GPU NUCLEAR

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January 24, 2002
E910-02-003

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Subject: Saxton Nuclear Experimental Corporation (SNEC)
Operating License No., DPR-4
Docket No. 50-146
Supplemental Response to RAI#3 Questions

Gentlemen,

Attached to this letter is GPU Nuclear's supplemental response to the NRC Request for Additional Information (RAI3), dated January 17, 2001, concerning the License Termination Plan (LTP) for the Saxton Nuclear Experimental Corporation (SNEC) facility. GPU Nuclear letter E910-01-007, dated March 19, 2001, provided responses to these questions. On August 6, 2001, representatives of the NRC staff met with representatives of SNEC and GPU Nuclear at the Saxton site. NRC issued a letter on November 2, 2001, summarizing the meeting minutes. From this letter, question resolution and further action items were specified pertaining to specific questions in RAI3 and GPU's responses dated March 19, 2001. From this meeting, the NRC accepted GPU Nuclear's responses to questions 2, 4, and 5.

The purpose of this letter is to provide supplemental responses to the remaining questions and address open issues from the August 6, 2001 meeting.

If you have any questions on this information please contact Mr. James Byrne at (717) 948-8461.

Sincerely,

G. A. Kuehn
Program Director, SNEC

cc: NRC Project Manager
NRC Project Scientist, Region 1

A001

Response to SNEC RAI3 per NRC November 2, 2001 Letter (Based on August 6, 2001 SNEC Site Meeting with NRC)

Question 1/RAI3: According to the licensee the previous conclusion which classified the area beneath the containment vessel (CV) as impacted may be premature, and it may be revised or reclassified. The licensee needs additional sampling to determine the actual classification of this area. The licensee and their contractor, TLG, discussed their plans for removing the concrete from the CV. Approximately 30 rock anchors will be installed into the bedrock adjacent and under the CV to prevent buoyant effects and uplifting. The core samples through the saddle have contained less than 1 pCi/g of Cs-137. The materials underneath the CV may be non-impacted.

The licensee clarified their discussion on the geometry of the proposed well installation, which will be used to monitor groundwater adjacent to the CV.

Response:

Work in this area continues. Approximately 40 rock anchor boltholes and 10 dewatering wells are to be installed around the perimeter of the CV. Anchor boltholes will be drilled approximately 36 inches from the CV exterior walls and 75 feet deep. Soil (drill spoils) samples will be obtained from a portion of the rock anchors holes and all dewatering wells. These samples will be analyzed for radioactivity to provide characterization information in classifying the area under the CV. When the rock anchor bolt work is completed, the angle well will be installed. The following is the projected schedule for completion of this work:

- Rock anchor boltholes are scheduled to be complete the week of January 28, 2002.
- Angle well installation is scheduled the week of February 25, 2002.

Question 2/RAI3: March 19, 2001, response is acceptable.

Question 3/RAI3: GPU resumed their quarterly sampling of all existing groundwater monitoring wells in July 2001. GPU and NRC discussed how many additional quarterly sampling events will be needed to provide assurance that the sampling events are representative of long-term climatic conditions at this site. It was agreed that the number of additional sampling events would depend upon the occurrence of both wet and dry climatic periods that will produce a representative range of the seasonal climatic conditions.

GPU agreed to submit groundwater level data for all existing monitoring wells for each sampling event. For most sampling events, a tabular listing of the water levels will be adequate. However, potentiometric groundwater configuration maps of the water-bearing units should be submitted when these maps are needed to demonstrate a change in the groundwater flow direction from previously submitted maps.

NRC encouraged GPU to supplement their slug tests discussion on the new monitoring wells (in the latest RAI response) with additional information on how the tests were performed and analyzed to generate hydraulic conductivity (K) values for the water-bearing units and with additional information on how K values were developed from slug and packer tests performed on existing monitoring wells and test borings at this site. NRC recommended that a range of K values should be developed for the overburden and bedrock water-bearing units based upon an evaluation of the new slug tests and the existing aquifer tests. This evaluation is critical because the hydraulic conductivity is a significant parameter used in determining the time and distance of radionuclide transport in the groundwater.

