My name is Howard M. Deutsch and I am employed by the Georgia Institute of Technology (GIT) as a Senior Research Scientist. In this capacity I do not work on any projects related to the nuclear power industry and have never done so in my past professional history. My educational background includes a B.S. (Chemistry) in 1962 from Georgia Institute of Technology and PhD (Organic Chemistry) in 1967 also from GIT . From 1966 to 1974, I was employed by Union Camp Corporation in Princeton, New Jersey and did industrial research related to the pulp and paper industry.

As a spokeman for joint intervenors, I am very familiar with contention 10.5 and was largely responsible for its formulation, and the research to show that this issue should be brought to the attention of the ASLB. We orignally contended that:

"Some of the equipment specified in VEGP FSAR table 3.11.N.1-1 as being environmentally qualified may in fact be unqualified. For example, on August 31, 1983, NRR issued a Board notification transmitting a summary of a Staff investigation into Franklin Research Center tests on solenoid valves. Over half the valves failed in tests simulating normal and accident conditions. BN 83-128.

Several valves manufactured by ASCO failed early after exposure to 340 degrees F., i.e., they had little or no time to perform their safety function before failing. Over one year earlier ASCO's own testing had shown poor performance of these valves, and had reported this to the EQB. The EQB memo from R. Vollmer to D. Eisenhut (included in BN83-128A) stated the staff "continues to approve" the qualification of valves on the basis

of 1978 tests. The applicable standard in 1978 was IEEE 382-1972, which has since been replaced with IEEE 382-1980. The EQB concluded that the early failure of the ASCO solenoid valves makes them unacceptable for use in safety systems and suggested that licensees and applicants be prohibited from using the valves in any application where conditions could be more severe than those reported in the qualification test report. In relationship to VEGA, FSAR table 3.11.N.1-1 (environmentally qualified equipment) shows the sum of twenty three separate ASCO solenoid valves. The function of some of the valves is not listed and in no case is the qualification reference listed."

The ASLB accepted this contention, as a separate subcontention among a number of contentions in the area of environmental qualifications, which was part of a package of contentions dealing with safety-related items at VEGP. After several rounds of discovery, in which the applicant refused to answer most of the intervenors' questions, and were later compelled to answer by the ASLB, the applicants filed for summary disposition on July 31,1985. In their memorandum of January 7, 1986, the ASLB denied the motion and made it very clear that there were many areas of material facts for which genuine issues remain to be heard.

I would like to briefly summarize, to the best of my knowledge the testing history that has been done on ASCO solenoid valve, so that it will be obvious to anyone looking at these facts that the valve should not be considered qualified.

Valve NP8316 was tested in 1979 by Isomedix for ASCO and

judged to have sucessfully passed the tests. In 1980 and 1981, Westinghouse and ASCO jointly tested these valves and judged them to be qualified. However, in these tests malfunctions did occur. These malfunctions happened after a period time designed to simulate one year of plant operation after a design basis accident (DBA). This one year period does not appear to be related to any known NRC regulation. Another valve had to have the operating voltage increased to compensate for a leaking housing (apparently this was judged adequate by ASCO/Westinghouse).

Franklin Research Center (FRC) also tested NP8316 valves for the NRC staff. Of two valves tested, both failed to function properly during simulated DBA transients; these results were published as NUGEG/CR-3424.

The NP8320 valve was tested by ASCO/Westinghouse in the same manner as the previous valve. No unusual results were reported. FRC also tested one NP8320 valve, which functioned properly throughout the testing program, but was found to have a valve seat leakage of "in excess of 100 cubic feet per hour". ASCO calculated 151 cubic feet per hour as the threshold of acceptability. Clearly, this is not much margin and further tests should be performed.

The NP8321 valve is similar to the NP8316 but somewhat smaller and not designed to be in the containment environment. This valve was tested by Isomedix and appeared to perform satisfactorily. Westinghouse/ASCO also tested the NP8321, which failed during a simulated DBA. This failure occured during the twelveth day of testing and was judged by applicants to be

adequate performance. They state that only a few hours of performance would be required at VEGP (basis not stated). FRC also tested one NP83?', but after artificial aging was removed from the test program because of seat leakage in excesss of 60 liters per minute. In other words it failed before it was even tested! Nevertheless, applicants judged the valve to be qualified.

Valve 206-381-6F (one each only) was tested by Westinghouse/ASCO and FRC and deemed to have performed satisfactorily.

