NRC requests related to Hydrology is also provided in Enclosure 1.

Enclosure 2 contains pages with sensitive information related to the response to RAI 2.3-5. Because the location of water withdrawal sites in ER Table 2.3-31 is related to critical **infrastructure that must be protected from attack under Homeland Security Presidential Directive (HSPD-7) dated December 17, 2003, TVA requests this information to be withheld from disclosure in accordance with 10 CFR 2.390(a)(3).** Consequently, Attachment 2.3-5W to Enclosure 2 is provided to include the non-public version of ER Table 2.3-31, which is changed by the BLN response to RAI 2.3-5.

D085
NRO

If you should have any questions, please contact Thomas Spink at 1101 Market Street, LP5A, Chattanooga, Tennessee 37402-2801, by telephone at (423) 751-7062, or via email at tespink@tva.gov.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 4th day of Aug, 2008.

Jack A. Bailey
Vice President, Nuclear Generation Development
Nuclear Generation Development & Construction

Enclosures and Attachments:
See Page 3

Enclosures and Attachments:

Enclosure 1: Response to Environmental Report Requests for Additional Information – Hydrology

Attachments:

2.3-1 Tennessee Valley Authority, ER Figure 2.3-23, Sheet 1 of 4, March 2005 Potentiometric Surface Map, Sheet 2 of 4, May 2005 Potentiometric Surface Map, Rev. 1. (Excerpts)

2.3-2 U.S. Environmental Protection Agency, *Ground-Water Monitoring in Karst Terranes,* March 1989. (Excerpts)

2.3-5 Tennessee Valley Authority, *Tennessee Valley Water Supply Inventory and Needs Analysis*, November 2004. (Excerpts)

3.6-1A Alabama Onsite Wastewater Board, Code of Alabama Law 1975, §34-21A. (Excerpts)

3.6-1B Portable Sanitation Association International, Benefits of Portable Sanitation, Standards, Website http://www.psai.org/about.html (Entire document)

3.6-1C Alabama State Board of Health, Alabama Department of Public Health, Bureau of Environmental Services, Division of Community Environmental Protection, Administrative Code Chapter 420-3-1, Onsite Sewage Treatment and Disposal, Amended effective November 23, 2006. (Excerpts)

3.6-1D U.S. Environmental Protection Agency, Onsite Wastewater Treatment Systems Manual, EPA/625/R-00/008, February 2002. (Excerpts)

5.2-1 Tennessee Valley Authority, Dredged Material Area, July 2008. (Entire Document)

5.3-1 Envirex Service Manual, Envirex Traveling Water Screen – Four Post – Data Sheet No. 330.3.022.02.01, Page 4 of 5 and Close-up Installation Drawing Illustrating Base Elevation of the Screen, June 1977. (Excerpts)

Enclosure 2: WITHHELD INFORMATION: Response to Environmental Report Requests for Additional Information - Hydrology

Attachment:

2.3-5W WITHHELD INFORMATION: ER Table 2.3-31, Local Surface Water Users – Guntersville Watershed Area (Entire document)

cc (Enclosures and Attachments):
M. A. Hood, NRC/HQ

cc (w/o Enclosures and Attachments):
S.P. Frantz, Morgan Lewis
M.W. Gettler, FP&L
R.C. Grumbir, NuStart
P.S. Hastings, NuStart
P. Hinnenkamp, Entergy
R.H. Kitchen, PGN
M.C. Kray, NuStart
A.M. Monroe, SCE&G
C.R. Pierce, SNC
L. Reyes, NRC/RII
R.F. Smith-Kevern, DOE/HQ
G.A. Zinke, NuStart

cc (w/o Enclosures and Attachments):
G.P. Arent, EQB 1A-WBN
A.S. Bhatnagar, LP 6A-C
C.L. Hamill
A. L. Sterdis, LP 5A-C
S. A. Vance, WT 6A-K
E. J. Vigluicci, WT 6A-K
EDMS, WT CA-K

RESPONSE TO ENVIRONMENTAL REPORT REQUESTS FOR ADDITIONAL INFORMATION

HYDROLOGY

This enclosure provides the status of the 22 requests for additional information (RAI) related to Hydrology and provides the BLN responses to ten of these requests. This enclosure also provides the BLN response to one request related to Aquatic Ecology, RAI 2.3.1-1.

Status of Requests for Additional Information Related to Hydrology

RAI Number	Date of TVA Response
• 2.3-1	This letter – see following pages.
• 2.3-2	This letter – see following pages.
• 2.3-3	Future – expected submittal by August 6, 2008.
• 2.3-4	Future – expected submittal by August 6, 2008.
• 2.3-5	This letter – see following pages.
• 3.3-1	This letter – see following pages.
• 3.6-1	This letter – see following pages.
• 3.6-2	This letter – see following pages.
• 5.2-1	This letter – see following pages.
• 5.2-2	Future – expected submittal by August 6, 2008.
• 5.2-3	This letter – see following pages.
• 5.2-4	Future – expected submittal by August 6, 2008.
• 5.2-5	Future – expected submittal by August 11, 2008.
• 5.3-1	This letter – see following pages.
• 5.3-2	Future – expected submittal by August 6, 2008.
• 5.3-3 (1)(4)	Future – expected submittal by August 6, 2008.
• 5.3.3 (2)(3)	Future – expected submittal by August 11, 2008.
• 5.3-4	Future – expected submittal by August 6, 2008.
• 5.3-5	Future – expected submittal by August 11, 2008.
• 5.3-6	Future – expected submittal by August 6, 2008.
• 5.3-7	Future – expected submittal by August 6, 2008.
• 5.3-8	Future – expected submittal by August 11, 2008.
• 6.6-1	This letter – see following pages.

NRC Review of the BLN Environmental Report

NRC Environmental Category: AQUATIC ECOLOGY

NRC RAI NUMBER: 2.3.1-1

Describe the "significant" impact the Nickajack, Guntersville and Wheeler reservoirs can have on the BLN plant operations and the impact BLN plant operations can have on the reservoirs.

BLN RESPONSE:

The word "significantly" was used erroneously in Subsection 2.3.1.3. Chapter 2 does not address impacts and should not have included statements regarding impact significance. Furthermore, no large or moderate water-related impacts are expected as a result of BLN plant operation. Water-related impacts of BLN plant operations are addressed in Section 5.2. Impacts on aquatic ecosystems are addressed in Section 5.3. A review of these sections reveals that only small impacts are expected. Hence, the text in Subsection 2.3.1.3 is changed to read "potentially" instead of "significantly."

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

Change COLA Part 3, ER Chapter 2, Subsection 2.3.1.3, first sentence of the first paragraph, to update ER text changes provided in response to NRC Information Need H-16F in TVA's June 12, 2008 letter, as follows:

Three, large manmade impoundments are located within ~~100~~ 50 river mi. of the BLN site. These impoundments can ~~significantly~~ potentially affect or be affected by BLN plant operations.

ATTACHMENTS:

None.

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 2.3-1

Edit the caption for ER Figure 2.3-23 to address concerns over W29 data.

BLN RESPONSE:

In response to NRC Information Need H-05, TVA updated Environmental Report (ER) Subsection 2.3.1.5.5 to account for the apparent anomalous water level reading in Monitoring Well W29. TVA refers the reviewers to the referenced TVA letter, dated June 12, 2008.

In response to this RAI 2.3-1, annotation is added to Figure 2.3-22 (Sheet 1 of 4) to provide clarity regarding the anomalous reading for W29 in March 2005. It is also apparent that the interpretation of the groundwater equipotential lines around W29 in ER Figure 2.3-23 (Sheet 2 of 4) was influenced by the March 2005 reading; therefore, similar annotation is added to ER Figure 2.3-23 (Sheet 2 of 4).

This response is PLANT-SPECIFIC.

Reference:

Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Hydrology," dated June 12, 2008 [ML081280468].

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 2, Figure 2.3-23 (Sheet 1 of 4) by adding the following note to the legend/caption area:

   Note: The March 2005 reading from Well W29 is considered an anomalous reading, and the water level and interpretation of the groundwater elevations in the vicinity of Well W29 depicted in this figure are not considered in current groundwater evaluations.

2. Change COLA Part 3, ER Chapter 2, Figure 2.3-23 (Sheet 2 of 4) by adding the following note to the legend/caption area:

   Note: The March 2005 reading from Well W29 is considered an anomalous reading, and the water level and interpretation of the groundwater elevations in the vicinity of Well W29 depicted in this figure are not considered in current groundwater evaluations.

ATTACHMENTS:

The following figure is provided as Attachment 2.3-1 to this enclosure:

2.3-1 Tennessee Valley Authority, ER Figure 2.3-23, Sheet 1 of 4, March 2005 Potentiometric Surface Map, Sheet 2 of 4, May 2005 Potentiometric Surface Map, Rev. 1. (Excerpts)

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 2.3-2

Reconcile the statements describing the pores, joints, bedding planes, and the description of the model (i.e., "equivalent porous media" versus "karst") in the ER and those in FSAR Section 2.5.

BLN RESPONSE:

In response to NRC Information Need H-06, TVA provided an update to ER Subsection 2.1.3.5.4 to render the description more consistent with description of subsurface geologic conditions provided in ER Subsection 2.1.3.5.6. Because NRC 2.3-2 requests much of the same information as that provided in response to H-06, TVA refers the reviewers to the response provided in the referenced TVA letter, dated June 12, 2008.

The descriptions of the subsurface geologic and hydrologic conditions presented in FSAR Subsection 2.5.4 are intended to characterize the actual conditions of the subsurface geology and groundwater at the BLN. ER Subsection 2.3.1 used the analysis in FSAR Subsection 2.5.4 as a basis for the physical descriptions of the subsurface conditions. The representation of the subsurface aquifer as an equivalent "porous media" is based on the concept that a poorly defined karst system, as found at the BLN site, shows similar properties to, and can be simulated as, movement in a granular media, as described in Attachment 2.3-2 (ER 2.3 Reference 39). To account for the inherent unknown conditions beneath the surface, the conservative approach involving a worst-case scenario (groundwater flow through a postulated single fracture) was employed to "simplify" the complex groundwater pathways in a conservative manner. The description was not intended to infer the subsurface is granular in nature, but used the similarity in properties between the two systems to allow for determination of subsurface flow properties, including a conservative groundwater velocity and flow travel times.

This response is PLANT-SPECIFIC.

Reference:

Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Hydrology," dated June 12, 2008 [ML081280468].

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

Change COLA Part 3, ER Chapter 2, Subsection 2.1.3.5.6, second paragraph, as follows:

Based on information from present and previous field investigations, the karst system in the area of the BLN facility is poorly developed in that groundwater flow within the aquifer is dominated by poorly integrated pores, joints, and tubes, most with soil or clay fill. A complete description of the subsurface karst system is found in FSAR Subsection 2.5.4. Karst aquifers exhibiting these types of groundwater conditions are termed "diffuse-type" karst aquifer systems. Due to the similarities of flow and response to aquifer input and drainage, movement of water through a diffuse karst aquifer is similar to conditions found within a granular (sand, silt, gravel) aquifer system. Movement of water in a granular aquifer can be characterized by use of Darcy's Law; therefore, application of Darcy's Law calculations is appropriate for a diffuse karst aquifer system as found at the BLN

(Reference 39). Average interstitial groundwater flow velocity for the epikarst hydrogeologic unit was determined using a form of the Darcy equation as follows:

ATTACHMENTS:

The following document is provided as Attachment 2.3-2 to this enclosure:

2.3-2 U.S. Environmental Protection Agency, *Ground-Water Monitoring in Karst Terranes,* March 1989. (Excerpts)

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 2.3-5

Provide consistent and complete data on water use (diversion) and water return.

Provide a justification for using a cumulative demand of 16 MGD while acknowledging 1600 MGD withdrawn from Guntersville Reservoir, or present and defend a revised cumulative demand value.

BLN RESPONSE:

Table 2.3-31 provides a listing of actual water users for Guntersville Reservoir and their use category. Table 2.3-31 (previously based on 2000 data) has been updated with TVA's 2005 average monthly withdrawal and return rates (including Widow's Creek Fossil Plant). The replacement Table 2.3-31, which lists water users for Guntersville Reservoir (including tributaries) from the Nickajack Dam (approximately 30 miles upstream) to the downstream edge of the region (approximately 50 miles) from BLN, is provided below.