NRC discussed with GPU's consultant, Haley & Aldrich, the need to provide descriptions of the new monitoring well logs. NRC had agreed earlier that core sampling and/or particle size testing would not be necessary for these new wells. If field logs of these wells are not available, NRC believes that a brief discussion on significant lithologic variations in these wells from the typical conceptual logs for this site will be appropriate substitute for these logs.

NRC discussed with GPU the importance of calculating the time-of-travel for plant-generated radionuclides dissolved in the groundwater for the overburden and bedrock water-bearing units. These calculations should be based upon the range of K values and upon the hydraulic heads that are representative of seasonal climatic conditions at this site.

GPU was encouraged to examine the seasonal changes in the groundwater levels to determine whether the groundwater flow paths may alternate between the primary and secondary fracture orientations. It appears that the primary fracture orientation, north 45° west, is the predominant flow path direction of groundwater discharge from the plant site to the Raystown Branch of the Juniata River. However, water levels and groundwater flow paths that are representative of the range of climatic conditions at this site should be evaluated to determine whether the secondary fracture orientation, north 45° east, may become the flow path direction of groundwater discharge from the plant site to the Raystown Branch of the Juniata River.

Currently, there are 20 groundwater monitoring wells, which are sampled on a quarterly basis. It was recommended that water levels in these wells should be measured before groundwater samples are collected for radiological characterization. This information is required for dose modeling purposes. It was also recommended that the groundwater sampling should follow proper sampling protocol, including sample preservation, and chain-of-custody procedures between the sampling point and the analytical laboratory.

Response:

To Q3 Paragraphs 1 & 2:

Water levels have been collected monthly or bimonthly since January 2001 to evaluate the potential for seasonal groundwater flow direction changes. A total of 21 rounds of water level monitoring have been conducted at the site. A spreadsheet with level data is attached as Table 1 (Ground and Surface Water Level Measurements) at the end of this document. Haley & Aldrich, Inc. evaluated the individual sets of water level information for Saxton throughout the past year. This evaluation included wells installed at the overburden/bedrock interface and bedrock.

Groundwater elevations fluctuate throughout the year, however the groundwater flow pattern remains consistent. Groundwater elevations were reviewed over the past year and groundwater elevation contours were generated for the 2001 monitoring events. This includes the high water period in April 2001 and during the recent low water period in November 2001. Contouring indicates that the flow pattern is consistent and similar to past groundwater contours. For example, at the upgradient OW-3 series wells, the water level elevations have fluctuated between 8.30 and 7.00 feet in OW-3 and OW-3R, respectively. Similarly, the groundwater elevations have fluctuated 4.75 and 4.90 feet at the OW-5 series wells situated downgradient of the site and near the river.

A comparison of groundwater and surface water level trends indicates they behave similarly. When higher and lower groundwater elevations occur at the site, they also occur in the surface water (the Raystown Branch of the Juniata River).

To Q3 Paragraph 3:

In the third paragraph of Question 3, additional information was requested regarding the slug tests (aquifer response test) conducted on the OW-series wells. These tests were conducted by adding water to the well, then frequently measuring and recording decreasing water levels. The water levels were recorded with a hand held water level probe. The Bouwer-Rice and the Hvorslov methods were used to analyze the slug test data and estimate hydraulic conductivity. The range of hydraulic conductivity for three wells at the overburden/bedrock interface is 15.59 m/year to 35.62 m/year. The range of hydraulic conductivity for the four bedrock wells is 15.59 m/year to 909.53 m/year. The results are summarized in the table below.

Hydraulic Conductivity Values from Slug Tests

Medium/Well ID	Calculated Hydraulic Conductivity m/year	Calculated Hydraulic Conductivity cm/sec
Overburden/Bedrock Interface Wells		
OW-3	35.62	1.13×10^{-4}
OW-4	No water in the well	No test
OW-5	24.49	7.77×10^{-5}
OW-6	15.59	4.94×10^{-5}
OW-7	No water in the well	No test
Bedrock Wells		
OW-3R	87.95	2.79×10^{-4}
OW-4R	15.59	4.94×10^{-5}
OW-5R	16.70	5.30×10^{-5}
OW-7R	909.53	2.88×10^{-3}

The aquifer response tests (slug tests) and previously conducted packer tests both evaluate hydraulic conductivity. However, the slug test utilizes the entire open bedrock borehole (approximately 40 feet). The slug test results therefore represent an average hydraulic conductivity at that location related to intercepted pervious fractures (or lack of these fractures). The packer tests conducted in 1981 by Ground/Water Technology, Inc. focused on testing discrete sections of three boreholes (B-3 to B-5). The packer test consisted of applying increments of pressure to a zone between inflated packers. The decay of pressure in these six-foot zones is monitored and plotted versus time. The rate of pressure decay is related to the hydraulic conductivity of the formation. Three to four zones in each borehole were tested to provide an overall characterization of the bedrock's hydraulic conductivity at each location.

