GROUNDWATER MONITORING PROGRAM

PROCEDURE USAGE REQUIREMENTS-		SECTIONS
Continuous Use:	Procedure must be open and readily available at the work location. Follow procedure step by step unless otherwise directed.	**NONE**
Reference Use:	Procedure or applicable section(s) available at the work location for ready reference by person performing steps.	**ALL**
Information Use:	Available on plant site for reference as needed.	**NONE**

REFERENCE USE

1.0 PURPOSE

The Groundwater Monitoring Program is implemented to keep track of ground water levels and movement for the life of the plant. The Groundwater Monitoring Program is a separate program, not part of Technical Specifications, and implemented as specified in this procedure. This program is designed to monitor ground water levels in both the confined and unconfined aquifers for the life of the plant. Back fill wells not abandoned will be maintained for the permanent monitoring program.

This procedure provides definitions, responsibilities, requirements and instructions for groundwater monitoring in the following:

2.0 DEFINITIONS

2.1 STATIC WATER LEVEL ELEVATION

Water level recorded when the pump is off; this is the distance between the inspection port and the water level.

2.2 PUMPING WATER LEVEL ELEVATION

Water level recorded when the pump is pumping; this is the distance between the inspection port and the water level.

2.3 DRAWDOWN

The difference between static and pumping water elevations.

3.0 RESPONSIBILITIES

3.1 CHEMISTRY MANAGER

The Chemistry Manager has overall responsibility for the Groundwater Monitoring Program.

3.2 CHEMISTRY SUPPORT SUPERVISOR

The Chemistry Support Supervisor - Implements the Groundwater Monitoring Program.

3.3 NUCLEAR SPECIALIST

3.3.1 The Nuclear Specialist is responsible for the following:

3.3.2 Directs investigation of abnormal well water level fluctuations or trends.

3.3.3 Reviews, and submits groundwater monitoring data to supervision.

3.3.4 Compiling and submitting reports in accordance with the NRC Groundwater Monitoring Program.

3.3.5 Submitting State of Georgia Groundwater Use Reports to Environmental Protection Division.

3.4 NUCLEAR CHEMISTRY TECHNICIANS

The Nuclear Chemistry Technicians are responsible for performing the Groundwater Monitoring Program at VEGP in accordance with this procedure.

3.4.1 Maintains well cap security keys and /or combinations.

3.4.2 Request WO's for cleaning or repairing.

4.0 PROCEDURE

4.1 NRC GROUNDWATER MONITORING

4.1.1 Description And Requirements

4.1.1.1 Manual well water level measurement must be performed and reported quarterly on all active observation wells throughout plant life.

4.1.1.2 Well depth measurements must be performed and reported semi-annually (June, December) on all active monitoring wells.

4.1.1.3 Quarterly (March, June, September, December) measurements shall be taken of the four wells in the area of Power Block backfill. Well numbers LT-1B, LT-7A, LT-12 and LT-13.

4.1.1.4 Semi-annual (June & December) measurements shall be taken of the four water table aquifer wells outside the Power Block. Well numbers 802A, 805A, 806B, and 808.

4.1.2 Data Collection

NOTE

Either a Slope Water Level Indicator or a Powers Portable Well Sounder may be used to obtain the static and pumping elevations.

4.1.2.1 If a Slope Water Level Indicator is used, obtain the Slope Water Level Indicator and ENSURE it is in current calibration.

4.1.2.2 POSITION the instrument's test switch to test and ENSURE visual and audio indicators are activated.

NOTE

Additional operating instructions are in 37035-C, "Operation And Calibration Of The Slope Water Level Indicator".

4.1.2.3 OBTAIN well head keys or combinations and LOCATE monitoring wells from Figure 1 and Table 2.

4.1.2.4 At the well location site, UNLOCK and REMOVE the well cap from observation monitoring port.

4.1.2.5 LOCATE the probe portal reference elevation at the top of the monitoring port pipe. All level indications should be taken at this reference point.

NOTE

When maintenance is performed on a well, ensure reference point changes are documented. If necessary, have the well re-surveyed.