Attachment 2.3-5 to this enclosure, "Tennessee Valley Water Supply Inventory & Needs Analysis," (page 2-4) provides the supporting data for the TVA record of water use on Guntersville Reservoir of 1600 Mgd withdrawn and the U.S. Geological Survey (USGS) net water demand value of 16 Mgd for Guntersville. (The amount of 16 Mgd was incorrectly referred to as "cumulative net demand" in Subsection 2.3.2.2.3.) The 2000 USGS data were referenced with regard to net demand, because TVA's available water use data at the time did not provide water return amounts. However, Subsection 2.3.2.2.3 is updated below based on TVA's 2005 water use data, and water return amounts are provided in replacement Table 2.3-31. Updated average monthly consumption rates are also provided in replacement Table 2.3-31. Table 2.3-29 is corrected to show only net water demand. As stated in the response to NRC information need H-12 in the referenced June 12, 2008 letter, TVA is in the process of preparing an updated estimate of future water use in the Tennessee River watershed that is expected to be available in fall 2008.

This response is PLANT-SPECIFIC.

Reference:

Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Hydrology," dated June 12, 2008 [ML081280468].

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 2, Subsection 2.3.2.2.3, as follows:

   According to ~~TVA~~ TVA's records, there are approximately ~~18~~ 19 significant water users in the Guntersville Reservoir watershed area that withdraw approximately ~~1600~~ 1510 Mgd. ~~Fourteen~~Twelve of these water users are providers of public water to local communities that withdraw approximately 0.5 – 5.0 ~~0.8 – 10.0~~ Mgd. The largest water user is TVA's Widows Creek Fossil Plant, which withdraws and discharges approximately 1500 Mgd ~~uses up to 1546 Mgd~~ for thermoelectric power generation ~~(Reference 9)~~. ~~TVA records did not provide water return volumes; therefore, USGS cumulative net demand of 16 Mgd is used as the local net water volume.~~ Table 2.3-31 lists local surface water users and use category, as well as detailed information such as facility name, county, intake location (if known), ~~maximum~~ average monthly withdrawal ~~rate~~ and discharge rates (if known), average monthly

consumption rates, and water source. Due to U.S. Department of Homeland Security requirements, distance from the BLN site and water withdrawal locations have been omitted from Table 2.3-31 and are provided, as required, to the appropriate personnel on an as-needed basis. There are several private small quantity water users (irrigation) in this area, including two golf courses and two farms that are not listed in Table 2.3-31, because ~~withdrawal volume or~~ the water source for ~~them~~ these small users cannot be determined. A description of other station water uses is contained in Section 3.4.

2. Change COLA Part 3, ER Chapter 2, Table 2.3-29, by deleting the line items for Cumulative Net Demand, including the corresponding values for Net Water Demand, as follows:

Water-Use Tabulation Area and Reservoir Catchment Area	Net Water Demand
Nickajack Area	
Nickajack	12
~~Cumulative Net Demand~~	~~12~~
Guntersville Area	
Guntersville	16
~~Cumulative Net Demand~~	~~16~~
Wheeler-Wilson Area	
Wheeler	167
Wilson	29
~~Cumulative Net Demand~~	~~196~~
Local Watershed Total	224

3. Change COLA Part 3, ER Chapter 2, by replacing Table 2.3-31 with a substantially revised version of the table that provides water return rates and source and receiving water body, as depicted on the pages following this response.

ATTACHMENTS/ENCLOSURES:

The following document is provided as Attachment 2.3-5 to this enclosure:

2.3-5 Tennessee Valley Authority, *Tennessee Valley Water Supply Inventory and Needs Analysis*, November 2004. (Excerpts)

Enclosure 2 to this letter provides Attachment 2.3-5W, which contains sensitive information that TVA requests be withheld from disclosure in accordance with 10 CFR 2.390(a)(3). The following document is provided as Attachment 2.3-5(W) to Enclosure 2:

2.3-5W WITHHELD INFORMATION: ER Table 2.3-31, Local Surface Water Users – Guntersville Watershed Area, July 2008 (Complete document)

TABLE 2.3-31
LOCAL SURFACE WATER USERS - GUNTERSVILLE WATERSHED AREA

Facility Name	Use Type	County, State	Distance (mi.)	Location (TRM)	Average Annual Withdrawal Rate (Mgd)	Average Monthly Withdrawal Rate (Mg/mo)	Average Annual Discharge Rate (Mgd)	Average Monthly Discharge Rate (Mg/mo)	Average Monthly Consump-tion Rate (Mg/mo)	Source/ Receiving Body
Castle's Coin Laundry	Industrial	Marion, TN	[	]	NW	NW	0.002	0.061	0.000	Town Ditch
Whitwell Water Department	Public Water	Marion, TN	[	]	0.802	24.411	ND	ND	24.411	Sequatchie River
Jasper Water Department	Public Water	Marion, TN	[	]	0.472	14.367	ND	ND	14.367	Sequatchie River
Jasper Lagoon	Public Water	Marion, TN	[	]	NW	NW	0.362	11.018	0.000	Tennessee River
South Pittsburg Water System	Public Water	Marion, TN	[	]	1.016	30.925	ND	ND	30.925	Tennessee River
South Pittsburg Wastewater Treatment Plant	Public Water	Marion, TN	[	]	NW	NW	0.445	13.545	0.000	Tennessee River
Bridgeport Utilities Board	Public Water	Jackson, AL	[	]	2.362	71.893	0.504	15.341	56.552	Tennessee River
Widows Creek Fossil Plant	Thermal	Jackson, AL	[	]	1476.300	44934.881	1476.300	44934.881	0.000	Tennessee River
Stevenson Mill	Industrial	Jackson, AL	[	]	NW	NW	6.216	189.203	0.000	Tennessee River
Smurfit-Stone Container Corp.	Industrial	Jackson, AL	[	]	8.531	259.662	ND	ND	259.662	Tennessee River
Avondale Mills, Corner Spring	Industrial	Jackson, AL	[	]	0.050	1.522	ND	ND	1.522	Corner Spring
Shaw Industries, Inc.	Industrial	Jackson, AL	[	]	0.196	5.966	ND	ND	5.966	Prince Spring
John B. Roper Jr.	Irrigation	Jackson, AL	[	]	0.400	12.175	ND	ND	12.175	Private Pond
Hollywood Wastewater Treatment Plant	Public Water	Jackson, AL	[	]	NW	NW	0.062	1.887	0.000	Tennessee River

TABLE 2.3-31
LOCAL SURFACE WATER USERS - GUNTERSVILLE WATERSHED AREA

Facility Name	Use Type	County, State	Distance (mi.)	Location (TRM)	Average Annual Withdrawal Rate (Mgd)	Average Monthly Withdrawal Rate (Mg/mo)	Average Annual Discharge Rate (Mgd)	Average Monthly Discharge Rate (Mg/mo)	Average Monthly Consump-tion Rate (Mg/mo)	Source/ Receiving Body
Fort Payne Water Works Board	Public Water	Dekalb, AL	[	]	0.470	14.306	ND	ND	14.306	Tennessee River
Scottsboro Water Board	Public Water	Jackson, AL	[	]	2.304	70.128	ND	ND	70.128	Tennessee River
Aaf Mcquay International	Industrial	Jackson, AL	[	]	NW	NW	0.024	0.731	0.000	Unnamed tributary to Roseberry Creek
Scottsboro Aluminum LLC	Industrial	Jackson, AL	[	]	NW	NW	0.003	0.091	0.000	Tennessee River and Roseberry Creek
Scottsboro Southside Wastewater Treatment Plant	Public Water	Jackson, AL	[	]	NW	NW	4.580	139.404	0.000	Tennessee River
Scottsboro Development Corp	Public Water	Jackson, AL	[	]	NW	NW	0.018	0.548	0.000	Tennessee River
Scottsboro Water Board	Public Water	Jackson, AL	[	]	2.357	71.741	ND	ND	71.741	North Sauty Creek
Maranatha Camp Center Lagoon	Public Water	Jackson, AL	[	]	NW	NW	0.004	0.122	0.000	Tennessee River
Northeast Alabama Water, Sewer & F.P.A.	Public Water	Marshall, AL	[	]	1.362	41.456	ND	ND	41.456	Tennessee River

TABLE 2.3-31
LOCAL SURFACE WATER USERS - GUNTERSVILLE WATERSHED AREA

Facility Name	Use Type	County, State	Distance (mi.)	Location (TRM)	Average Annual Withdrawal Rate (Mgd)	Average Monthly Withdrawal Rate (Mg/mo)	Average Annual Discharge Rate (Mgd)	Average Monthly Discharge Rate (Mg/mo)	Average Monthly Consump-tion Rate (Mg/mo)	Source/ Receiving Body
DCNR - Lake Guntersville State Park	Irrigation	Marshall, AL	[	]	0.020	0.609	ND	ND	0.609	Tennessee River
Lake Guntersville State Park	Irrigation	Marshall, AL	[	]	0.020	0.609	ND	ND	0.609	Tennessee River
Lake Guntersville S.P. Lagoon	Public Water	Marshall, AL	[	]	NW	NW	0.093	2.831	0.000	Tennessee River
Albertville Municipal Utilities Board	Public Water	Marshall, AL	[	]	4.773	145.278	ND	ND	145.278	Short Creek
Guntersville Wastewater Treatment Plant	Public Water	Marshall, AL	[	]	NW	NW	2.765	84.160	0.000	Tennessee River
Albertville East-side Wastewater Treatment Plant	Public Water	Marshall, AL	[	]	NW	NW	5.990	182.321	0.000	Turkey Creek
Slab Creek Wastewater Treatment Plant	Public Water	Marshall, AL	[	]	NW	NW	3.506	106.714	0.000	Unnamed tributary to Slab Creek
River Bend Marina Wastewater Treatment Plant	Public Water	Marshall, AL	[	]	NW	NW	0.009	0.274	0.000	Tennessee River
Arab Water Works Board	Public Water	Marshall, AL	[	]	4.305	131.033	ND	ND	131.033	Tennessee River

TABLE 2.3-31
LOCAL SURFACE WATER USERS - GUNTERSVILLE WATERSHED AREA

Facility Name	Use Type	County, State	Distance (mi.)	Location (TRM)	Average Annual Withdrawal Rate (Mgd)	Average Monthly Withdrawal Rate (Mg/mo)	Average Annual Discharge Rate (Mgd)	Average Monthly Discharge Rate (Mg/mo)	Average Monthly Consump-tion Rate (Mg/mo)	Source/ Receiving Body
North Marshall Utilities	Public Water	Marshall, AL	[	]	1.202	36.586	ND	ND	36.586	Honeycomb Creek
Woodville Wastewater Treatment Plant	Public Water	Jackson, AL	[	]	NW	NW	0.014	0.426	0.000	Yellow Branch
Albertville Water Treatment Plant	Public Water	Marshall, AL	[	]	NW	NW	0.375	11.414	0.000	Tennessee River
Section & Dutton Water Boards	Public Water	Jackson, AL	[	]	3.055	92.987	ND	ND	92.987	Tennessee River
					1509.997	45960.535	1501.272	45694.969	1010.313	

Notes:

Source: 2005 withdrawal and discharge data provided by Alabama Department of Economic and Community Affairs.

Water users for Guntersville Reservoir are listed in order from approximately 30 mi. upstream to approximately 50 mi. downstream from BLN.

Location - Tennessee River mile (TRM) where the facility is located on the Tennessee River or where the tributary the facility discharges to/withdraws from flows into the Tennessee River.

Mgd - Million gallons per day.

NW - No withdrawal from Tennessee River or Tennessee River tributaries.

ND - No discharge to Tennessee River or Tennessee River tributaries.

U - Upstream from BLN.

D - Downstream from BLN.

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 3.3-1

With respect to Table 3.6-1, describe the seasonal variation in chemical usage.

Table 3.6.1 refers to an algaecide in the CWS. It does not refer to a molluskicide. Is a separate molluskicide used? If so, what is the amount used per year, the frequency of use, and the concentration in the waste stream for both the CWS and the SWS?

BLN RESPONSE:

ER Table 3.6-1 identifies the chemicals used in each system, the amount used per year, the frequency of use, and the concentration in the waste stream discharged from two units. Some seasonal variation in chemical usage is likely throughout the year; however, due to the degree of variability in the factors that affect the effectiveness of the chemicals used, it is not practical to speculate on the quantity of chemicals that will be required prior to the scenarios in which the chemicals are required. Because the chemical concentrations in plant effluents are required to remain within discharge permit limits, seasonal variation in plant effluents is expected to be minimal. Therefore, it is reasonable to assume the chemicals listed in Table 3.6-1 are distributed evenly throughout the year.