The slug and packer test results present a similar range of hydraulic conductivity values for the site. The hydraulic conductivity values from the packer tests range from 10^{-5} to 10^{-3} cm/sec (3.15 to 315 m/yr) and some borehole zones had no flow. This range of hydraulic conductivity values is consistent to the slug test results presented in the table above.

<u>To Q3 Paragraph 4:</u>

The subsurface materials at the Site generally consist of three units: fill, boulders, and bedrock. A generalized description of the subsurface materials was previously presented in other reports and letters (Ground/Water Technology, Inc. 1981. A brief description follows:

- Unit A: Fill usually consisting of sand, silt and gravel or ash and cinders
- Unit B: A layer of boulders in a dense sandy, silty, clay matrix
- Unit C: Siltstone and sandstone bedrock with redbeds

In response to lithologic characteristics:

- The bedrock is not flat, but is an undulating surface as observed in the excavation adjacent to the CV. The bedrock surface decreases in elevation from the site to the northwest. Also, this surface apparently decreases in elevation to the north and the south.
- The backfill observed on the eastern side of the discharge tunnel contained mostly angular rock pieces, and was well graded and loose.
- Using a backhoe, we observed that the Fill at the OW-7 was comprised primarily of angular rock fragments and the depth to bedrock was rather shallow (approximately seven feet).
- The discharge tunnel intersects the soil profile (locally modifying the subsurface conditions), and is excavated into the bedrock. This structure alters the flow of shallow groundwater locally.

To Q3 Paragraph 5:

NRC requested Saxton consider seasonal variation of hydraulic heads with respect to travel time of radionuclides in groundwater. Using monthly water level readings obtained from the site since January 2001, the highest (12 April 2001) and the lowest (6 November 2001) water level readings were used to re-calculate travel time of radionuclides (tritium in groundwater). As discussed in previous correspondence (GPU Nuclear to NRC Letter E910-01-007, dated March 19 2001), tritium is very mobile and serves as an ideal tracer in groundwater since it does not undergo soil adsorption. Most other radionuclides have the propensity for adsorption and site conditions would provide ample means for ion adsorption. Thus, the travel time of tritium was considered to be the same as groundwater using the formulas below.

$$v = {}^{Ki}\!/_{\theta} \qquad\qquad t = {}^{d}\!/_{v}$$

Where: v = Average seepage velocity (m/year)

θ = Effective porosity of the flow medium

K = Permeability or hydraulic conductivity (m/year)

i = Change in hydraulic head per unit length (gradient, unit less)

d = Distance (m)

t = Travel time (years)

Travel time estimates continue to indicate if tritium was released from this facility, it has likely reached the Raystown Branch of the Juniata River. In our letter (GPU Nuclear to NRC E910-01-007, dated March 19, 2001), a range of travel times was reported based on 11 January 2001 water levels. Recent calculations using the high (12 April 2001) and low water levels (6 November 2001) for 2001 indicate seasonal variation in hydraulic head changes the travel time estimates. However, the average travel time values continue to indicate the tritium has likely reached the Raystown Branch of the Juniata River. The section below discusses the updated travel time calculations in detail.

Recent groundwater testing results (last 12 months) indicate tritium is not present above levels of measurable detection. The operational period of this plant was from 1962-1972, or 39 to 29 years ago. Tritium has been the only positively identified radionuclide detected in the site groundwater and has not been detected above USEPA's Primary Drinking Water Standard of 20,000 pCi/l. In May 2001, additional monitor wells (OW-7 and OW-7R) were installed closer to the Site to increase confidence that tritium was not present in the groundwater. In addition, monitor wells were installed in the backfill of the discharge tunnel (OP-3 and OP-4).