It is obvious from the foregoing that serious problems have been found with ASCO solenoid valves, and there is no reasonable basis to think that all of these valves that will be installed at VEGP will perform adequately during the lifetime of the plant.

Relevant to this last point is the applicants program for maintenance and surveillance of ASCO solenoid valves. During the discovery process, applicants refused to answer intervenors' questions in this area, but were forced to do so by the board (order of June 4, 1985). Applicants furnished intervenors with a ten page report titled "ASCO Solenoid Valve Maintenance", copy attached, and stated that the frequency of maintenance has not yet been determined. This document gives a detailed procedure for how valves are to be serviced, but nothing about a surveillance program. Page 8 of the document states the acceptance criteria for proper maintenance. According to these criteria, a valve can be accepted BUT NOT WORK! Nowhere is the simple statement made

"Verify that the valve functions properly"! Clearly, applicants do not have an adequate maintenance or surveillance program for ASCO solenoid valves. One wonders about the myriad of other equipment that was not questioned by joint intervenors.

Another interrogatory that applicants refused to answer, but were forced to by the board, asked how physical orientation of ASCO valves was considered during environmental qualification testing. Applicants stated that they were designed to perform in any orientation (except 206-381-6F), the only requirements being that the "solenoid enclosure be sealed". In view of the fact that ASCO our testing of NP8316 had shown a loss of housing seal integrity one wonders about the usefullnes of the statement. In fact, the attached "ASCO Solenoid Valve Maintenance" report states on page 5 that the valves must be "mounted in the position indicated on the nameplate". Thus it is clear that physical orientation is an important factor and must be considered in qualifications of ASCO valves.

Howard M. Deutsch

Howard M. Deutsch

February 23, 1986

MANL
No. 12

ASCO SOLENOID VALVE MAINTENANCE

1.0 PURPOSE

This procedure provides instructions for the disassembly, inspection, and reassembly of ASCO solenoid valves.

If only portions of this procedure are needed to complete the required maintenance, contact the Maintenance Foreman and use only the steps which are applicable. Document which steps were used in the "Comments" section of the "Completion" or "Data" Sheet. N/A the steps on the "Completion" or "Data" Sheet which were not used.

2.0 PRECAUTIONS AND LIMITATIONS

2.1 The valve may be in a radiation area or may be radioactively contaminated. If so, follow the instructions on the Radiation Work Permit.

2.2 Minimize the entry of foreign materials or dirt into the working parts of the valve.

3.0 PREREQUISITES AND INITIAL CONDITIONS

3.1 Verify that a Quality Control (QC) representative has signed the "Completion" and/or "Data" Sheets indicating QC review of the procedure for hold points. If hold points are indicated, notify QC prior to starting work.

3.2 Determine the safety classification of the valve and check the appropriate classification on the "Power and Signal Removal/Replacement Data" Sheet.

3.3 Valve isolated, depressurized, and tagged. (Operations' responsibility, Maintenance verify.)

3.4 MINIMUM PARTS REQUIRED

3.4.1 Dow Corning's Valve Seal or equivalent high grade silicon grease.

3.4.2 Approved safety solvent.

3.4.3 Gaskets

a. Bonnet or Upper Body Gasket

b. Lower Body Gasket

3.5 SPECIAL TOOLS REQUIRED

3.5.1 Solenoid base sub-assembly wrench (for explosion proof, watertight solenoid).

3.5.2 Torque Wrench (0-300 in-lbs), for valves with core diaphragm sub-assemblies.

4.0 DISASSEMBLY, INSPECTION, AND REASSEMBLY

4.1 DISASSEMBLY

NOTES

a. To install jumpers and/or lift wires other than those directly associated with the equipment tag number(s)/scheme number(s) listed on the Work Order, notify the Shift Supervisor and comply with his instructions.

b. Ensure that each lead (wire) is marked so that it can be uniquely identified with its termination point.

4.1.1 */* Notify Shift Supervisor of work to be performed.

4.1.2 */* Ensure that the valve and/or operator is fully isolated and tagged in accordance with Procedure 00304-C, "Equipment Clearance and Tagging".

200009

CONTINUED

4.1.3 */* Disconnect and lift instrument control, and power leads from the valve and solenoid coil as required. Record their removal by wire number and termination point on the "Power and Signal Removal/Replacement Data" Sheet.