4.1.2.6 POSITION the water level indicator at the edge of the monitoring port.

4.1.2.7 SLOWLY LOWER the probe until the water surface is indicated by sustained audio and visual response.

4.1.2.8 SLOWLY RAISE AND LOWER the probe until intermittent audio and visual responses occur.

4.1.2.9 RECORD the well water level probe reading on Data Sheet 1 to the nearest one tenth decimal place.

4.1.2.10 If required, OBTAIN well bottom probe reading as follows:

a. LOWER probe into the well,

b. When probe touches bottom, as indicated by lack of cable tension, RECORD well bottom probe reading.

4.1.3 Data Handling:

4.1.3.1 CALCULATE and RECORD water elevation on Data Sheet 1 for each well as follows:

Reference Elevation - Probe Reading = Water Elevation

4.1.3.2 OBTAIN previous readings for each well and RECORD on Data Sheet 1.

4.1.3.3 CALCULATE and RECORD water elevation difference on Data Sheet 1 for each well as follows:

Water Elevation - Previous Reading = Difference

4.1.3.4 CALCULATE and RECORD well depth difference on Data Sheet 1 for each applicable well as follows:

Bottom Probe Reading - Construction Depth = Difference

4.1.3.5 INITIAL Data Sheet 1 for each well.

4.1.3.6 FORWARD the completed Data Sheet 1 to the Nuclear Specialist.

4.1.3.7 The Nuclear Specialist will perform the following:

a. Review data,

b. Identify any abnormalities greater than 2 feet,

c. Recommend immediate remeasuring,

d. Initiate corrective actions and notify the Vogtle Project Engineering Support Group (VPESG).

e. Immediately notify the VPESG (Birmingham) and Programs Engineering if one observation well in the Power Block drops to elevation 155 or below. If the water level reaches elevation 150 or below, immediately notify Programs Engineering that Settlement Monitoring under procedure 84301-C is required.

f. ENSURE that the VPESG receives a copy of Data Sheet 1 quarterly.

g. ENSURE the original Data Sheet 1 is transmitted to Document Control.

4.2 STATE OF GEORGIA GROUNDWATER MONITORING

4.2.1 Description and Requirements

4.2.1.1 Complete Worksheet 1 or make CDM entry to log ground water usage and forward to the Nuclear Specialist.

4.2.1.2 The Chemistry Department uses daily Operations Department data to assimilate monthly totals, daily maximum and monthly average per day of groundwater used. Results are recorded in a data base or on a spreadsheet. This information is included in the Semi-Annual Groundwater Use Report that is submitted to the EPD semi-annually (January, July).

4.2.1.3 Semi-annually in the last month (June, December) of reporting period, the Chemistry Department determines static and pumping water levels of at least 2 of the 8 pumping wells with the highest yields and submits results to the Georgia Environmental Division on the Groundwater Use Report. See Figure 3. Although the Recreation Center well may not be one of the highest yielding wells, it may be used as an alternate. Consult the Nuclear Specialist to determine which wells are to be tested.

4.2.1.4 Annually, the Chemistry Department determines the specific conductivity and temperature of the water from the highest yielding well and submits the data to Environmental Affairs. Environmental Affairs will submit the results to the EPD on corporate letterhead and shall include the data sampled, a map depicting where the groundwater sample was collected, temperature of the water sample at the time of testing, the specific conductance, and the units of measurement.

4.2.1.5 The State of Georgia Permit To Use Groundwater, Permit 017-0003 (modified) has the following provisions:

a. Valid for groundwater withdrawal from the cretaceous sand aquifer. No other aquifer can be used without the approval of the EPD.

b. The permittee will comply with the provisions of the Groundwater Use Act, as amended, and the rules and regulations thereto:

(1) Monthly Average Withdrawal Limit - 6,000,000 GPD

(2) Annual Average Withdrawal Limit - 5,500,000 GPD

4.2.2 Data Collection

NOTE

When the Recreation Center well is tested, Operations will not be involved. As appropriate, Coordinate with Maintenance personnel to place the pump in manual/auto.

4.2.2.1 SELECT the well to be tested and PERFORM the following:

a. RECORD the six month period from/through on Data Sheet 2,

b. RECORD well number and date of the well to be tested on Data Sheet 2,

c. COORDINATE well pump shutdown with Operations,

d. RECORD the date/time well pump was stopped on Data Sheet 2.