Travel Time Calculations

Travel time in the overburden/bedrock interface was calculated from the former Radwaste Treatment Building (Radwaste Building) to the Raystown Branch of the Juniata River using seasonal high and low water level events. The calculation was divided into two parts, due to differing hydraulic characteristics. The first part was the distance from the building to the discharge tunnel and the second part was the distance adjacent to the tunnel in the tunnel's pervious backfill to the river. We utilized minimum, maximum and average hydraulic conductivity (K) values from slug testing hydraulic gradients from April 12, 2001 (high water level) and November 6, 2001 (low water level) and published effective porosity (θ) values in order to obtain a minimum, maximum, and average travel time values.

In the overburden/bedrock interface, the average travel times from the Radwaste Building to the river ranges is between 17 and 30 years, with an overall travel time range between 11 and 46 years using high and low water level events. The average travel times were calculated using a geometric mean of the hydraulic conductivity (K). We utilized minimum and maximum values for hydraulic conductivity (K) in order to obtain minimum and maximum velocity and travel time values. The velocity calculations were performed using an electronic spread sheet (attached) and includes references for the utilized values. Below we summarize the values used to calculate travel time.

Overburden/Bedrock Interface Travel Time Values based on High Water Level Data (12 April 2001)

Parameter	Range In Utilized Values Radwaste Building to Tunnel	Tunnel to River
θ	0.10	0.20
K	15.59 to 35.62 m/year*	3,156.06 to 315,606.38 m/year
$K_{average}$	23.87 m/year**	31,560.64 m/year**
Distance	114.45 meters	182.34 meters
i	0.029	0.024
v	4.57 to 10.44 m/year 6.99 m/year (average)	378.73 to 37,872.77 m/year 3,787.28 m/year
Travel Time	11 to 26 years 17 years (average)	

Overburden/Bedrock Interface Travel Time Values based on Low Water Level Data (6 November 2001)

Parameter	Range In Utilized Values Radwaste Building to Tunnel	Tunnel to River
θ	0.10	0.20
K	15.59 to 35.62 m/year*	3,156.06 to 315,606.38 m/year
$K_{average}$	23.87 m/year**	31,560.64 m/year**
Distance	161.00 meters	116.39 meters
i	0.023	0.026
v	3.54 to 8.09 m/year 5.42 m/year (average)	410.29 to 41,028.83 m/year 4,102.88 m/year (average)
Travel Time	20 to 46 years 30 years (average)	

* - Values from aquifer testing at the site.
** - Geometric mean

In bedrock, if tritium was released during operations, it has likely reached the river. In bedrock, we calculated travel time from the Radwaste Building to Raystown Branch of the Juniata River using both high (12 April 2001) and low (6 November 2001) water level events. In bedrock, the groundwater flow direction is controlled by bedrock fracture orientation. The travel time calculation for bedrock contained two components since groundwater elevation contours show the hydraulic gradient varies across the site in bedrock. The first part was the distance from the buildings to the tunnel and the second part was the distance between tunnel and the river.

The calculated average travel times from the Radwaste Building to the river ranges is between 5 and 6 years with an overall travel time of between less than 1 and 45 years using the seasonal high and low water level events. An average travel time was calculated using a geometric mean of the hydraulic conductivity (K) and average effective porosity (θ) values. We used minimum and maximum values for hydraulic conductivity (K) and effective porosity (θ) in order to obtain minimum and maximum travel time values. The velocity calculations were performed using an electronic spread sheet (attached) and includes references for the utilized values. Below we summarize the values used to calculate travel time.

Bedrock Travel Time Values based on April 2001 Water Level Data

Parameter	Range In Utilized Values: Radwaste Building to Tunnel	Range In Utilized Values: Tunnel to River
θ	0.005 to 0.05	0.005 to 0.05
$\theta_{average}$	0.028	0.028
K	15.59 to 909.53 m/year*	15.59 to 909.53 m/year*
$K_{average}$	67.91 m/year **	67.91 m/year **
Distance	142.97 meters	131.53 meters
i	0.036	0.021
v	11.32 to 6,603.15 m/year 89.16 m/year (average)	6.51 to 3,801.82 m/year 51.34 m/year (average)
Travel Time	0.06 to 33 years 5 years (average)	