4.1.4 Remove retaining cap, retaining clip (if provided), and nameplate.

WARNING

THE METAL RETAINING CLIP, PROVIDED ON SOME SOLENOIDS, WILL SPRING UPWARDS WHEN DISENGAGED.

4.1.5 Disassemble solenoid as follows:

a. For general purpose enclosure -

(1) Slip entire solenoid enclosure off solenoid base sub-assembly.

(2) Remove housing cover, spring washer, and insulating washer (if provided).

NOTE

In some assemblies, the coil and sleeves and washers are doubly enclosed in a yoke which must be pulled from the housing first to facilitate disassembly.

(3) Remove coil from housing (or from yoke).

b. For explosion proof/watertight enclosure -

Remove housing cover, take-up spring, flux plate, coil and insulating washers (if provided).

4.1.6 Unscrew solenoid base sub-assembly and/or remove bonnet.

NOTE

Explosion proof/water-tight construction requires special wrench for flats on solenoid base sub-assembly.

200010

CONTINUED

4.1.7 Remove core spring a d core assembly (or core/diaphragm assembly).

CAUTION

For valves with core diaphragm assemblies, ensure that the hanger spring between core and diaphragm is not damaged or distorted.

4.1.8 If valve body has an end cap, complete disassembly as follows:

a. Remove end cap and body gasket.

b. Remove disc spring and disc/holder assembly or remove piston spring and piston assembly.

NOTE

To remove piston assembly, hook a bent piece of wire or similar tool into the small hole provided in the back of the piston. Then pull the piston assembly from the valve body.

4.2 INSPECTION

4.2.1 Coil

/

a. Visually inspect coil and coil housing for external damage, discoloration from overheating, broken lead wires, or other abnormalities.

b. Check for open-circuited coil (burned out or cracked insulation).

c. Replace coil as necessary.

4.2.2 Inspect terminations and flexible conduit to solenoid for damage, discoloration, or other abnormalities.

/

200011

CONTINUED

4.2.3 Valve Internals

/

a. Clean parts with an approved safety solvent.

b. Inspect valve internals for excessive wear, erosion, corrosion, or other abnormalities.

c. Replace excessively worn parts as necessary.

4.3 REASSEMBLY

CAUTIONS

a. If lubrication of disc stem is required, DO NOT use a dry film lubricant. Use only a normal petroleum lubricant.

b. Ensure solenoid is mounted in the position indicated on the nameplate.

4.3.1 If valve body has an end cap, begin reassembly as follows:

a. Grease body gasket(s) with Dow Corning's Valve Seal or an equivalent silicon grease.

b. Install disc spring and disc/holder assembly or install piston spring and piston assembly.

c. Screw on end cap and gasket.

200012

CONTINUED

4.3.2 Install core assembly and solenoid base sub-assembly as follows:

a. Valves with core/diaphragm sub-assembly -

(1) Install body gasket and core/diaphragm sub-assembly.

NOTE

Locate the bleed hole in core/diaphragm sub-assembly approximately 45° from the valve outlet.

(2) Install core spring with wide end in core first; closed end protrudes from top of core.

(3) */* Install valve bonnet and screws. Torque screws to value shown in Table 1.

(4) */* Install bonnet gasket and solenoid base sub-assembly. Torque solenoid base sub-assembly to value in Table 1.

TABLE 1

Solenoid Valve Model No.	TORQUE VALUE (in-lbs) Bonnet Screws	Solenoid Base Sub-assembly	Solenoid Cover
8210 8211	110±10	175±25	NA
80033 80034	NA	NA	135±10

b. Valves without core/diaphragm sub-assembly -

(1) Install core spring, core assembly, and body gasket.

(2) Screw in solenoid base sub-assembly.

200013

CONTINUED

4.3.3 **Reassemble solenoid as follows:**

CAUTION

Solenoid must be fully reassembled as the housing and internal parts are part of and complete the magnetic circuit. Place insulating washer at each end of coil if required.

a. If the solenoid has an explosion-proof/watertight enclosure:

(1) Wipe surfaces clean.

(2) Grease joints with Dow Cornings' Valve Seal or equivalent.

(3) Place coil, insulating washers (if provided), fluxplate, and take-up spring onto solenoid sub-assembly.

(4) Grease joints with Dow Cornings' Valve Seal or equivalent.