The Tennessee Valley Authority plans to use a quaternary amine (ammonium chloride, NH_4Cl) as a molluskicide in both the Circulating Water System (CWS) and the Service Water System (SWS) at BLN. Table 3.6-1 is revised to include molluskicide and provide the amount used per year, frequency of use, and concentration in the waste stream, as noted in the COL application text changes provided below.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

Change COLA Part 3, ER Chapter 3, Table 3.6-1, to include molluskicide and add information on molluskicide use, as follows:

System	Chemical-Type/Specific	Amount Used per Year	Frequency of Use	Concentrations in Waste Stream
CWS	Molluskicide/quaternary amine (ammonium chloride, NH_4Cl)	2200 gal.	3-4 times/year, ~24 hours per treatment	Below detectable limits
SWS	Molluskicide/quaternary amine (ammonium chloride, NH_4Cl)	680 gal.	3-4 times/year, ~24 hours per treatment	Below detectable limits

ATTACHMENTS:

None.

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 3.6-1

Explain how the various descriptions of portable toilet use at the site are consistent. Provide an estimate of water use and waste disposal volumes. Describe the use of vendors and the ultimate disposal of the waste.

BLN RESPONSE:

Sanitary facilities will be in place during preconstruction and construction activities, including the anticipated use of a combination of a temporary trailer-type facility and portable toilets. A substantial portion of the field workforce is expected to make use of the portable toilets, with a smaller number of administrative and management personnel using the temporary trailer-type facility. Portable toilets used are supplied by vendors licensed by the Alabama Onsite Wastewater Board (AOWB) (Attachment 3.6-1A).

The use of portable toilets has the potential to reduce the quantity of water required for sanitary needs during construction. According to industry information, portable sanitation conserves water by using only 6 gallons of clean water to contain the 30 gallons of waste generated by a 10-worker crew during one 40-hour work week (Attachment 3.6-1B). Raw sewage can only be disposed of by an approved sanitary sewer system. The septage (the solids and liquids removed during the pumping of an on-site sewage treatment and disposal system pre-treatment device) from portable units is disposed of in a public sewer manhole or to a sewage treatment plant per the written approval of the responsible person of the governmental entity or other entity owning or operating the public sewer system or sewage treatment plant. Alternatively, septage may be sent to a temporary Alabama Department of Public Health (ADPH) approved storage tank or to a landfill as permitted by the ADPH (Attachment 3.6-1C).

A temporary trailer-type facility is anticipated to require 13 gallons of water per employee per day to handle sanitary waste, with the sewage discharged to an approved sanitary sewer system (Attachment 3.6-1D).

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 3, Subsection 3.6.2, second paragraph, as follows:

   Sanitary systems needed at BLN during the pre-construction and construction activities of the plant include primarily portable toilets with a smaller number of administration and management personnel using a temporary trailer-type restroom facility that are supplied and serviced by an off-site contracted vendor licensed by the Alabama Onsite Wastewater Board (AOWB) (Reference 1). There is no sanitary system discharge from the portable toilets at the construction site into the effluent stream.

2. Change COLA Part 3, ER Chapter 10, Subsection 10.4.2.2.3, first paragraph, as follows:

   Sections 4.2 and 5.2, respectively, discuss hydrologic alterations for construction and operation. As discussed in these sections, there are some costs associated with providing water for various needs during construction and operation. Construction activities require between 240 and 420 gpm of water for concrete batch plant operation, dust suppression, and sanitary needs. A peak use of 872,000 gpd could be required at startup. ~~Construction water use may be reduced if portable toilets are used for sanitary needs.~~ The use of portable toilets for sanitary needs reduces the quantity of water used during construction. Construction workforce potable water use is estimated at 11,700~~6300~~ gpd. (See Section 4.2)

3. Change COLA Part 3, ER Chapter 3, to add Subsection 3.6.4, References, and a new Reference 1, as follows:

   3.6.4 REFERENCE

   1. Alabama Onsite Wastewater Board, Code of Alabama Law 1975, Section 34-21A-12, Website, http://www.aowb.alabama.gov/Downloads.htm, accessed June 3, 2008.

ATTACHMENTS:

The following documents are provided as Attachments 3.6-1A through 3.6-1D to this enclosure:

3.6-1A Alabama Onsite Wastewater Board, Code of Alabama Law 1975, §34-21A (Excerpta)

3.6-1B Portable Sanitation Association International, Benefits of Portable Sanitation, Standards, Website, http://www.psai.org/about.html (Entire document)

3.6-1C Alabama State Board of Health, Alabama Department of Public Health, Bureau of Environmental Services, Division of Community Environmental Protection, Administrative Code Chapter 420-3-1, Onsite Sewage Treatment and Disposal, Amended effective November 23, 2006 (Excerpts)

3.6-1D U.S. Environmental Protection Agency, Onsite Wastewater Treatment Systems Manual, EPA/625/R-00/008, February 2002. (Excerpts)

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 3.6-2

Provide estimates of non-radioactive wastes, and describe the proposed use or disposal of PCB-containing items / equipment / articles.

BLN RESPONSE:

Section 3.6.3 discusses gaseous, liquid, and solid effluents that are discharged. Quantities and sources of gaseous non-radiological emissions are provided in Tables 3.6-2 and 3.6-3, and stormwater waste is discussed in Subsection 3.6.3.2. The quantity of non-radiological solid waste expected to be generated at BLN during the construction and operations periods is estimated based on data from comparable power plants operated by TVA, such as Browns Ferry Nuclear Plant and Sequoyah Nuclear Plant. It is estimated that the plant will generate approximately 800 tons of non-hazardous, non-radiological solid waste (i.e., trash) during each year of plant operation. The amount of trash generated during construction is expected to exceed the annual operations estimate, but has not been estimated, because there is no recent nuclear construction experience upon which to base such an estimate. During the construction period, approximately 5000 lbs/year of hazardous, non-radiological solid waste is expected to be generated. An average of 4000 lbs/year of hazardous, non-radiological solid waste is expected to be generated during plant operation.

Existing on-site equipment containing polychlorinated biphenyls (PCBs) is limited to the switchyard. As the station is upgraded, existing equipment and components containing PCBs are replaced with those that do not contain PCBs. Equipment and components containing PCBs are disposed of in accordance with applicable State and Federal regulations and industry guidelines.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

Change COLA Part 3, ER Chapter 3, Subsection 3.6.3.3, third and fourth paragraphs, as follows:

Non-radioactive solid wastes include typical industrial wastes such as metal, wood, and paper, as well as process wastes such as non-radioactive resins, filters, and sludge. These non-radioactive wastes are disposed of in a permitted landfill as discussed in Section 1.2. It is estimated that the plant will generate approximately 800 tons of non-hazardous, non-radiological solid waste (i.e., trash) during each year of plant operation. The amount of trash generated during construction is expected to exceed the operations period amount, but has not been estimated because there is no recent nuclear construction upon which to base such an estimate.

The BLN site is classified as a small quantity generator of hazardous waste. Any waste is presently disposed of off-site by contract at an Alabama Department of Environmental Management permitted facility. During the construction period, approximately 5000 lbs/year of hazardous, non-radiological solid waste is expected to be generated. A combined two-unit average of 4000 lbs/year of hazardous, non-radiological solid waste is expected to be generated during plant operation. There are no polychlorinated biphenyl (PCB) transformers on-site; however, there are other PCB-containing items/equipment/articles on-site but not in

service. Existing on-site equipment containing PCBs is limited to the switchyard. As the station is upgraded, existing equipment and components containing PCBs are replaced with ones that do not contain PCBs. The equipment and components containing PCBs are disposed of in accordance with applicable State and Federal regulations and industry guidelines. PCB information is reported annually in the PCB Annual Document Log.

ATTACHMENTS:

None.

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 5.2-1

Using a figure, identify the on-site area or areas that may be used for dredged material deposition.

BLN RESPONSE:

The area within the 500-year floodplain and the area of potential effect (APE) that is expected to be used for dredged material deposition (spoils) is illustrated in Attachment 5.2-1 as the cross-hatched area that lies between E625,000 and E626,000 and between N1,529,000 and N1,530,000. This figure is a marked-up excerpt from TVA/BLN Drawing DWG-NUSTART-004, which was provided as Attachment C in the referenced TVA letter dated June 12, 2008.

This response is PLANT-SPECIFIC.

Reference:

Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Hydrology," dated June 12, 2008 [ML081280468].

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

None.

ATTACHMENTS:

The following illustration is provided as Attachment 5.2-1 to this enclosure:

5.2-1 Tennessee Valley Authority, Dredged Material Area, July 2008. (Entire document)

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 5.2-3

The applicant states "...the appropriate USACE permit is expected to be acquired..."; however, Table 1.2-1 notes for the USACE that "pre-construction permit not required". Explain how these statements are consistent.

This response is PLANT-SPECIFIC.

BLN RESPONSE:

Subsections 4.2.1.4 and 5.2.1.6 are corrected to show that USACE pre-construction permits are not required, because the dredge spoils are planned to be placed in an upland, on-site spoils disposal area that is above the 500-year floodplain. Attachment 5.2-1, provided in the response to RAI 5.2-1, illustrates the area where dredge spoils may be placed.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 4, Subsection 4.2.1.4, third paragraph, as follows:

   The existing intake structure, located east of Units 3 and 4 (Figure 3.1-6), is planned for use in future plant operations. Maintenance dredging ~~Dredging~~ is expected to be necessary in the vicinity of this intake structure, and as stated in Table 1.2-1,~~the appropriate~~ a USACE permit is not required ~~acquired~~ prior to commencing dredging activities, because the dredge ~~Dredge~~ spoils are ~~intended~~planned to be disposed of in an upland, on-site spoils area above the 500-year floodplain; therefore, disposition of dredge spoils is considered to be a SMALL impact. In addition, navigation in the Tennessee River and its tributaries is controlled by TVA, so no Section 10 permit (Rivers and Harbors Act of 1899, 33 USC 403) is necessary.

2. Change COLA Part 3, ER Chapter 5, Subsection 5.2.1.6, first paragraph, fourth sentence, as follows:

   As discussed in ~~Section 4.2~~ Subsection 4.2.1.4 and Table 1.2-1, ~~the appropriate~~ a USACE permit is not required ~~expected to be acquired~~ prior to commencing maintenance dredging activities. Dredge spoils ~~would~~ are planned to be disposed of in an upland, on-site spoils area above the 500-year flood elevation.

ATTACHMENTS:

None.

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 5.3-1

Explain how the description of the water velocity through the screens is consistent in the three sections (Sections 3.4.2.1, 5.3.1.1.1, and 5.3.1.1.1) in which it is presented. Provide the background information sufficient to check this calculated velocity (e.g., water withdrawal rate, base elevation of screen, minimum pool elevation {top of screen}, width of screen, number of screens, area of screen).

BLN RESPONSE:

A calculation of maximum velocities through clean screens indicates there is little difference in velocity at maximum and minimum pool elevation at BLN, partially due to the small difference (approximately 2 feet) between maximum and minimum pool elevations. Because flow velocity through clean screens is inversely related to the area of the screen (and thereby the depth of the pool), the calculated flow velocity at the minimum normal pool elevation of 593 feet (0.13 feet per second [fps]) was higher than the flow velocity at the maximum normal pool elevation of 595 feet (0.12 fps). Use of the minimum pool elevation yields an upper bounding limit for the maximum velocity.

Subsection 3.4.2.1 is corrected to indicate the through-screen velocity at minimum normal pool elevation is 0.13 fps, which is well under the 0.50 fps requirement of Section 316(b) of the Clean Water Act, and is consistent with the associated language in Subsection 5.3.1.2.1 that states flow velocity through the screens during operational mode is well under 0.50 fps. Subsection 5.3.1.1.1 correctly states that flow velocity is less than 0.50 fps; however, this subsection is revised to indicate the use of the minimum normal pool elevation to calculate the maximum velocity, as noted below.

The calculation for maximum velocities provided for review at the BLN site audit was revised in May 2008 to better define the flow velocity for maximum velocities through clean screens. The calculation provides information on water withdrawal rate, base elevation of the screens, minimum pool elevation, width of screen, number of screens, and area of screen. Attachment 5.3-1 illustrates the base elevation of the traveling screen. The revised calculation is made available for NRC reviewers at NuStart's contractor's offices.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 3, Subsection 3.4.2.1, paragraph 4, sentence 6, as follows:

   The maximum velocities through clean screens ~~are estimated to be about 0.5 fps~~ are 0.13 fps at the minimum normal pool elevation of 593 ft. and 0.12 fps at the maximum normal pool elevation of 595 ft. These maximum velocities are well under the 0.50 fps requirement of Section 316(b) of the Clean Water Act.