Bedrock Travel Time Values based on November 2001 Water Level Data

Parameter	Range In Utilized Values: Radwaste Building to Tunnel	Range In Utilized Values: Tunnel to River
θ	0.005 to 0.05	0.005 to 0.05
$\theta_{average}$	0.028	0.028
K	15.59 to 909.53 m/year*	15.59 to 909.53 m/year*
$K_{average}$	67.91 m/year **	67.91 m/year **
Distance	148.46 meters	148.69 meters
i	0.026	0.019
v	7.98 to 4,656.77 m/year 62.88 m/year (average)	5.77 to 3,365.24 m/year 45.44 m/year (average)
Travel Time	0.08 to 45 years 6 years (average)	

* - Values from aquifer testing at the site.
** - Geometric mean.

To Q3 Paragraph 6:

Groundwater flow direction is toward the northwest and is not affected by seasonal water table fluctuations. As noted earlier, water level information was collected and analyzed to evaluate seasonal effects on groundwater flow direction. Groundwater flow direction in bedrock is controlled by fractures. There are two general fracture orientations at this Site. One trends to the northwest (a high angle fracture set oriented between N 50° W and N 75° W) and a second trends to the northeast (consisting of two subsets: bedding (dips moderately to the southeast) and a fracture (dips at moderate angles to the northwest)). Data from the Site indicates that the northwest trending high angle fractures control groundwater flow since groundwater flow is consistently toward the northwest throughout the year. There is no indication that groundwater flow at the site is toward the northeast and OW-4 series wells either along bedding planes or through the northeast trending fractures at any time throughout the year.

To Q3 Paragraph 7:

A program is now in place where water level measurements are made on the 20 monitoring wells prior to obtaining samples for radiological analyses. Well water level measurements are taken monthly, as a minimum. Radiological environmental monitoring program (REMP) sampling is still conducted quarterly. Sampling and radiological analyses have been completed on new wells installed in 2001. Analysis results for gamma emitters, hard to detect (HTD) and transuranic (TRU) radionuclides are listed in Tables 2 & 3.

Trained site technicians perform sampling of SNEC's monitoring wells. Samples are identified, retained, stored, and transferred using protocols required by the applicable SNEC chain of custody procedures. Sample preservation (acidification) of liquid samples is not required due to the following:

a. Analysis is conducted promptly within 48 hours for gamma emitters.
b. Samples are stored in the same containers (marinellis) as used for analysis.
c. The primary analyte in groundwater at SNEC is tritium and to a lessor degree carbon-14. The use of acids as a preservative is not recommended for the analysis of tritium or C-14. The adverse impact of acid on tritiated water is because water dissociates and recombines continuously. The tritium ion that was part of the water molecule may be exchanged for the hydrogen ion from the acid. This could result in a reduced specific activity in the tritiated water. The addition of acid to a sample containing C-14 may result in the production of $^{14}CO_2$ and the loss of radioactivity from the sample.
d. The pH of SNEC groundwater is neutral (6-7) which minimizes plateout effects.
e. SNEC participates in EML's crosscheck program. Liquid samples received from EML are not acidified. Analytical comparisons for gamma emitters are comparatively acceptable.

Table 2

SNEC Monitoring Well Quarterly Results (pCi/L)

LOCATION CODE	FIRST QUARTER (Sampled 1-24-01)				SECOND QUARTER (Sampled 4-4-01)			
	TRITIUM	Cs-137	Cs-134	Co-60	TRITIUM	Cs-137	Cs-134	Co-60
MDA	<2000	18	15	15	<2000	18	15	15
GEO-1	<603	<10.1	<9.9	<11.5	<547	<6.89	<6.31	<7.65
GEO-3	<603	<9.2	<7.1	<10.6	<547	<40.3	<40.3	<42.4
GEO-4	<603	<9.4	<9.1	<11.4	<547	<4.81	<4.44	<5.61
GEO-5	<105	<5.4	<4.9	<6.6	<92	<10.10	<9.15	<12.1
GEO-8	<603	<5.3	<5.5	<5.6	<547	<10.8	<10.5	<12.2
GEO-10	<603	<14.0	<14.9	<18.4	<547	<33.2	<30.3	<38.8
MW-2	<603	<4.7	<4.4	<5.8	<547	<8.26	<7.34	<8.37
MW-2Q(teledyne)	<100	<4.1	<4.2	<3.9	<200	<6.7	<7.5	<6.4
MW-3	<603	<5.7	<5.1	<6.7	<547	<5.94	<5.79	<7.17
MW-4	<603	<10.3	<9.6	<12.5	<547	<10.5	<10.8	<12.6
OW-3	THESE WELLS WERE INSTALLED IN 1ST QTR. & WILL BE SAMPLED IN 2 ND QTR.				<600	<6.34	<5.85	<8.37
OW-3R					<600	<9.99	<8.48	<12
OW-4					NO SAMPLE OBTAINED (DRY)			
OW-4R					<600	<8.49	<7.41	<9.65
OW-5					<600	<9.06	<9.81	<11.7
OW-5R					<600	<6.91	<6.91	<7.19
OW-6					<600	<7.22	<6.55	<9.34