(5) */ Screw on housing cover and torque to value given in Table 1.

b. If the solenoid has a general enclosure -

(1) Reassemble coil, insulating washers (if provided), and spring into housing.

(2) Slip entire solenoid as a unit onto the solenoid base sub-assembly.

4.3.4 */* Reconnect the instrument, control, and power leads to the valve and solenoid coil. Verify correct replacement and initial the "Power and Signal Removal Replacement Data" Sheet. If required, independently verify correct replacement and initial the "Power and Signal Removal/Replacement Data" Sheet.

200014

CONTINUED

4.3.5 Place nameplate, metal retaining clip (if provided), and retaining cap onto solenoid cover.

4.3.6 Ensure that solenoid valve mounting bracket is fixed securely to both solenoid valve and mounting surface.

4.3.7 */** Notify Shift Foreman that required maintenance is complete.

5.0 ACCEPTANCE CRITERIA

Maintenance performed using this procedure is acceptable when the "Completion" Sheet is properly filled out and approved. Deviations from procedure data and recommended settings will be evaluated on a case-by-case basis, identified in the "Comments" section of the "Completion" Sheet and approved by the Maintenance Foreman.

6.0 REFERENCES

6.1	AX4AY01-3-1	Excerpt from "Reciprocating Air Compressor-Instruction XLE Packaged "L" Design"
6.2	2X4AY03-25-0	Excerpt from "Rotary Screw Compressor Instruction Manual"
6.3	1X4AN02-291	Excerpt from "Condensate Filters-Operating Instructions-Powdex Condensate Polishing" Vol.3.

END OF PROCEDURE TEXT

200015

POWER AND SIGNAL REMOVAL/REPLACEMENT DATA SHEET

☐ Safety Related ☐ Non-Safety Related

NOTES

a. To install jumpers and/or lift wires, other than those directly associated with the equipment tag number(s)/ scheme number(s) listed on the Work Order, notify the Shift Supervisor and comply with his instructions.

b. Ensure that each lead (wire) is marked so it can be uniquely identified with its termination point.

c. Independent verification is only required on safety related equipment. Place N/A in independent verification block for non-safety related equipment.

IDENTIFY leads lifted jumpers installed, links opened etc.	LOCATION Panel or junction box terminal block, etc.	VERIFY RECONNECTION	
		VERIFICATION	INDEPENDENT VERIFICATION
		200016	

COMPLETION SHEET

Procedure No.	Revision	Sheet
26060-C	0	1 of 1
Tag No.	Description	
	ASCO Solenoid Valve	
Serial No.	Manufacturer	Model
	Automatic Switch Co.	
Test Equipment Used		

PROCEDURE STEP	DESCRIPTION	MAINT. INITIAL	HOLD POINT (Yes/No)	QC INITIAL
4.1.1	Ensure Clearance and Tagging			
4.2.1	Coil Inspection			
4.2.2	Wiring Inspection			
4.2.3	Valve Internal Inspection			
4.3.2a(3)	Valve Bonnet Screws torqued properly			
4.3.2a(4)	Solenoid Base Sub-assembly torqued properly			
4.3.3a(5)	Housing Cover Torqued Property (Explosion Proof/ Watertight only)			
4.3.7	Notify Shift Foreman			

Comments/Additional Hold Points _____

_____

_____

_____

QC has reviewed this procedure for hold points _____
Signature

APPROVED ( )	DISAPPROVED ( )
FOREMAN	DATE

COMPLETED BY	DATE

December 15, 1985

United States of America

Nuclear Regulatory Commission

In the Matter of Georgia Power Company, et al. (Vogtle Electric Generating Plant, Units 1 and 2) ; Docket Nos. 50-424 (OL), 50-425 (OL)

Analysis of the Atomic Safety and Licensing Board's November 12, 1985 Memorandum And Order (Ruling On Motion For Summary Disposition Of Contention 7 re: Groundwater Contamination)

The intervenors did not file a motion to strike because the Applicants' were arguing their case through the mails. Because of the complexity of this issue, and because both Applicants and the ASLB board have had difficulty understanding some of the issues raised by Intervenors, Intervenors want to argue their case in front of both the Applicants and the ASLB board where confusion can be more easily resolved rather than trying to do so through the mails. Intervenors feel that sufficient information had been supplied to the Atomic Safety And Licensing Board (ASLB) to make a determination on whether or not the groundwater contention entoto merited genuine issues of material fact to be heard in an open forum before the ASLB. Nonetheless, the ASLB granted part of the Applicants' request although the ASLB board agreed genuine issues do exist with the goundwater contention. This analysis will review seriatim the dispositions by the ASLB board of the Intervenors' allegations on the groundwater

contention.