2. Change COLA Part 3, ER Chapter 5, Subsection 5.3.1.1.1, paragraph 4, sentence 4, as follows:

   This section also estimates the maximum velocities through clean screens ~~at maximum~~ based on minimum normal water elevation.

ATTACHMENTS:

The following document is provided as Attachment 5.3-1:

5.3-1 Envirex Service Manual, Envirex Traveling Water Screen – Four Post – Data Sheet No. 330.3.022.02.01, Page 4 of 5 and Close-up of Installation Drawing Illustrating Base Elevation of the Screen, June 1977. (Excerpts)

NRC Review of the BLN Environmental Report

NRC Environmental Category: HYDROLOGY

NRC RAI NUMBER: 6.6-1

Describe, list, or provide a diagram showing the likely internal monitoring points used to track water quality within the plant (i.e., prior to discharge through regulatory defined control points).

BLN RESPONSE:

The AP1000 design includes both a primary and a secondary sampling system for use during plant operations. The design incorporates both continuous monitoring and grab sample locations. The operation of each is described in Design Control Document (DCD) Section 9.3. Sample points for the primary system are listed in Tables 9.3.3-1 and 9.3.3-2 in the Westinghouse AP1000 DCD. Sample points for the secondary sampling system are listed in Tables 9.3.4-1 and 9.3.4-2 in the Westinghouse AP1000 DCD.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

None.

ATTACHMENTS:

None.

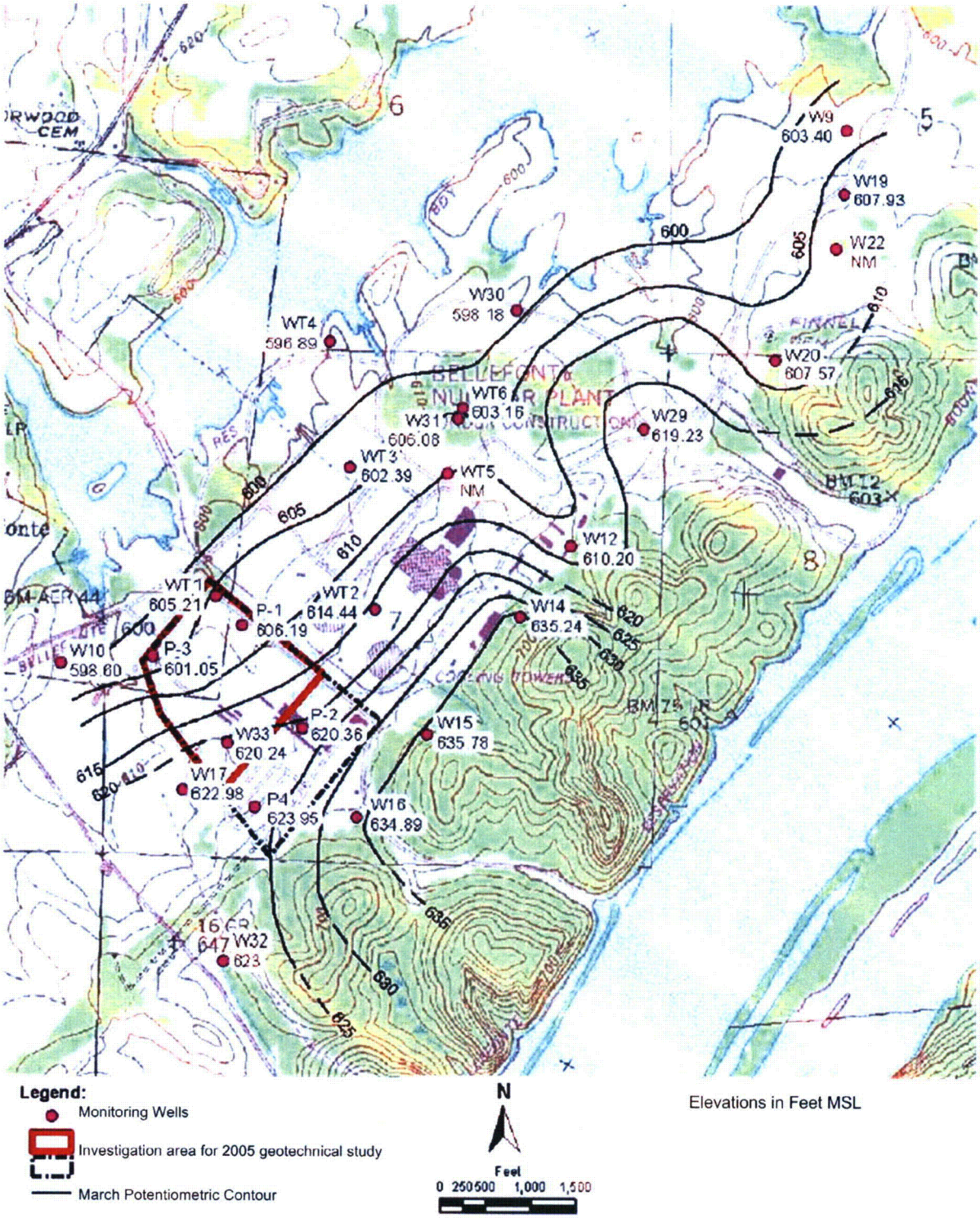
ATTACHMENT 2.3-1
TENNESSEE VALLEY AUTHORITY
ER FIGURE 2.3-23
SHEET 1 OF 4, MARCH 2005 POTENTIOMETRIC SURFACE MAP
SHEET 2 OF 4, MAY 2005 POTENTIOMETRIC SURFACE MAP
REV. 1

Tennessee Valley Authority

ER Figure 2.3-23

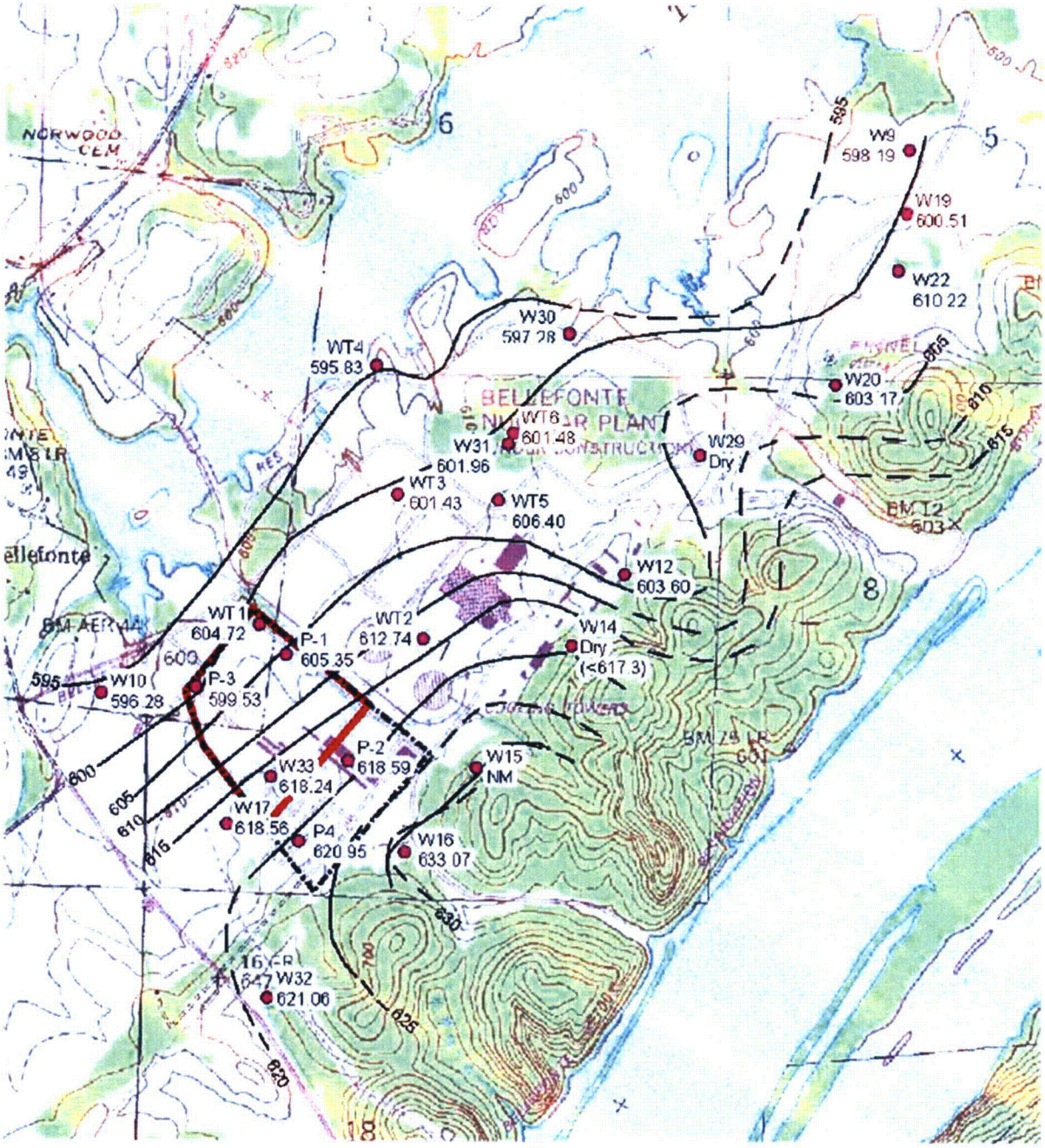
Sheet 1 of 4
March 2005 Potentiometric Surface Map
Sheet 2 of 4
May 2005 Potentiometric Surface Map
(2 pages: Sheets 1 of 4 and 2 of 4)

Rev. 1



Note: The March 2005 reading from Well W29 is considered an anomalous reading, and the water level and interpretation of the groundwater elevations in the vicinity of Well W29 depicted in this figure are not considered in current groundwater evaluations.

FIGURE 2.3-23 (Sheet 1 of 4)
March 2005 Potentiometric Surface Map



Note: The March 2005 reading from Well W29 is considered an anomalous reading, and the water level and interpretation of the groundwater elevations in the vicinity of Well W29 depicted in this figure are not considered in current groundwater evaluations.

FIGURE 2.3-23 (Sheet 2 of 4)
May 2005 Potentiometric Surface Map

U. S. Environmental Protection Agency

Ground-Water Monitoring in Karst Terranes

(2 pages: Cover and page 4)

March 1989

United States
Environmental Protection
Agency

Environmental Monitoring
Systems Laboratory
P O Box 93478
Las Vegas NV 89193-3478

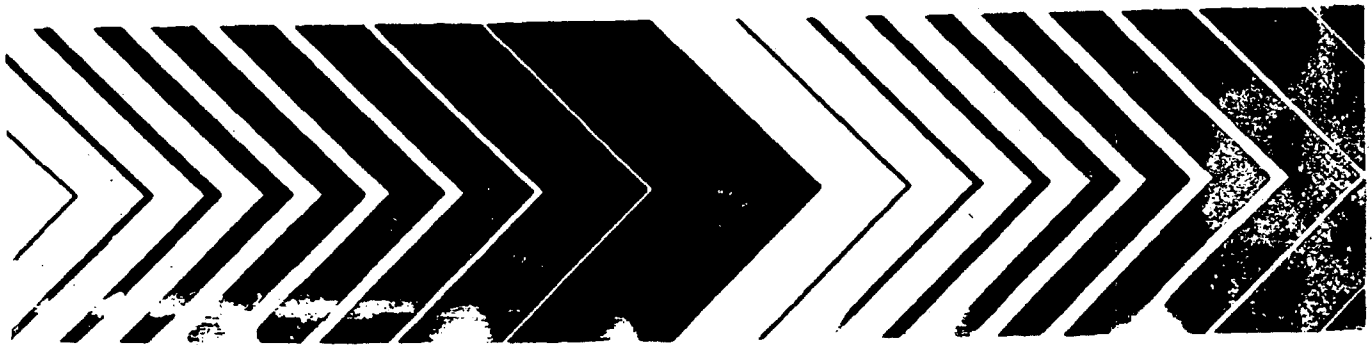
EPA/600/X-89/050
March 1989

Research and Development

EPA

Ground-Water Monitoring in Karst Terranes

Recommended Protocols & Implicit Assumptions



Two major types of ground-water flow occur in karst aquifers--conduit flow and diffuse flow, each of which is an end-member of a continuum. Springs and cave streams in conduit-flow systems are "flashy", as expressed by high ratios between their maximum discharge and base-flow discharge, typically 10:1 to 1000:1. Discharge responds rapidly to rainfall. Flow is generally turbulent. The waters possess low but highly variable hardness; turbidity, discharge, and sometimes temperature also very widely. Where a karst aquifer is less developed and is characterized primarily by diffuse flow, its behavior is less flashy; the ratio between maximum discharge and base-flow discharge of major springs is low (4:1 or less) , and the response of their discharge and water quality to rainfall is slower than in conduit-flow springs. Flow is generally laminar. Hardiness is higher than in conduit-flow springs, but hardness, turbidity, discharge, and temperature have low variability (Quinlan and Ewers, 1985). The variations in and relations among these properties and their variability as a function of aquifer flow, storage, and recharge have been described in a significant paper by Smart and Hobbs (1986).