NOTE

The Slope Water Level Indicator may be used to obtain the static and pumping elevations for Well #1. For Well #2, a portable air compressor or other air supply in conjunction with CLI-7704 will be used to get both the static and pumping water elevations.

4.2.2.2 If a Slope Water Level Indicator is to be used, OBTAIN the Slope Water Level Indicator and PERFORM the following:

a. ENSURE indicator is in current calibration,

b. POSITION the Indicator Test Switch to TEST and ENSURE visual and audio responses,

c. RECORD Indicator Serial Number on Data Sheet 2,

d. As required, REFER to 37035-C, "Operation And Calibration Of The Slope Water Level Indicator".

4.2.2.3 At the well location, REMOVE the monitoring port screw cap (not applicable for Well #2).

NOTE

Well pump must be shutdown at least 30 minutes prior to taking static probe reading.

4.2.2.4 OBTAIN the Static Probe Reading as follows:

4.2.2.4.1 For all wells except Well #2:

a. POSITION the water level indicator at the probe portal reference elevation,

b. SLOWLY LOWER the probe until the water surface is indicated by sustained audio and visual response,

c. SLOWLY RAISE AND LOWER the probe until intermittent audio and visual response occurs,

d. RECORD the static probe reading to the nearest one tenth decimal point on Data Sheet 2,

e. RECORD the time static probe reading was taken.

4.2.2.4.2 For Well #2:

NOTE

Do not exceed 90 psig when applying air pressure to CLI-7704.

a. REMOVE the threaded cap on the valve stem of CLI-7704.

b. CONNECT the air supply to the valve stem on CLI-7704.

c. APPLY air to the air line on CLI-7704 until the gauge hand remains stationary.

d. RECORD the static gauge reading on Data Sheet 2.

e. RECORD the time static gauge reading was taken.

f. BLEED off air from CLI-7704 by pushing in valve stem pin.

g. REPLACE threaded cap to valve stem of CLI-7704.

4.2.2.5 OBTAIN the pumping probe reading as follows:

4.2.2.5.1 For all wells except Well #2:

a. COORDINATE well pump start with operations,

b. RECORD time well pump started,

NOTE

Well pump must run for at least 30 minutes prior to taking pumping probe readings.

c. SLOWLY RAISE AND LOWER the probe until intermittent audio and visual response occur,

d. RECORD pumping probe reading to the nearest one-tenth decimal point on Data Sheet 2.

4.2.2.5.2 For Well #2:

NOTE

Do not exceed 90 psig when applying air pressure to CLI-7704.

a. COORDINATE well pump start with operations.

b. RECORD time well pump started.

NOTE

Well pump must run for at least 30 minutes prior to taking pumping probe readings

c. APPLY air to air line on CLI-7704 until the gauge hand remains stationary.

d. RECORD the pumping gauge reading on Data Sheet 2.

e. RECORD the time pumping gauge reading was taken.

f. BLEED off air from CLI-7704 by pushing in valve stem pin.

g. REPLACE threaded cap to valve stem of CLI-7704.

NOTE

After the static and pumping readings have been obtained for the second well to be tested, the well pump may be left running or aligned as directed by Operations procedure 13740-C. In this case, the time that the well pump was stopped is not applicable and N/A should be entered on the data sheet.

4.2.2.6 MONITOR for well pump auto stop or COORDINATE with Operations to stop the well pump and RECORD time well pump stopped on Data Sheet 2

4.2.2.7 If required, SAMPLE and ANALYZE the highest yielding well for specific conductivity and temperature and RECORD results on Data Sheet 2.

4.2.2.8 REPEAT Steps 4.2.2.1 through 4.2.2.7 for the second selected well.

4.2.3 Data Handling

4.2.3.1 CALCULATE and RECORD the following for wells tested on Data Sheet 2:

a. Well Probe Portal Reference Elevation - From Nuclear Specialist,

b. Static Water Level Elevation = Reference Elevation - Static Probe Reading,

c. Pumping Water Level Elevation = Reference Elevation - Pumping Probe Reading,

d. Total Gallons Pumped = Before Pump Start Meter -Pump Stop Meter X 100 if totalizer available, if totalizer is unavailable go to step 4.2.3.2.