Sr-90 contamination of groundwater at VEGP

The ASLB board and the Applicants misconstrued this allegation. This part of the allegation stated :

> The 1971 groundwater chemical analysis should be updated. It has been found that Sr-90 contamination in the VEGP...area , likely due to SRP releases, is significant (cf FES). There is the possibility that other released chemicals may have changed the 1971 datum.

Both the ASLB board and Applicants were unable to find reference to Sr-90 contamination in the VEGP groundwater in the FES and therefore dismissed the contention out of hand. But, Intervenors did not state there was Sr-90 contamination of the groundwater in the VEGP area. Intervenors stated that Sr-90 contamination in the VEGP area was significant, and that this was discussed in the FES (cf. FES, Appendix A, pp.91-92; the NRC response in the FES ,pp. 9-27,28, did not address the WFL-19 comment concerning significant Sr-90 in milk in the VEGP area either).

Simply put, using Dupont SRP and EPA data, there exists a significant difference in concentrations of Sr-90 found in milk in the VEGP area compared to what both the EPA and the SRP claim should be in the VEGP area due to nuclear weapons fallout and thus do to chance. Numerous EPA and SRP sources attest to the confounding of SRP released Sr-90 by

fallout; these are referenced in the first FES citation above. But none of these sources, both EPA and SRP, analyzed the Sr-90 data using statistical inference. Thus for the most part, the EPA and SRP conclusions in these sources were speculative. Using statistical inference, a significant difference was found to exist (t(12)=2.48,p less than .05).

With it being firmly established that Sr-90 contamination in the SRP area is significant, especially in the VEGP area where the highest readings were found, and since the SRP emits Sr-90, the source of the Sr-90 becomes important. The SRP predictions of Sr-90 maximum concentrations, due to airborne releases, at its plant boundary are orders of magnitude below the concentrations found in milk in the VEGP area (e.g., DPST-82-1054, p. 2-5 (1982); DOE/EIS-0108, p.5-52 (1984); EPA 520/5-84-012 (1984)). Considering that the SRP is a source of Sr-90 (e.g., ERDA-1537, p. A-26), that the SRP has had a consistent history of underestimating environmental parameters and impacts (e.g., ERDA-1537, p.III-20; vs. DOE/ER-0225, pp. D-38,41), it is possible to conclude that the Sr-90 milk contamination in the VEGP area is likely due to many years of SRP releases.

Why is this of concern? The SRP releases not only Sr-90 but many other radionuclides and nonradioactive effluents as well (e.g., DPST-82-1054). The Sr-90 may be considered a signature. At the SRP, groundwater contamination due to background tritium under the radioactive waste burial grounds, about 1 mile upwind from the airborne release stacks in the H-Area, has been attributed to H-Area release stacks releasing tritium. Airborne released tritium effluents

are deposited on the surface of the burial grounds, washed into the soil when it rains, then percolated downwards to the groundwater below, and then intercepted by background monitoring wells (cf. the SRP Annual Well Monitoring Reports by Fenimore, Radionuclides In 643G Groundwater- 1973-76 , November 23, 1977, p.2). A clear path of airborne releases, deposition, and subsequent goundwater accumulation has been established at the SRP. The same pattern and causal relationship should be found in the VEGP area as a result of SRP releases. Since the only chemical datum for the groundwater under VEGP was established in 1971, and since the SRP makes significant airborne releases each year, and since Sr-90 has been found to be significantly higher in concentrations within milk in the VEGP area, it would appear to be important to re-establish a new datum for the groundwater. Otherwise, subsequent monitoring data may be confounded.

There is another concern. Groundwater under VEGP has been accepted as a formal contention. Groundwater contamination is a complex subject, one not easy to understand or predict. However, it doesn't appear to be part of the scientific method to dismiss arguments because the comments are vague, or not understandable, especially when it is an easy matter to contact those making the arguments. The ASLB and Applicants tend to suggest that some of these scientific arguments can be legally acceptable or not. While that may be so, it must be clearly understood that the spread of contamination in the aquifers below VEGP cannot be prevented by decree, by legal resolution, or by formal environmental statements. The most prosperous course, it would seem, is to resolve issues that may appear to be vague, especially when possible and when to the advantage of all parties.