Two important and seemingly contradictory points need to be made about diffuse flow:

1. Movement of water through most parts of a diffuse-flow aquifer is similar to movement of water through granular aquifers. Darcy's law is operative (Hickey, 1984; Wailer & Howie, 1988).

2. Although water from a diffuse-flow spring may be discharged from an obvious conduit, perhaps 3 m (10 ft) in diameter, the geometry and configuration of the "plumbing system" that feeds it near the orifice is trivial. Wilson and Skiles (1988) and Stone (1989) have published maps of different cave systems with more than 11 km (6.5 mi) of braided passage that feeds diffuse flow springs.

   The most significant controls on flow-type are the types of recharge and storage, as discussed by Smart & Hobbs (1986). These most influence the degree of variability of water chemistry and the magnitude, timing, and duration of response of springs and wells to storms. For very large ground-water basins there is additional dampening of response to storms as a consequence of their sheer size and the greater time necessary to transmit the storm input to their spring (White, 1988, p. 186-187). Also, individual storms will tend to overlap and seasonal trends will comprise the most obvious part of the annual record.

A quick, inexpensive way to distinguish between a conduit-flow spring and a diffuse-flow spring is to observe its turbidity

Tennessee Valley Authority

Tennessee Valley Water Supply Inventory and Needs Analysis

(2 pages: Title page and page 2-4)

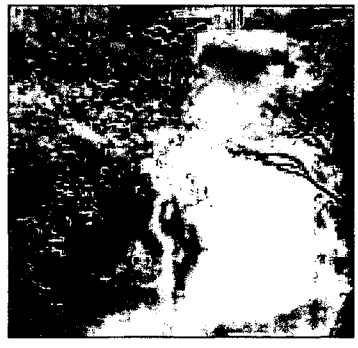
November 2004

TENNESSEE VALLEY AUTHORITY

Prepared by
River Operations
Navigation & Hydraulic Engineering

Charles E. Bohac
M. Carolyn Koroa

November 2004



Tennessee Valley Water Supply Inventory & Needs Analysis

TVA

Table 2–1: 2000 Water Use by Source, Water-Use Tabulation Area, and Reservoir Catchment Area (in Millions of Gallons per Day)

Water-Use Tabulation Area Reservoir Catchment Area	Surface Water	Groundwater	Total Water	Total Return Flow	Net Water Demand
Cherokee					
Watauga	12.40	9.40	21.80	2.85	18.95
South Holston	21.30	8.01	29.31	2.33	26.98
Boone	0.00	3.72	3.72	23.62	-19.90
Fort Patrick Henry	513.10	0.00	513.10	0.00	513.10
Cherokee	639.23	13.00	652.22	1103.66	-451.44
WUTA total	1186.02	34.13	1220.15	1132.46	87.69
Douglas					
Douglas	110.78	11.99	122.76	57.50	65.26
Fort Loudoun					
Fort Loudoun	77.52	1.60	79.12	56.39	22.73
Cumulative net demand					175.68
Fontana-Tellico					
Fontana	4.64	1.13	5.76	3.37	2.40
Santeetlah	0.44	0.00	0.44	0.00	0.44
Tellico	4.16	0.57	4.73	1.09	3.64
WUTA total	9.24	1.70	10.93	4.46	6.47
Norris					
Norris	29.88	3.42	33.30	10.69	22.61
Melton Hill	500.36	1.58	501.94	479.33	22.61
WUTA total	530.25	4.99	535.24	490.02	45.22
Hiwassee-Ocoee					
Chatuge	1.73	0.18	1.91	0.27	1.64
Nottely	0.60	0.55	1.15	0.24	0.91
Hiwassee	0.93	0.00	0.93	0.10	0.84
Apalachia	2.94	0.00	2.94	0.00	2.94
Blue Ridge	33.25	0.05	33.30	0.33	32.97
Ocoee	0.01	1.11	1.12	24.63	-23.51
WUTA total	39.46	1.90	41.36	25.57	15.79
Watts Bar-Chickamauga					
Watts Bar	1494.66	1.11	1495.77	1366.58	129.19
Chickamauga	1667.10	24.02	1691.12	1775.56	-84.44
WUTA total	3161.76	25.13	3186.89	3142.13	44.76
Cumulative net demand					287.92
Nickajack					
Nickajack	62.94	9.86	72.80	60.50	12.30
Cumulative net demand					300.23
Guntersville					
Guntersville	1594.42	7.86	1602.28	1585.93	16.35
Cumulative net demand					316.57
Tims Ford					
Tims Ford	58.57	2.80	61.37	40.50	20.87
Wheeler-Wilson					
Wheeler	2449.02	45.82	2494.84	2328.13	166.71
Wilson	53.77	3.36	57.31	27.81	29.32
WUTA total	2502.79	49.18	2551.96	2355.95	196.01
Cumulative net demand					533.46
Pickwick					
Pickwick	1308.23	5.41	1313.64	1291.56	22.08
Cedar Creek	3.00	1.13	4.13	0.00	4.13
Upper Bear Creek	2.81	0.16	2.97	0.00	2.97
WUTA total	1314.04	6.70	1320.74	1291.56	29.18
Cumulative net demand					562.64
Normandy					
Normandy	26.30	2.11	28.41	2.19	26.22
Kentucky					
Kentucky	1322.24	54.93	1377.17	1317.30	59.87
Watershed total	11996.32	214.86	12211.18	11562.45	648.73

Alabama Onsite Wastewater Board

Code of Alabama Law 1975, §34–21A

(6 pages: Cover page, page 4, and pages 18 through 21)

ALABAMA ONSITE WASTEWATER BOARD

Code of Ala. 1975, §34-21A

LAW

CHAPTER 21A.

ONSITE WASTEWATER BOARD AND LICENSEES.

SECTIONS:

Section 34-21A-11

Fees.

The board may establish and charge reasonable fees for the processing of all applications, administration of examinations, issuance of all active and inactive licenses, license renewals, license restoration and replacement, supplying information to applicants, licensees, and the general public, and any and all other required board procedures and related activities. A fee schedule shall be developed by the board and adopted as a rule, and all fees shall be commensurate with the cost of fulfilling the duties of the board as defined in this chapter.

(Act 99-571, p. 1265, §11.)

Section 34-21A-12

Licenses.

(a) The board shall initially establish the following types of licenses:

(1) A basic level license for the installation, cleaning, servicing, repairing, or maintenance of a conventional onsite wastewater system.

(2) An advanced level license for the installation, cleaning, servicing, repairing, or maintenance of an alternative onsite wastewater system.

(3) A manufacturer's license for those involved in the manufacture of onsite wastewater septic tanks and receptacles.

(4) A pumper license for those involved in pumping, cleaning, servicing or maintenance, or both, of onsite wastewater systems and receptacles.

(b) A person shall first obtain a basic level license before qualifying for an advanced level license. Additional areas of qualification and license levels may be established by the board based on future evaluations of industry needs and technology advancements.

(c) Licenses issued by the board shall be recognized as evidence of qualification and knowledge of the licensee by the Alabama Department of Public Health and county or local health authorities, and no other additional level of qualification or certification or other requirement shall be required by the Alabama Department of Public Health or any county or local health authorities for those persons engaged in the manufacture, installation, or servicing of onsite wastewater systems.

(d) A license shall be issued for the current calendar year and the license shall be valid only for that calendar year. All licenses shall expire on December 31 of each calendar year.

(e) No individual, business, partnership, or corporation shall engage in the manufacture, installation, servicing, cleaning, or maintenance of an onsite wastewater system installed in the State of Alabama unless the individual, or the person in responsible charge for the business, partnership, or corporation, has received the required specific license from the board. Persons engaged in the installation or servicing of onsite wastewater systems shall obtain a basic level license for conventional onsite wastewater systems or an advanced level license for alternative onsite wastewater systems. All manufacturers of onsite wastewater septic tanks or receptacles for onsite wastewater systems shall qualify and obtain a manufacturer's license. Licenses issued under this chapter shall be granted to individuals meeting the criteria for qualification as established

by this board. The licensee shall perform no work outside the level of competency stated on the certificate of license. An individual may be licensed in all areas of eligibility.

(f) No individual, business, partnership, or corporation shall advertise, solicit, bid, obtain permit, conduct business, or perform the function of manufacturing, installing, cleaning, servicing, repairing, or maintaining onsite wastewater equipment or systems in Alabama unless the person or persons in responsible charge are licensed as defined in this chapter.

(g) No official charged with the duty of issuing business licenses to any individual, partnership, corporation, or other business entity to operate a business performing the function of manufacturing, installing, cleaning, servicing, repairing, or maintaining onsite wastewater equipment or systems in Alabama shall issue such a business license unless there is presented for inspection a license certificate as provided herein issued by the board to the individual or to some person in responsible charge with the partnership, corporation, or business entity.

(h) No license shall be issued except to an individual. A firm, partnership, association, or corporation shall not be licensed. Partnerships, corporations, or other business entities shall designate the licensed individual in responsible charge under whose name its business is to operate to the local business licensing authority, the board, and the local health officials. If that designated person ceases to be employed by the business entity, notice shall be made immediately to the board and the local health officials. The partnership or corporation shall then have 45 days to re-designate a licensed individual responsible for work performed by the business entity. During this 45-day period, no work shall be initiated by the business entity without the knowledge and approval of local health officials. Any work performed during this time shall be

inspected by local health officials and approved by the officials before being considered complete and put into operation. Under special circumstances, a business entity engaged in the manufacture of septic tanks can petition the board for an extension of time beyond the 45-day period to re-designate a licensed individual in a position of responsible charge under whose manufacturer's license the business is to operate. Under no condition may this extension of time extend more than three weeks past the date of the next examination offered by the board for a manufacturer's license.

(i) License certificates suitable for framing, bearing the licensee's name, level and type of license, license number, and the calendar year in which the license is valid shall be issued to all qualified licensees. Every licensee holding a license issued by the board shall display it in a conspicuous manner at his or her principal place of business.

(j) All licensees shall abide by all federal, state, and local laws and ordinances. No license issued by the board may be sold or transferred. Any license misused may be revoked by the board.

(k) Every licensee shall notify the board of the address of his or her place of business, the counties in which he or she does business or performs work, and the name under which the business is carried on. Licensees shall give immediate notice to the board of any change in this information.

(Act 99-571, p. 1265, §12; Act 2002-521, p. 1351, §1.)

Section 34-21A-13

Form of application for licenses, examinations, and license renewals.

ATTACHMENT 3.6-1B
PORTABLE SANITATION ASSOCIATION INTERNATIONAL
BENEFITS OF PORTABLE SANITATION
STANDARDS

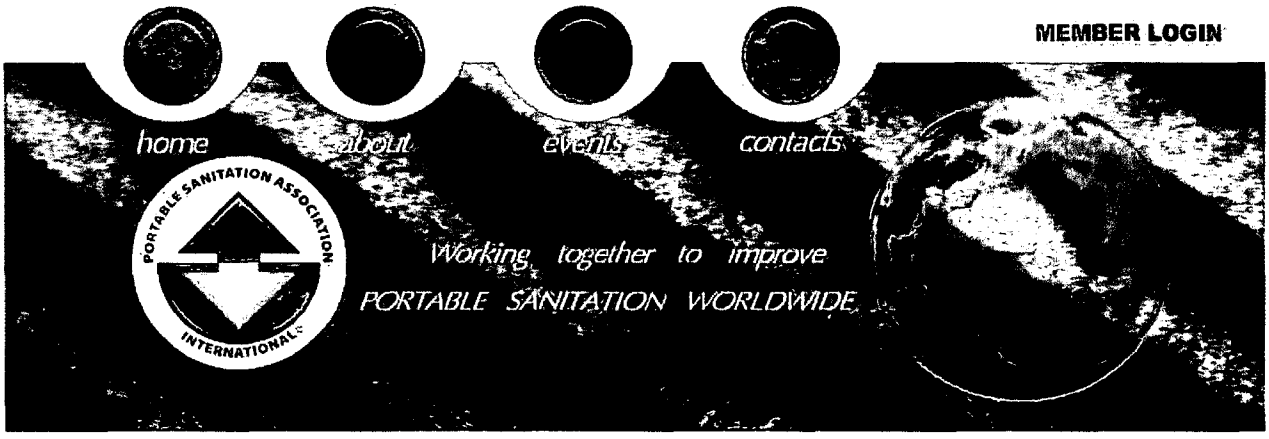
Portable Sanitation Association International

Benefits of Portable Sanitation Standards

Website, http://www.psai.org/about.html

(3 pages: Website pages 1 through 3)

PSAI **PORTABLE SANITATION ASSOCIATION INTERNATIONAL**



About PSAI

Mission

It is the mission of the Portable Sanitation Association International (PSAI) to expand and improve portable sanitation services and facilities worldwide and to be recognized as the authority within our industry.