LOCATION CODE	THIRD QUARTER (Sampled 7/3/01)				FOURTH QUARTER (Sampled 10/2/01)			
	TRITIUM	Cs-137	Cs-134	Co-60	TRITIUM	Cs-137	Cs-134	Co-60
MDA	<2000	18	15	15	<2000	18	15	15
GEO-1	<332	<16.2	<14.7	<14.3	<266	<12.7	<11.8	<13.1
GEO-3	<332	<10.9	<10.9	<10.6	<266	<11.7	<12.6	<14.0
GEO-4	<332	<11.2	<11.9	<11.8	<266	<10.2	<10.8	<11.5
GEO-5	<332	<10.6	<11.2	<12.5	<266	<11.4	<11.4	<11.1
GEO-8	<332	<9.7	<10.3	<8.5	<266	<10.1	<10.5	<9.11
GEO-10	<332	<10.6	<11.1	<12	NO SAMPLE - WELL DRY			
MW-2	<332	<14.4	<11.7	<12.4	<266	<10.6	<9.66	<10.8
MW-2Q(B&W)	<189	<13.5	<11.8	<14.4	n/a	n/a	n/a	n/a
MW-3	<332	<14.9	<11.9	<14.8	<266	<15.9	<13.5	<14.9
MW-4	<332	<9.6	<10.9	<10.6	<266	<15.7	<12.4	<14.5
OW-3	<332	<9.3	<10.4	<9.9	<266	<11.7	<12.3	<11.3
OW-3R	<332	<10.3	<9.7	<10.1	<266	<10.5	<11.2	<9.57
OW-4	NO SAMPLE - WELL DRY				NO SAMPLE - WELL DRY			
OW-4R	<282	<15.9	<12.2	<14.6	<266	<12.8	<11.6	<11.6
OW-5	<332	<11.7	<11.3	<12.5	NO SAMPLE - WELL DRY			
OW-5R	<332	<10.4	<12.2	<12	<266	<15.0	<13.7	<12.5
OW-6	<332	<7.9	<9.01	<8.8	<289	<9.45	<10.0	<10.2
OW-7	NO SAMPLE - WELL DRY				NO SAMPLE - WELL DRY			
OW-7R	<332	<9.5	<10.7	<10.9	<266	<13.9	<12.9	<15.3
OP-3	<332	<9.8	<9.1	<11.1	NO SAMPLE - WELL DRY			
OP-4	<332	<13.7	<14.5	<12.5	<289	<10.3	<10.5	<10.6

REQUIRED MDA NOT MET DUE TO LOW VOLUME OF SAMPLE

Table 3

NEW MONITORING WELL TRU/HTD ANALYSIS RESULTS
(Results <MDA in pCi/g)