Statistical Analysis of Hydrological Data

Intervenors' stated that the groundwater data had not been studied with scientific inference methods. Applicants and the ASLB board agreed that this data had not been statistically treated, but both stated that intervenors have not found flaws in the conclusions based on that data. Intervenors were not planning to look for statistical errors, but for errors in process. This the Intervenors have found. Statistical treatment on the groundwater data should include a sensitivity analysis and an estimate of the range of error that exists in the collected data. VEGP groundwater data should be compared to normalized groundwater data from national groundwater monitoring data from nuclear reactors. No data base is error free, but the amount of error should be quantified, a datum established and updated when found incorrect. For example, an uncertainty analysis on the groundwater travel time may have resolved some of the issues in this area. The ASLB board has agreed that uncertainty exists in some of the VEGP data. A statistical treatment would quantify this uncertainty. Intervenors were not looking for flaws in the groundwater data using statistical treatments, per se, but in the planning process. It appears both were found.

Groundwater contamination plumes are known not to travel as a discrete whole, but as a distribution modeled by distribution moments. There are other reasons to use statistical and probabilistic treatments of hydrologic data. From Viessman, Knapp, Lewis, and Harbaugh (Introduction to Hydrology (2nd ed.) ,1977, pp.157,201) :

Many hydrologic processes are so complex that they can be interpreted and explained only in a probabilistic sense. Hydrologic events appear as uncertainties of nature and are the result, it must be assumed, of an underlying process with random or stochastic components. The information to investigate these processes is contained in records of hydrologic observations. Methods of statistical analysis provide ways to reduce and summarize observed data, to present information in precise and meaningful form, to determine the underlying characteristics of the observed phenomena, and to make predictions concerning future behavior...

probability and statistical ...applications (to)...complex hydrologic processes often require knowledge of the joint distribution of several random variables and consideration of the correlation between them. Dependence of sequential events in a time series is also an important concept in hydrology. Methods of analysis can be extended... over both space and time...With the development of electronic computers, these methods and techniques have become a valuable element in planning and design.

From Meyer (Introductory Probability and Statistical Applications ,1970, p.3),

For ...probabilistic...or...stochastic model(s , these phenomena do)...not lend itself to a deterministic approach. A probabilistic model describes the situation more accurately.

In a letter report from Dupont in 1981 (Letter R. Maher, Dupont, to T.B.Hindman, DOE-SR, Issues Pertinent to the Long-Term Operation of the Burial Ground , June 30, 1981, p. 25, 26), a discription of contaminant flow in the groundwater at SRP is of a distribution:

> Tritium will continue to move out of the burial ground at an average flow velocity of 30-50 feet/year. The leading edge of the activity is moving 3-10 times faster...

In summary, scientific inference would quantify the amount of error that exists in the VEGP hydrologic data. If anything, in conclusions by VEGP on groundwater travel time, in its conclusions on the marl, in its conclusions on the direction of groundwater flow, VEGP has demonstrated that an uncertainty in the data exists.

Effect of Settlement on the Marl

Applicants and the ASLB board have misunderstood this part of the contention by Intervenors. Both stated they did not understand "differential flow rates of the grouted wells underlying the (VEGP) facility." An explanation follows. The wells underneath VEGP have supposedly been grouted with an acceptable method (Intervenors have questioned this method before; e.g., cf. the Bechtel report Geotechnical Verification Work Report of Results , August 1985, Geologic Drill Log, Hole No. 904: The amount of cement injected into the hole to grout the well was 28 cu yd compared to a drilled-out volume of 46.8 cu yds, leaving a difference of 18.8 cu yds.) Assuming the grouted wells under the VEGP power block are one complete solid ,

then as the power block settles, those grouted wells directly under the block will be punched downward at a one-to-one rate, a rate that may be different ("differential") for the marl. Applicants have concluded that the marl is impermeable, but have not shown whether the marl is incompressible, or whether the marl will deform downward at the same rate as the grouted wells. The grouted wells are likely less compressible in a vertical direction than the more elastic marl. As these grouted wells settle, driven by the weight of the power block atop them, they act like spikes. With plastic deformation of the marl, it is possible that the bottom of the grouted wells may separate and core out at the bottom of the marl. If so, the integrity of the marl would be dimenished.