Vision

The PSAI is an organization which:
• Is recognized internationally as the credible, authoritative voice of the portable sanitation industry.
• Continues to educate the industry, general public and government entities and provides tools to promote safety and health.
• Represents international members through a regional network and assists and promotes the setting of standards and services as a repository of information and resources for all. Through our efforts, the environment is a cleaner, safer place.

Scope

The portable sanitation industry has developed into a 1.5 billion dollar a year business. Worldwide, there are an estimated 1,400,000 portable restrooms in use, serviced by a fleet of 9,400 trucks.

Applications

• Construction and various work sites- commercial, industrial, residential

History Timeline:

• **1970 -** A group of business leaders in the portable sanitation industry meet at the Marriott Twin Towers in Washington D.C. to discuss mutual problems and issues. Out of this meeting emerges the framework for the formation of a formal trade association- The Portable Sanitation Association.
• **1971 -** The first PSAI Convention is held in New Orleans, LA, managed by a committee elected during the first gathering in Washington D.C. The Chairman and Executive Committee, later to become the Board of Directors, chose a professional management firm, Executive Consultants Inc., to manage the business affairs of the Association.
• **1972 -** Miami Beach Convention, Larry Miller & Associates is hired to manage the Association, replacing Executive Consultants, Inc.
• **1982 -** The PSAI Board of Directors voted to hire an Executive Director to manage the affairs of the association.
• **1985 –** PSAI provides testimony and input into the OSHA hearings and writings of the OSHA Field Worker's Sanitation Regulations setting sanitation standards for farm workers.
• **1987 -** ANSI Standards Z4.1, Z4.3, Z4.4 related to worker sanitation were successfully revised and published through the coordination of PSAI. The standards establish a 1:10 ratio for number of units per number of workers.
• **1987 -** The PSAI National Health Committee was formed to bring together representatives of the general public, professional sanitarians and government and industry leaders to develop a legislative program for improving sanitation at

- Parks and recreation- parks, campgrounds, pools, private homes
- Government agencies- military facilities
- Sporting events- stadiums, auto races, golf tournaments
- Outdoor public gatherings- concerts, festivals
- Disaster relief- floods, fires, hurricanes and earthquakes
- Permanent human settlement areas

Benefits of Portable Sanitation

Cost Savings

Portable sanitation provides significant labor savings by minimizing lost labor time associated with leaving the site to use toilets. The average time needed to make an off site restroom usage is 7 minutes including travel time. University of Missouri- St. Louis study, "Provision of Sanitation Facilities at Construction Sites", contractors earned an 850% return on their investment in portable facilities.

Health

Portable sanitation provides sanitation facilities where sewer and water are not conveniently available enhancing the health and environmental factors associated with a project or event.

Health Officials: Build goodwill and support from health authorities, OSHA inspectors, environmentalists
Work Force: Outdoor workers who appreciate clean toilets have higher productivity and morale.
Investors: Assures site and building owners that clean conditions are maintained on their property.

Environmental

Portable sanitation conserves water by using only 6 gallons of clean water to contain the 30 gallons of waste generated by a 10 worker crew during one 40-hour work week. The same personnel, using conventional water flush toilets, could waste up to 2,500 gallons of clean water needed to carry away the 30 gallons of waste they generate.

Standards

Rental Types

Route Units: Portable sanitation facilities placed on construction sites or other locations that require regularly scheduled service.

Special Event Units: Portable sanitation facilities placed on a site on a short term basis that require irregular or on demand service.

Usage

Route Units: On a construction site, each weekly serviced toilet unit can accommodate 10 workers (working a single 40-hour shift) ANSI Z4.3-2005.

Special Event Units: Each unit can accommodate approximately 200 uses with 4 hours between uses before service is required. The American with Disability Act requires work sites and special events. This committee later developed into our Industry Standards and Marketing Committee.

- **1988** - Independent studies in construction and recreation by the University of Missouri document the economic and health benefits resulting from the use of additional, properly located portable sanitation units. Out of this study developed, "Portable Restroom Requirements at Special Events and Crowd Gatherings-Sanitarian and Health Officials Guide."
- **1992**- The PSAI initiates the Portable Sanitation Worker Certification program that serves as an impartial measure of a portable sanitation worker's competence and understanding of the sanitary and health requirements mandatory to the industry.
- **1993** – M.Z. "Andy Gump" Award established. The M.Z. "Andy" Gump Distinguished Service Award is a lifetime achievement award honoring those that have improved the image of the industry and have created innovative approaches for sanitation needs through new and improved products and services.
- **1996** - The International Portable Sanitation Working Group (IPSWG) was formed. The Group is comprised of representatives from the Portable Sanitation Association International, Portable Sanitation Europe and Portable Sanitation Germany (BDE - Bundesverband der Deuschen Entsorgungswirtschaft e.V.) and the Ontario Waste Haulers Association. The mission of the IPSWG is to expand and improve portable sanitation services and facilities, to collaborate with organizations within the portable sanitation industry and to promote the setting and enforcement of standards worldwide. PSAI would act as secretary for the group.
- **1996** – The State of Minnesota approved the PSAI Certification Program as meeting the requirement s for licensing / continuing education.
- **1998** – PSAI web site www.psai.org was created to better maintain communications with our members, the portable sanitation industry and the markets we serve.
- **2001** – Service Technician of the Year Award established. The Service Technician of the Year award is an annual award acknowledging the service technicians that actively embody the highest standards of our industry worldwide.
- **2003** – International collaborative agreement signed between Portable Sanitation Europe – A Division of the Hire Association Europe, Portable Sanitation Germany Committee – A Division of the BDE – German Waste Management Association and the Ontario Canada Sewage and Liquid Waste Haulers Association. These organizations agreed that the furtherance of the portable sanitation industry would be served by a great degree of collaboration and co-operation between organizations.
- **2003** – PSAI in conjunction with OSHA's Advisory Committee on Construction Safety Health drafted a revision to OSHA regulation 1926.51 – Toilets at Construction Jobsite requiring a 1 unit to 10-worker ratio. This draft was approved by the full ACCSH Committee. Unfortunately due to the 911 attacks on the World Trade Center. OSHA cleared its agenda deleting the revision. • 2004 – PSAI Certification Program

that 5% of all units ordered be wheelchair accessible, or a minimum of one per each order.
Special Event Usage Guide (PDF)

Service

The minimum established standard for route units is weekly service and for special event units when at 1/3 tank capacity.

1. Pumping or evacuating the effluent from the portable toilet receptacle into the truck holding tank.
2. Recharging the portable toilet receptacle.
3. Cleaning the interior of the portable toilet by scrubbing with brushes and towel drying.
4. Providing toilet tissue.
5. Performing minor repairs to the portable toilet as needed.

Effluent is disposed of at licensed and approved disposal sites as needed. Officially approved disposal sites can be found by consulting with local health officials.

For more detailed information contact us at info@psai.org.

translated into Spanish.
- **2004** – PSAI produced a service technician training video to compliment the PSAI Certification Program.
- **2004**- Special Events requirements revised with the approval of the University of Missouri.
- **2005** – Sioux City, Iowa passed ordinance 205-05-77 requiring companies to be PSAI Certified to conduct portable restroom business within the city.
- **2006** – The State of Alabama approved the PSAI Certification Program as meeting the requirement s for licensing / continuing education.
- **2006 / 2007** – PSAI Certification manual revised to include servicing hand washing stations and restroom trailers.
- **2007** – The State of Illinois approved PSAI Certification as meeting the licensing requirements for the state. The Illinois Department of Health currently revising the Illinois Private Sewage Disposal code to reflect this change.
- **2008** – PSAI conducted its first training session for the State of Michigan. Michigan recently approved the PSAI Certification Program as meeting the requirement for licensing and continuing education

PSAI Standards

The PSAI develops standards directed toward providing clean, sanitary restroom facilities for any gathering of people who do not have adequate permanent facilities close at hand. The PSAI recommends standards to the International Code Council (ICC), OSHA, Council of American Building Officials (CABO), IAPMO and various other country, state, county and local regulatory agencies.

• ANSI Standards

- ANSI Z4.1 - Sanitation in Places of Employment
- ANSI Z4.3 – Nonsewered Waste Disposal Systems
- ANSI Z4.4 - Sanitation in Field & Temporary Labor Camps
- PDF of ANSI Z4.3

• Special Event Standards

- PDF of Extended Chart with Pics

ATTACHMENT 3.6-1C
ALABAMA STATE BOARD OF HEALTH
ALABAMA DEPARTMENT OF PUBLIC HEALTH
BUREAU OF ENVIRONMENTAL SERVICES
DIVISION OF COMMUNITY ENVIRONMENTAL PROTECTION
ADMINISTRATIVE CODE
CHAPTER 420-3-1
ONSITE SEWAGE TREATMENT AND DISPOSAL

Alabama State Board of Health
Alabama Department of Public Health
Bureau of Environmental Services
Division of Community Environmental Protection

Administrative Code
Chapter 420-3-1
Onsite Sewage Treatment and Disposal

(4 pages: Title page, Table of Contents, pages 43 through 46)

Amended effective November 23, 2006

RULES OF STATE BOARD OF HEALTH BUREAU OF ENVIRONMENTAL SERVICES

DIVISION OF COMMUNITY ENVIRONMENTAL PROTECTION

CHAPTER 420-3-1

ONSITE SEWAGE TREATMENT AND DISPOSAL

ADOPTED BY THE STATE BOARD OF HEALTH

EFFECTIVE DATE MARCH 19, 2006

AMENDED EFFECTIVE NOVEMBER 23, 2006

ALABAMA STATE BOARD OF HEALTH
ALABAMA DEPARTMENT OF PUBLIC HEALTH
BUREAU OF ENVIRONMENTAL SERVICES
DIVISION OF COMMUNITY ENVIRONMENTAL PROTECTION
ONSITE SEWAGE DISPOSAL
ADMINISTRATIVE CODE
CHAPTER 420-3-1

TABLE OF CONTENTS

(2) An order issued by the Department pursuant to the appropriate law, its implementing Rules or a State-Issued Performance Permit or State-Issued Product Permit shall specify a reasonable time within which noncompliance shall cease. In appropriate cases a reasonable time may be immediately. Reasonableness shall be determined based upon the severity of the violation and the complexity and availability of the measures necessary to correct the violation.

(3) If the permittee is not in compliance with the conditions of an expiring or expired permit, the SHO may choose to do one or more of the following, provided the permittee has made a timely application for reissuance of the permit:

(a) Initiate enforcement action based upon the permit which has been continued;

(b) Issue a notice of intent to deny the permit reissuance. If the permit is denied, the owner or operator would then be required to cease the activities authorized by the continued permit or be subject to enforcement action for operating without a permit;

(c) Reissue the new permit with appropriate conditions; or

(d) Take other actions authorized by these Rules and the appropriate law.

Authors: Jimmy Coles, Thad Pittman
Statutory Authority: Code of Ala. 1975, §§22-2-2(4); 22-2-2(6); 22-10-1, et seq.; 22-20-5; 22-26-1; 22-26-2; 22-26-3; 22-26-5; 22-26-7; 22-27-1, et seq.
History: Repealed and New Rule: Filed October 20, 2005, effective March 19, 2006.

420-3-1-.34 Sewage Tank Pumping Permit

(1) A person proposing to be a sewage-tank pumper shall obtain a permit (or permits) issued by the LHD(s) in accordance with the requirements listed below. LHDs may honor a permit issued by another LHD.

(a) The applicant shall submit an application to the LHD(s) on forms provided by the Board and shall state the business name, address and telephone number; the applicant's, owner's, and proprietor's name, address and telephone number; AOWB licensee name, license number and expiration date; the manner in which tank contents are to be collected, transported, and disposed of; the type of waste to be hauled; the location of disposal points, method of sewage disposal and the type of waste disposal at each point; and the tag number, state of registration, and sewage tank capacity (gallons) of each vehicle. Copies of written approvals from the disposal point authority shall be attached to the application.