4.2.3.2 FORWARD Data Sheet 2 to the Nuclear Specialist.

4.2.3.3 The Nuclear Specialist will perform the following:

a. Review data,

b. Identify and correct abnormalities,

c. ENSURE the original Data Sheet 2 is transmitted to Document Control.

4.3 EARLY SITE PERMIT GROUNDWATER MONITORING

This procedure section provides guidance for temporary monitoring of wells drilled for the purpose of the Early Site Permit Monitoring program. Monitoring of these wells will be performed only for the duration requested by the Early Site Permit project manager and are not subject to commitments of the NRC Groundwater Monitoring Program or the State of Georgia Groundwater Monitoring Program.

4.3.1 Description, Precautions and Requirements

4.3.1.1 Manual well water level measurements are to be performed monthly on all observation wells designated for the Early Site Permit Monitoring program as listed on Data sheet 3.

4.3.1.2 A copy of Data Sheet 3, when completed, should be forwarded to the Early Site Permit project manager, at SNC Environmental Affairs in Birmingham.

4.3.1.3 The well monitoring evolutions should occur at approximately the same week of each month during the term of the study. (i.e. the 3rd Saturday of each month)

4.3.1.4 Several of these wells are in remote areas of the site. Exercise diligent caution when transiting to each well location. Sharp drop offs, wash outs, infrequently used dirt roads and paths should be kept as a safety focus. Keep a watchful eye out for feral hogs, snakes, and other potential animal encounters while in the field. Insects such as mosquitoes, deer flies and wasps will also be a likely nuisance. Weather conditions should be monitored and, if warranted, noted on Data Sheet 3.

4.3.1.5 If monitoring activity is to be performed alone, ensure that a working means of communication is kept with the monitoring individual at all times.

4.3.2 Data Collection

NOTE

A Slope Water Level Indicator should be used to obtain the static elevations. Ideally, the same instrument should be used throughout the study if possible.

4.3.2.1 Obtain Slope Water Level Indicator and ENSURE it is in current calibration. Record the instrument number and calibration due date on Data Sheet 3.

4.3.2.2 TEST the instrument by depressing the test button and ENSURE visual and audio indicators are activated.

NOTE

Additional operating instructions are in 37035-C, "Operation and Calibration Of The Slope Water Level Indicator".

4.3.2.3 OBTAIN well head keys or combinations, if needed, and LOCATE monitoring wells from the "Groundwater Observation Wells Location Plan" map provided by the SNC project manager. The map, sounding instruments, current procedures, and data sheets may be obtained from the Environmental Chemistry technician in a binder located in the STP laboratory or at another location designated in the environmental report.

4.3.2.4 At the well location site, OPEN the well cap/cover for the observation monitoring port.

4.3.2.5 LOCATE the probe portal reference elevation at the monitoring port pipe. All level indications should be taken at the reference point. This reference point on the PVC pipe has been marked with a permanent marker. If mark becomes faded, reapply permanent ink to the PVC over the original point and make note in the remarks section of Data Sheet 3.

4.3.2.6 POSITION the water level indicator at the edge of the monitoring port.

4.3.2.7 SLOWLY LOWER the probe until the water surface is indicated by sustained audio and visual response.

4.3.2.8 SLOWLY RAISE AND LOWER the probe until intermittent audio and visual responses occur.

4.3.2.9 RECORD the well water level probe reading at the top of the marked reference point onto Data Sheet 3 to the nearest one hundredth decimal place.

4.3.2.10 REPLACE well cover and, if initially found locked, RELOCK.

4.3.2.11 PROCEED to the next desired well location and perform monitoring until all desired wells are measured.

4.3.3 Data handling:

NOTE

Reference elevations may not be available for all the wells during the first few months of the monitoring program. In this event, leave the reference elevation data point blank on Data sheet 3 and skip step 4.3.3.1 for those wells.