There are other concerns with this issue. Will the power block settlement resume with water withdrawl over the years? The Savannah River Plant credits the contamination of the Tuscaloosa aquifer under the SRP to deterioration of production well casings. What is the possibility of grouting deterioration under the VEGP? Applicants have not given sufficient assurance that this will not become a pathway for contamination. Settlement under the VEGP powerblock has been described as plastic deformation, but Applicant did not describe the marl deformation boundary at the points of furtherest deformation on the surface of the marl and downwards through the marl.

Leakage of Radioactive water from Auxiliary Building

Intervenors do not disagree with Applicants and the ASLB board that water would seep into the building from outside through a fracture.

The highest levels of contamination recorded under the SRP and in the Tuscaloosa aquifer occurred under a spent solvent holdup tank (e.g., Steele, Technical Summary of the A/M Area Groundwater Remedial Action Program , ca. 1984, SRP report, pp. 7, 10; DPST-83-829, pp. 6-12, 13, 79). The tank was not shown by SRP to have failed, only leaked for many years. In addition, even if water only inflows from a fracture in the building, a concentration gradient will occur, and it is possible that contamination will escape. Intervenors believe this to be a viable issue.

Hazardous Chemical Wastes

Intervenors argue that the potential for groundwater contamination of the aquifers at VEGP to be as viable an issue as the possibility of radioactive contamination. The groundwater contamination at the SRP has been by both radioactive and hazardous chemicals. The VEGP groundwater monitoring program should include monitoring for all chemical effluents.

Contamination of Crataceous Aquifer at SRP

ASLB alledges that Intervenors stated that groundwater contamination at SRP resulted from leaks out of a holding tank. That is so, but not the only source of contamination. The areal extent of the groundwater contamination in 1983 was in the hundreds of acres. Contamination under the tank is the highest recorded at SRP (e.g., DPST-83-829, p.6-12,13,79), but it occurred under the M-Area basin, and since the basin overflowed, and since the sewar lines leaked, percolation

downward occurred over a large areal extent also.

A source on the storage tank for spent solvents is noted above. On other matters, there is some confusion on the HLW tank releases with releases from other areas on the SRP. The HLW tanks are located in the 200 area at SRP, and the known Tuscaloosa aquifer contamination has occurred in M-Area, a significant distance away, but still on the SRP site.

Groundwater Travel Time

The outcrop at the SRP did not occur early solely because of the shortened flowpath due to erosion. It occurred primarily because of erroneous conclusions based on average groundwater flowrates. The original flowpath was about 1700 to 2600 ft and the erosion was about 900 ft (ERDA-1537,p. II-116; DP-1638, p.10). Assuming that erosion was the only factor, eroding 900 of 1700 should reduce the old estimated travel time for the groundwater first outcrop of tritium to 35 years from 70 years (ERDA-1537,p. II-116). However tritium effluent at the outcrop was first discovered in 1978, one year after ERDA-1537 was published wherein it was stated that no significant outcrop would occur until the 70th year; it could have occurred sooner than 1978, but that was the year it was discovered (Lawless, Savannah River Plant (SRP) Burial Ground Building 643-G Management Appraisal Report (BGAR) Appraised June 2-13, 1980 , November 1, 1982, pp.12-13). Further, and conclusively, even with the 900 ft erosion repaired, SRP predicted the re-emergence of the tritium in a subsequent outcrop within one year (Lawless, BGAR , 1982, p. 11). This does not support

Applicants contentions on groundwater travel time.

The groundwater estimate used by SRP was in error. Applicants have used a similar method at the VEGP, a method subject to error. That is the main point of DP-1638. By using a three-dimensional model for groundwater flow, a calculation of 17 years for an outcrop was found, in close agreement to what has been observed. Flow rates varied in relation to changing gradients. This may account in part for the calculated differences from observed rates.

CERTIFICATE OF SERVICE

This is to certify that copies of the foregoing prefiled testimony of Dr. Howard Deutsch and attachments thereto, as well as the enclosed attachment to prefiled testimony of William Lawless, were served by deposit with the U.S. Postal Service in the City of Atlanta and that copies of the prefiled testimony of William Lawless were served by deposit with the U.S. Postal Service in Augusta, both with first class postage attached to be delivered to the following service list this 24th day of February, 1986.

Tim Johnson

SERVICE LIST

Morton B. Margulies, Chairman
Atomic Safety & Licensing Board
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