1. The application shall have the following statement on it::

"I agree to allow inspection of all sewage tank cleaning equipment, vehicles, implements, containers, or other devices and sites used in the collection, transportation, or disposal of sewage tank contents. I also agree to mark my vehicle(s) and sewage holding tanks and to keep adequate records and submit them to the local health department personnel in accordance with rules

of the State Board of Health. I understand that permit renewal is required each year between November 1 and December 31."

(b) The LHD(s) shall, prior to the issuance of a permit(s) to pump sewage tanks, and as often as necessary thereafter, inspect or cause to be inspected the sewage tank cleaning equipment, implements, containers, or other devices used in the collection, removal, transportation or disposal of septage, as well as septage disposal sites and methods, to ensure that the above mentioned items are used, maintained, and operated in compliance with applicable provisions of these Rules and do not create a condition that is or is likely to become a nuisance or threat to public health. Where more than one LHD is affected, cooperative understandings on the inspection process may be mutually honored.

(c) The LHD shall not issue a Sewage Tank Pumping Permit under this Chapter of the Rules of the State Board of Health unless an approved source and method of sewage disposal is provided.

(d) The LHD shall submit to the Board a copy of the original and each renewal permit issued under this Rule.

(e) If the application is approved, the LHD(s) having jurisdiction where the pumper pumps and discharges shall issue a permit on a form provided by the Board, with identifying number.

1. Permits shall not be transferable, and shall become invalid upon a change of ownership or upon suspension or revocation.

2. A permit may be denied, suspended or revoked when the LHD determines that the operation is not being conducted in accordance with these Rules or conditions of the permit.

(2) A vehicle used in the collection, removal, transportation or disposal of septage shall display, in letters at least 2 inches high, and in a conspicuous place on both sides of the truck cab or carrier tank the name and address of the firm under which the business is conducted, the county in which the permit was issued, and the permit number.

(a) A carrier tank aboard a vehicle used for collecting, removing and transporting the contents of sewage tanks shall be conspicuously and permanently labeled "FOR SEWAGE ONLY" at or near the inlet and outlet valves of the tank. The use of the carrier tank for another purpose is prohibited. The required lettering shall be a minimum of 3 inches high.

(b) A carrier tank used for the collection, removal, transportation, or disposal of sewage tank contents shall be fully enclosed, leak proof, fly proof, and so operated as to prevent spillage or leakage during collection, removal, transportation and disposal. The carrier tank, when used for holding septage, shall have a minimum effective holding capacity of 1,250 gallons.

(c) Only pumping equipment, tanks and vehicles approved or permitted by the LHD shall be used.

(d) The equipment, implements, containers or other devices used for the collection, removal, transporting or disposal of sewage tank contents shall be maintained and operated so as to prevent unsanitary or nuisance conditions.

(3) A person engaged in sewage-tank pumping shall have facilities available for the flushing, cleaning and deodorizing of sewage tanks, carrier tanks and the required cleaning implements and equipment. In these operations the following practices shall be observed:

(a) Waste water resulting from the flushing and cleaning shall be disposed of either by an OSS designed for such activity or by a sanitary sewer system, when available.

(b) Odor-controlling substances may be left in the sewage tank, carrier tank or other sewage tank cleaning implement or equipment, but in no case shall such substances be used in lieu of proper cleaning.

(4) A sewage-tank pumping contractor shall keep a complete record of facilities pumped or cleaned and shall submit such records to the LHD quarterly or when requested by the LHD. The LHD may suspend a sewage-tank pumping contractor's permit for refusing to submit records quarterly. The LHD shall determine the duration of the suspension period. Records shall specify the following:

(a) Name and address of the person for whom the waste was removed;

(b) Date of completion of the operation;

(c) Size of the tank and the amount, in gallons, of the waste removed;

(d) Location of the disposal site; and

(e) Method of final disposal.

(5) Septage shall be disposed of in a manner that will protect the public health and avoid nuisance conditions. Raw sewage, such as that removed from holding tanks and portable toilets, shall be disposed of only by an approved sanitary sewer system. Septage may be disposed of by the following approved methods:

(a) Discharging the contents into a public sewer manhole or at an acceptable point in a ADEM-permitted sewage treatment plant, provided that the written approval of the responsible person of the governmental entity or other entity owning or operating the public sewer system or sewage treatment plant is received by the pumper prior to the use of such disposal facilities. A copy of such approval shall be provided to the LHD with the sewage tank pumping permit application;

(b) Land application of septage may be permitted by the Board when proper application for permit is made by the owner. Such applications shall be submitted through the LHD to the Board, under the provisions of the Septage Management Rules, ADPH, Chapter 420-3-6; or

(c) To an ADPH-approved sewage tank for temporary storage.

(6) A permitted sewage-tank pumping contractor, when pumping a sewage tank, shall effectively and completely remove the liquid and sludge in the tank by removing the inspection ports at both ends of the tank or the lids covering both ends of the tank, where inspection ports are not provided, and pump all compartments. The pumper shall make the access ports used in pumping watertight at the end of the pumping, and shall report problems or

deficiencies noted in a tank to the LHD. These may include, but are not limited to, the structural soundness of the tank; the absence or condition of a baffle, an inlet or outlet fixture, an outlet filter; or the water-tightness of the tank.

(7) The LHD shall suspend a sewage tank pumping contractor's permit for a period of at least 6 months for improperly discharging septage into the environment. Depending on the severity of the violation, the Board may permanently revoke a sewage tank-pumping contractor's permit.

(8) A pumper of portable toilets shall meet all conditions of this Rule with the additional requirements listed below;

(a) A carrier tank used exclusively for the pumping of portable toilets or marine sanitation waste may have a minimum holding capacity of less than 1,250 gallons. The sewage-tank pumping contractor shall state in writing that the carrier tank is used only for the pumping of portable toilet or marine sanitation waste.

Authors: Kim Rice
Statutory Authority: Code of Ala. 1975, §§22-2-2(4); 22-2-2(6); 22-10-1, et seq.; 22-20-5; 22-26-1; 22-26-2; 22-26-3; 22-26-5; 22-26-7; 22-27-1, et seq.
History: Repealed and New Rule: Filed October 20, 2005, effective March 19, 2006. Amended: filed October 19, 2006; effective November 23, 2006.

SYSTEM DESIGN CRITERIA & TECHNICAL SPECIFICATIONS

420-3-1-.35 Engineer Design Required

(1) An OSS meeting one or more of the following conditions shall be designed by an engineer.

(a) The system is designed to handle more than 1,200 gpd, of sewage as determined by Rule 420-3-1-.36, Design Flow and Wastewater Concentrations.

(b) The system will handle any amount of high-strength sewage.

1. The high-strength system does not necessarily have to use advanced treatment unless the design flow is over 1,200 gpd but the field must be sized according to Rule 420-3-1-.39, EDF Sizing for Establishments.

(c) The site characteristics prohibit the use of a conventional system, or require any cut or fill to be used except that necessary to cover a shallow placement system.

(d) The lot is smaller than the minimums set out in Rule 420-3-1-.09, Minimum Lot Size Requirements for Sites Using an OSS.

(e) Sites that require mound systems as described in Rule 420-3-1-.66, Mounds.

(f) Sites which have received or will require Modification or Fill as described in Rule 420-3-1-.67, Lot Modification and Controlled Fill Systems.

(g) The REDF is to be smaller than the primary EDF or the REDF includes driveway or parking areas.

ATTACHMENT 3.6-1D
U.S. ENVIRONMENTAL PROTECTION AGENCY
ONSITE WASTEWATER TREATMENT SYSTEMS MANUAL
EPA/625/R-00/008
FEBRUARY 2002

U.S. Environmental Protection Agency

EPA/625/R-00/008

Onsite Wastewater Treatment Systems Manual

(3 pages: Title page, page ix, page 3-7)

February 2002

EPA/625/R-00/008
February 2002

Onsite Wastewater Treatment Systems Manual

Office of Water
Office of Research and Development
U.S. Environmental Protection Agency

Tables

Table 3-4. Typical wastewater flow rates from commercial sources[a,b]

Facility	Unit	Flow, gallons/unit/day		Flow, liters/unit/day	
		Range	Typical	Range	Typical
Airport	Passenger	2–4	3	8–15	11
Apartment house	Person	40–80	50	150–300	190
Automobile service station[c]	Vehicle served	8–15	12	30–57	45
	Employee	9–15	13	34–57	49
Bar	Customer	1–5	3	4–19	11
	Employee	10–16	13	38–61	49
Boarding house	Person	25–60	40	95–230	150
Department store	Toilet room	400–600	500	1,500–2,300	1,900
	Employee	8–15	10	30–57	38
Hotel	Guest	40–60	50	150–230	190
	Employee	8–13	10	30–49	38
Industrial building (sanitary waste only)	Employee	7–16	13	26–61	49
Laundry (self-service)	Machine	450–650	550	1,700–2,500	2,100
	Wash	45–55	50	170–210	190
Office	Employee	7–16	13	26–61	49
Public lavatory	User	3–6	5	11–23	19
Restaurant (with toilet)	Meal	2–4	3	8–15	11
Conventional	Customer	8–10	9	30–38	34
Short order	Customer	3–8	6	11–30	23
Bar/cocktail lounge	Customer	2–4	3	8–15	11
Shopping center	Employee	7–13	10	26–49	38
	Parking space	1–3	2	4–11	8
Theater	Seat	2–4	3	8–15	11

[a] Some systems serving more than 20 people might be regulated under USEPA's Class V Underground Injection Control (UIC) Program. See http://www.epa.gov/safewater/uic.html for more information.
[b] These data incorporate the effect of fixtures complying with the U.S. Energy Policy Act (EPACT) of 1994.
[c] Disposal of automotive wastes via subsurface wastewater infiltration systems is banned by Class V UIC regulations to protect ground water. See http://www.epa.gov/safewater/uic.html for more information.

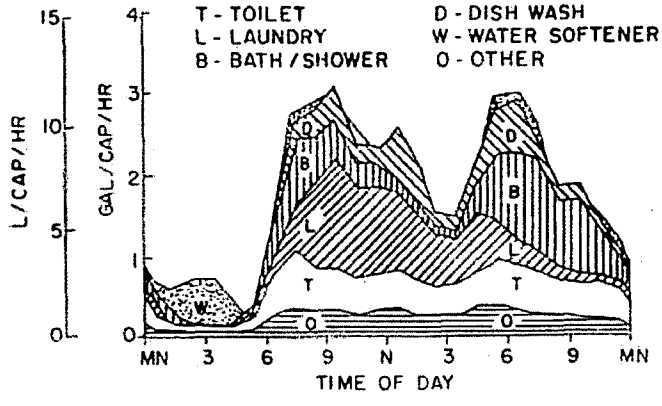
Source: Crites and Tchobanoglous, 1998.

3.3.3 Variability of wastewater flow

Variability of wastewater flow is usually characterized by daily and hourly minimum and maximum flows and instantaneous peak flows that occur during the day. The intermittent occurrence of individual wastewater-generating activities can create large variations in wastewater flows from residential or nonresidential establishments. This variability can affect gravity-fed onsite systems by potentially causing hydraulic overloads of the system during peak flow conditions. Figure 3-3 illustrates the routine fluctuations in wastewater flows for a typical residential dwelling.