4.3.3.1 CALCULATE and RECORD water elevation on Data Sheet 3 for each well as follows:

Reference Elevation – Probe Reading=Water Elevation

4.3.3.2 INITIAL Data Sheet 3 for each well.

4.3.3.3 FORWARD Data Sheet 3 to Chemistry Support Supervisor or his designee for review.

4.3.3.4 Notify Early Site Permit project manager of any issues.

5.0 REFERENCES

5.1 VEGP FSAR Chapter 2

5.2 Specification X2AP01, Section C2.18 "Observation Wells".

5.3 State of Georgia Permit To Use Groundwater, Permit 017-0003 (Modified)

5.4 Slope Indicating Company, Model 51453, Water Level Indicator Operating Instructions

5.5 Southern Company Services Recommendation, File: REA VC-2001 Log: SG-12283

5.6 PROCEDURES

5.6.1 37035-C, "Operation And Calibration Of The Slope Water Level Indicator"

END OF PROCEDURE TEXT

TABLE 1
OBSERVATION WELLS

Water-Table Aquifer - Unconfined

Well No.	Installed (Yr.)	Coordinates N	Coordinates E	Top of PVC Elev.(ft.)	Well Depth (ft.)
802A	1985	7196	10194	218.87	88.75
805A	1979	6672	10403	236.71	125
806B	1980	8821	9726	215.82	70
808	1985	9625	9300	216.40	74.97
LT-1B	1985	8388	9304	221.84	93.31
LT-7A	1985	8151	9317	221.17	92
LT-12	1985	7775	9600	219.24	88.87
LT-13	1985	8135	10110	220.61	90.66

TABLE 2

INSIDE PROTECTED AREA

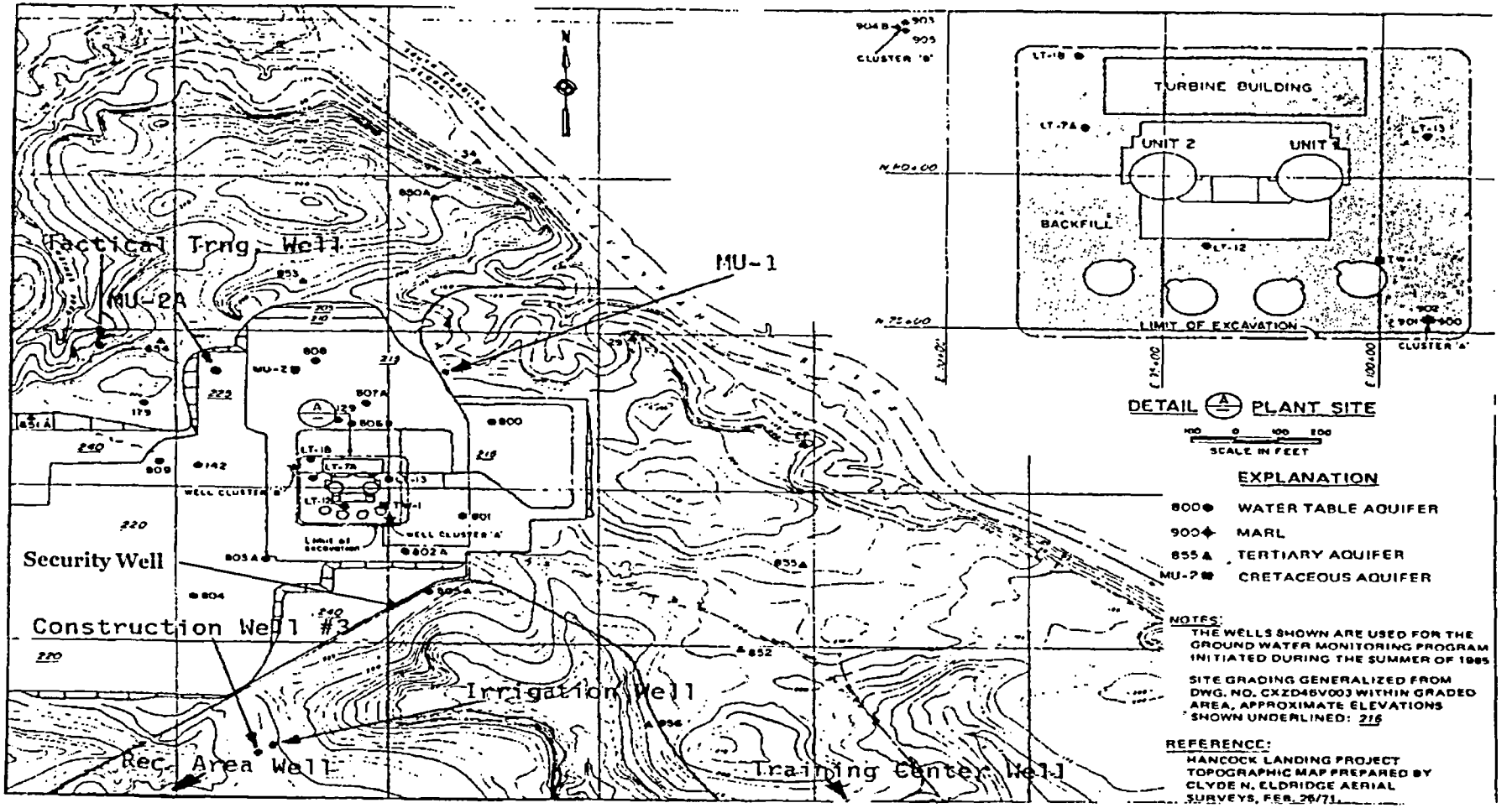
802 A	Unit 1 side. South of the Nuclear Operations Warehouse. Near the security isolation zone.
LT 13	Unit 1 side. Located in the tan aluminum building northeast of the CST'S near the intersection.
LT-12	Unit 2 side. Located south of the Auxiliary Building and north of NSCW B and west of railroad entrance to Refueling Building.
LT 7A	Unit 2 side. Located at the northeast corner of the north CST.
LT 1B	Unit 2 side. Located approximately 50 feet west of the northwest corner of the Turbine Building.

INSIDE HIGH VOLTAGE SWITCHYARD

808	North area of switchyard inside a 6 X 8 feet tan aluminum building.

OUTSIDE PROTECTED AREA

806 B	Unit 1 side. North of the Turbine Building and south of High Voltage Switchyard. Travel down the security isolation zone corridor.
805 A	Located southwest of Visitors Center near the helicopter pad.



NOTE: Recreation Area Well is located at the VEGP Recreation Area. Training Center Well is located at the VEGP Simulator Building.

FIGURE 1 - Observation and Water Supply Wells

DEPARTMENT OF NATURAL RESOURCES STATE OF GEORGIA
GROUNDWATER USE REPORT

This form shall be submitted to the Division twice each year, within the reporting period specified on the Groundwater Withdrawal Permit under Standard Condition No. 3.

(Print or type all information)

Permittee Information		
Contact Person:	Phone:	Email:
Company / Permittee:		
Address:		
(No. and Street)	(City)	(State) (Zip)
GW Withdrawal Permit No.: -	For six (6) month period from January	thru June
County where well(s) is located: _____		
This report is on the _____ aquifer(s) used by well(s) numbered ____		

Month/Year	Amount of water pumped from aquifer(s) each MONTH (in gallons)		Method used to determine pumpage
	System Total from ALL wells	Monthly Average (Total/Days in Month)	
/	gal	gal	☐ Flow meter
/	gal	gal	☐ Other (specify below)
/	gal	gal	_____
/	gal	gal	_____
/	gal	gal	_____
/	gal	gal	Average hours pumped
Six Month - Grand Total	gal		per day _____

Static water level (SWL)***	ft.	Elevation	ft.	Well no.	Date measured
Pumping water level (PWL)***	ft.	Elevation	ft.	Well no.	Date measured

(Use additional sheet if necessary)

Number of hrs shutdown for SWL measurement ____. Number of continuous hrs pumped for PWL measurement

Method of measurement: ☐ Air line ☐ Probe ☐ Tape ☐ Other (specify)

Measurement from: ☐ Top of casing ☐ Ground ☐ Other (specify)

***** Obtain and submit appropriate sets of water level measurements as indicated below:**

From 1-5 wells – a set from ONLY 1 WELL	Take readings from the highest yield well(s) using the same well(s) each time. For additional wells, follow this format.
From 6-10 wells – a set from ONLY 2 WELL	
From 11-15 wells – a set from ONLY 3 WELL	
From 16-20 wells – a set from ONLY 4 WELL	

And such other pertinent information submitted by the applicant or required by the Division.