Wastewater flow can vary significantly from day to day. Minimum hourly flows of zero are typical for

Figure 3-3. Daily indoor water use pattern for single-family residence



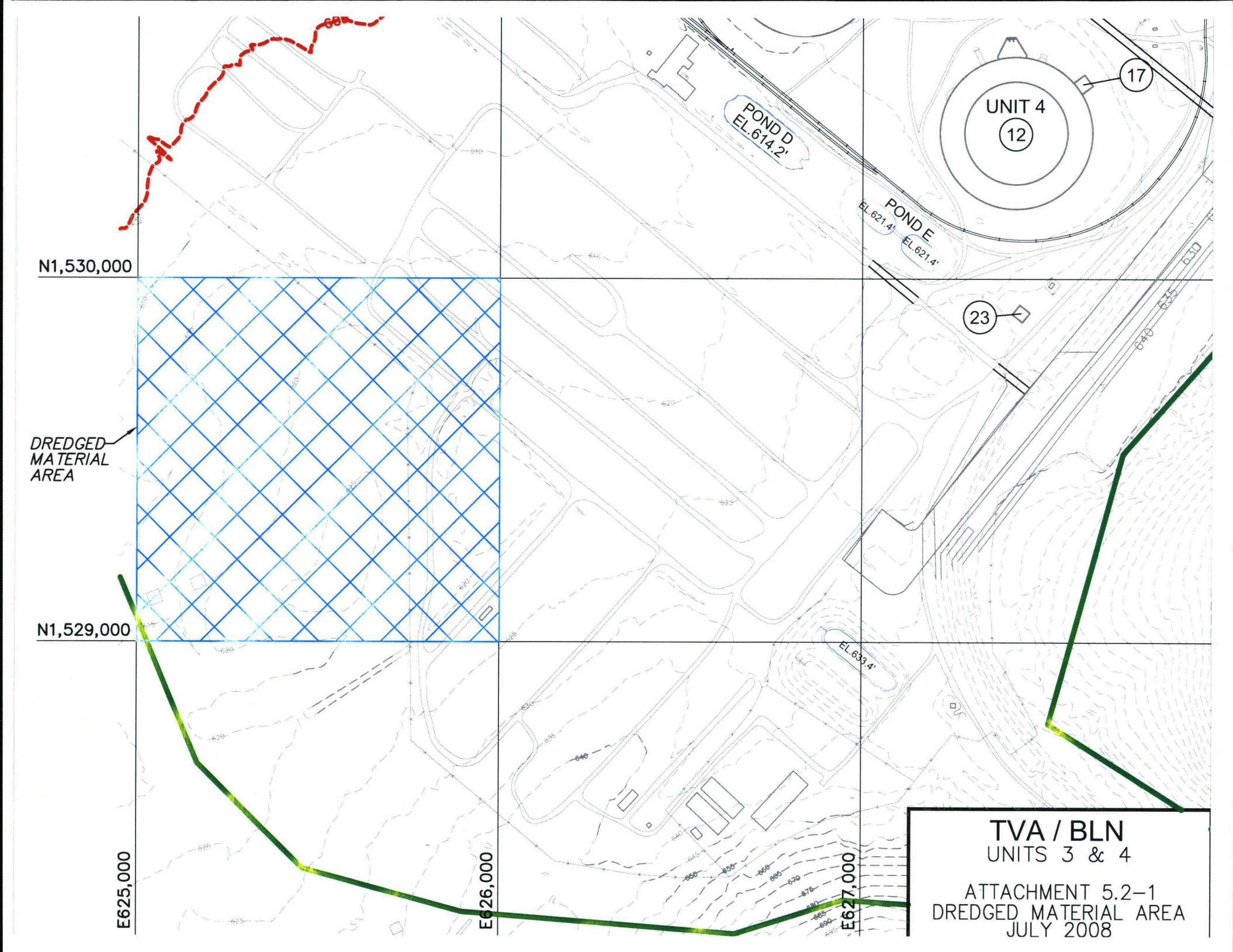
Source: University of Wisconsin, 1978.

ATTACHMENT 5.2-1
TENNESSEE VALLEY AUTHORITY
DRAWING - DREDGED MATERIAL AREA
JULY 2008

Tennessee Valley Authority

Drawing
Dredged Material Area

July 2008


N1,530,000
N1,529,000
E625,000
E626,000
E627,000
DREDGED MATERIAL AREA
POND D EL.614.2'
POND E EL.621.4'
EL.621.4'
EL.633.4'
UNIT 4
12
17
23
TVA / BLN
UNITS 3 & 4
ATTACHMENT 5.2-1
DREDGED MATERIAL AREA
JULY 2008

Envirex

Service Manual
Envirex Traveling Water Screen
- Four Post -
(Data Sheet No. 330.3.022.02.01, Page 4 of 5)
and
Installation Drawing Illustrating Base Elevation of the Screen
(Two installation drawings)

June 1977

Envirex
a Rexnord Company

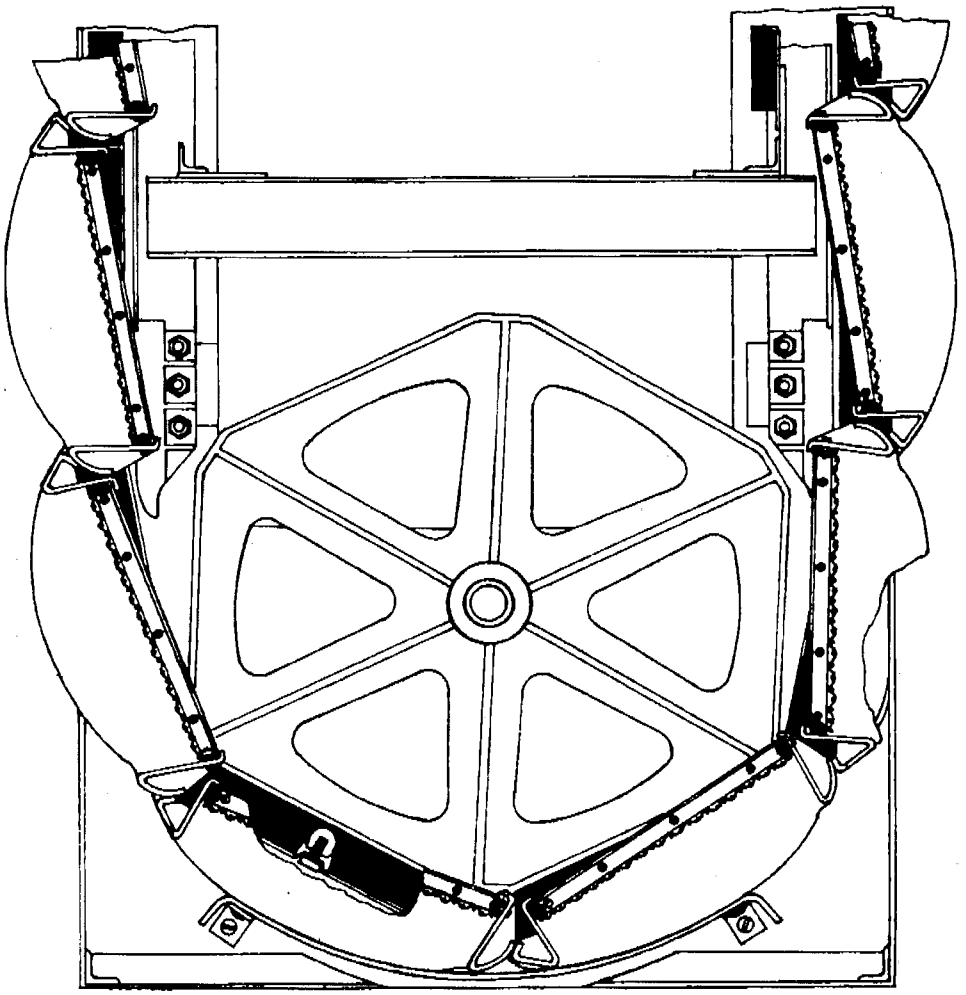
SERVICE MANUAL

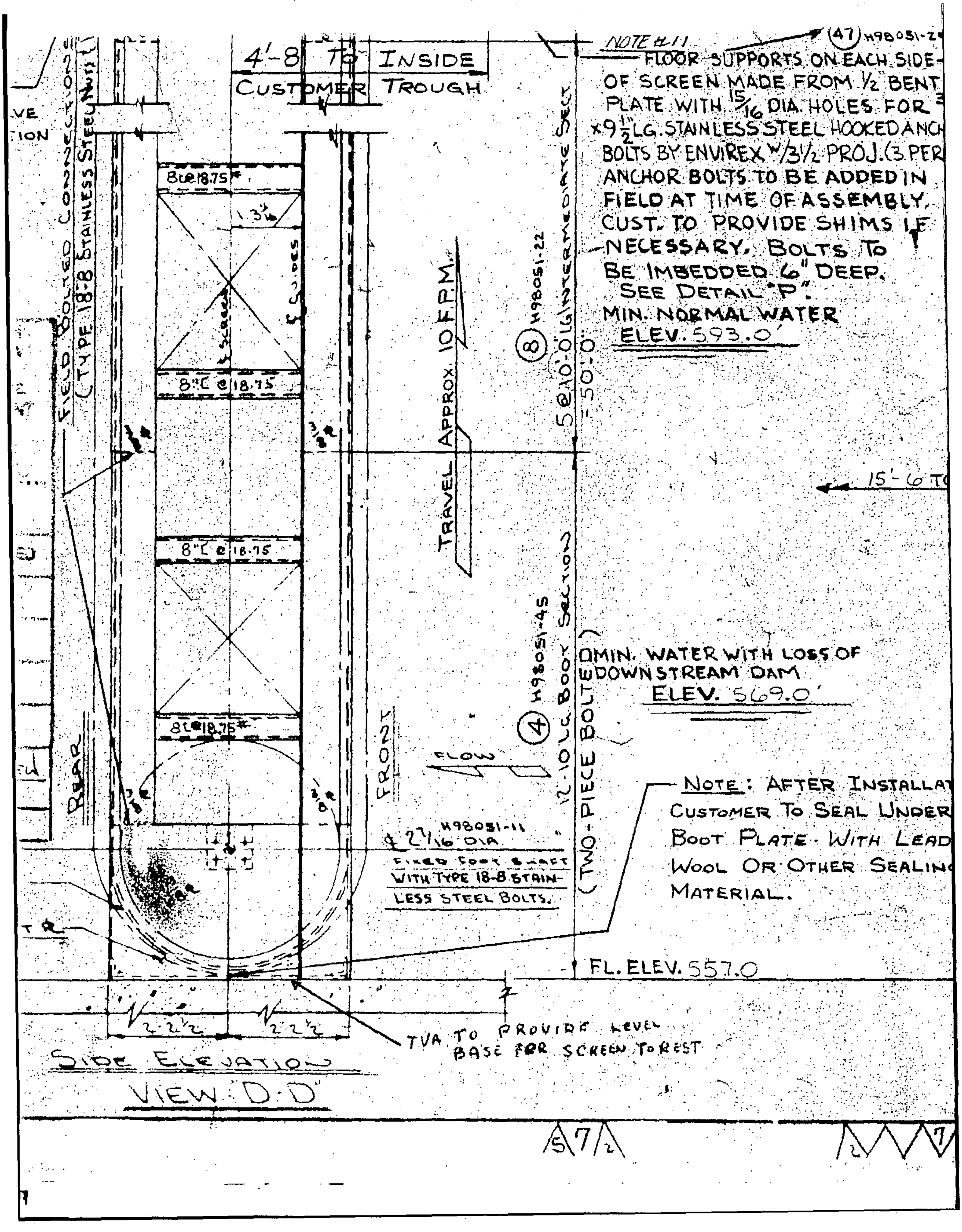
Data Sheet No.
330-3.022.2.01
Page 4 of 5
Issued June 1977
Supersedes May 1976

PRODUCT

Envirex TRAVELING WATER SCREEN
- FOUR POST -

Installation




4'-8 TO INSIDE
CUSTOMER TROUGH
NOTE #11
(47) H98051-24
FLOOR SUPPORTS ON EACH SIDE OF SCREEN MADE FROM ½" BENT PLATE WITH 15/16 DIA. HOLES FOR ⅞ x9½"LG. STAINLESS STEEL HOOKED ANCHOR BOLTS BY ENVIREX W/3½ PROJ. (3 PER ANCHOR BOLTS TO BE ADDED IN FIELD AT TIME OF ASSEMBLY. CUST. TO PROVIDE SHIMS IF NECESSARY. BOLTS TO BE IMBEDDED 6" DEEP. SEE DETAIL "P".
MIN. NORMAL WATER
ELEV. 593.0'
FIELD BOLTED CONNECTION
(TYPE 18-8 STAINLESS STEEL NUTS)
8C@18.75#
8"C@18.75
8"C@18.75
8C@18.75#
TRAVEL APPROX. 10 FPM.
(8) H98051-22
5@10'-0 LG. INTERMEDIATE SECT.
=50'-0"
15'-6 TO
(4) H98051-45
12'-10 LG. BOOT SECTION
(TWO-PIECE BOLTED)
MIN. WATER WITH LOSS OF DOWNSTREAM DAM
ELEV. 569.0'
REAR
FRONT
FLOW
H98051-11
℄ 2 7/16 DIA.
FIXED FOOT SHAFT WITH TYPE 18-8 STAINLESS STEEL BOLTS.
NOTE: AFTER INSTALLAT[ION] CUSTOMER TO SEAL UNDER BOOT PLATE WITH LEAD WOOL OR OTHER SEALIN[G] MATERIAL.
FL. ELEV. 557.0
2-2½
2-2½
TVA TO PROVIDE LEVEL BASE FOR SCREEN TO REST
SIDE ELEVATION
VIEW "D-D"