I certify that the above information is true to the best of my knowledge and belief.

Signed _____ Title Chemistry Manager - Vogtle Nuclear Plant Date _____

FIGURE 3

DATA SHEET 1

NRC GROUNDWATER MONITORING AREA

WELL NO.	DATE	WELL WATER ELEVATION (FT)					WELL DEPTH (FT)			REMARKS	INITIALS
		REF. ELEV	PROBE READING	WATER ELEV.	PREVIOUS READING	DIFF	PROBE READING	CONST. DEPTH	DIFF.		
LT-1B		221.8						93.3			
LT-7A		221.2						92			
LT-12		219.2						88.9			
LT-13		220.6						90.7			
802A		218.9						88.8			
805A		236.7						125			
806B		215.8						70			
808		216.4						75			

Reviewed By/Date _____ / _____

DATA SHEET 2
STATE OF GEORGIA GROUNDWATER MONITORING DATA

For Six Month Period From _____ Thru _____

Test Well Number	Date Measured
Water Level Indicator Serial Number	
Time Well Pump Was Stopped	
Static Probe Reading (FT)	Time
Well Probe Portal Reference Elevation*	
Static Water Level Elevation = Ref. Elev. - Static Reading	
Time Well Pump Started	
Pumping Probe Reading (FT)	Time
Pumping Water Level Elevation = Ref. Elev. - Pumping Reading	
Time Well Pump was Stop	
Specific Conductivity _____µmhos/cm @ _____°(F /C)	

*REFERENCE ELEVATIONS (FT)	
MU-1	200.53
MU-2A	226.0
CW1, 2, 3	Survey Req'd
TCW	Survey Req'd
Rec. Center	168.197
TW-1	221.0

PERFORMED BY: _____ DATE: _____

REVIEWED BY: _____ DATE: _____

DATA SHEET 3
EARLY SITE PERMIT WELL MONITORING

Performed By: _____ Instrument Type: _____
Print

Instrument S/N: _____

Date: _____

Cal. Due Date: _____

TIME	WELL NUMBER	REFERENCE ELEVATION	PROBE READING	WATER ELEVATION	REMARKS	INITIALS
	142					
	179					
	802A					
	803A					
	804					
	805A					
	806B					
	808					
	809					
	LT-1B					
	LT-7A					
	LT-12					
	LT-13					
	27					
	29					
	850A					
	851A					
	852					
	853					
	854					
	855					
	856					

Completed By: _____ Date: _____
Sign

Reviewed By: _____ Date: _____
Sign

DATA SHEET 3
EARLY SITE PERMIT WELL MONITORING

Performed By: _____ Instrument Type: _____
Print

Instrument S/N: _____

Date: _____

Cal. Due Date: _____

TIME	WELL NUMBER	REFERENCE ELEVATION	PROBE READING	WATER ELEVATION	REMARKS	INITIALS
	OW-1001					
	OW-1002					
	OW-1003					
	OW-1004					
	OW-1005					
	OW-1006					
	OW-1007					
	OW-1008					
	OW-1009					
	OW-1010					
	OW-1011					
	OW-1012					
	OW-1013					
	OW-1014					
	OW-1015					
	OW-1001A					

Completed By: _____ Date: _____
Sign

Reviewed By: _____ Date: _____
Sign

WORKSHEET 1

WEEKLY GROUNDWATER USE INSPECTION REPORT

DATE _____ **THRU** _____

GROUNDWATER USE LOG (DAILY READING)
CONSTRUCTION WELLS

	MON	TUES	WED	THURS	FRI
CONSTRUCTION WELL #3 METER READING					
GALLONS					
IRRIGATION WELL#4 METER READING					
GALLONS					
SECURITY WELL READING					
GALLONS (1)					

1. The security well totalizer reads out in actual gallons (ie..you don't have to multiply by 100). The well totalizer is located in a closet inside the lobby area near the back. It has a blue flip cover.

REMARKS: _____