Well ID	OW-3	OW-3R	OW-4R	OW-5	OW-5R	OW-6	OP-3	OP-4	OW-7R
Sample Date	4/12/01 @1446	4/12/01 @1455	4/12/01 @1505	4/12/01 @1545	4/12/01 @1535	4/12/01 @1620	7/5/01 @1630	7/3/01 @1545	7/2/01 @1330
Carbon-14	43.69	45.32	44.34	44.01	43.79	46.14	53.31	52.08	53.23
Nickel-63	12.13	12.77	13.7	11.56	11.11	9.9	154.9	73.55	68.53
Sr-90	0.8	1.06	0.65	1.23	1.3	0.82	1.46	0.75	0.77
Tc-99	11.79	12.1	12.94	11.89	12.51	12.26	24.3	11.57	14.48
I-129	109	216	189	190	229	373	518.05	183.57	149.14
Pu-242	0.22	0.23	0.38	0.25	0.25	0.24	0.39	0.18	0.96
Pu-239/240	0.22	0.23	0.36	0.25	0.37	0.2	0.39	0.18	1.07
Pu-238	0.24	0.58	0.63	0.25	0.34	0.49	0.39	0.59	1.79
Pu-241	55.43	63.24	56.48	67.78	40.03	54.53	120.67	60.88	317.69
Am-241	0.23	0.52	0.2	0.19	0.32	0.29	0.71	0.82	0.59
U-234	0.49	0.94	1.19	0.55	2.38	0.52	0.82	0.41	0.81
U-235	0.24	0.23	0.28	0.37	0.23	0.23	0.55	0.21	0.21
U-238	0.24	44	0.84	0.32	2.1	0.26	0.49	0.33	0.85

Note: Shaded cells indicate naturally occurring uranium above MDA.

Question 4/RAI3: March 19, 2001, response is acceptable.

Question 5/RAI3: March 19, 2001, response is acceptable.

Question 6/RAI3: The licensee staff stated that Argonne National Laboratory (ANL) is determining the distribution coefficients (K_d). ANL plans to provide distribution coefficients by September 18, 2001 (Note: Per telephone conversation with the licensee on September 24, 2001, ANL has not provided the information and is expected to provide by mid October 2001). This and other characterization information are required for the derivation of the derived concentration guidelines (DCGLs) using RESRAD computer code, Version 6.1. Classification of the discharge tunnel and other areas will be based on the final radiological survey. For example, the discharge tunnel ceiling may be classified as class 1, 2, or 3, floors as class 1, and walls as class 2 or 3. Phase 2 characterization of SSGS Discharge Tunnel and surrounding environs is underway. As part of the radiological characterization under Phase 2, river sediment samples are planned to be collected at three locations (4, 6, and 7 miles) in the upstream direction for background concentrations and at 10 locations (over a length of 4 miles) in the downstream direction and analyzed for site-generated radiological contamination in the sediments. The licensee is working to complete dose modeling by mid October 2001, at which time a publicly-noticed meeting may be conducted at the site to review these results and status of other remediation and decommissioning at this site. (Note: Subsequent telephone conversations with the licensee indicated that the mid October date would not be met).

Response:

<u>K_d Value Summary</u>

GPU Nuclear contracted with Argonne (ANL) to provide K_d measurements for the Saxton Nuclear Experimental Corporation Facility (SNEC). A list of radionuclides of concern was provided to ANL along with various soil and construction debris samples and site groundwater. In nearly all cases, Argonne provided the data experimentally for the listed radionuclides using either radioactive or stable elements (and stand-ins) to establish relevant site K_d values. The K_d values for certain nuclides (^3H and ^{14}C) were estimated because of the uncertainty in the chemical form that these radionuclides would exhibit in this particular environmental condition. In the latter case, the K_d values (e.g. tritium oxide) are generally very low (conservative). The ANL assayed values are reported in the following table (Table 4).

<u>Characterization and Classification Summary</u>

Phase 2 & 3 characterization of the SSGS Discharge Tunnel and surrounding environs is completed. Characterization and classification of the SSGS Discharge & Intake Tunnels, Juniata River sediment and Site Yard Drains have been completed. Documentation has been set to the NRC in the following submittals:

- GPU Letter E910-01-016 dated September 4, 2001: Phase 2 Characterization of the Saxton Steam Generating Station (SSGS), SSGS Discharge Tunnel and Surrounding Environs.
- GPU Letter E910-02-002 dated January 11, 2002: Phase 2 & 3 Characterization Data

<u>Dose Modeling Summary</u>

Dose models are currently developed and under review. Final submittal of dose modeling, input parameter, and resultant DCGL information will be submitted with GPU's response letter to RAI 2 questions scheduled to be sent by February 4, 2002.

Table 4

SNEC SAMPLES ASSAYED FOR Kd VALUES AT ANL								
	Sample 1	**Sample 2**	**Sample 3**	**Sample 4**	**Sample 5**	**Sample 6**	**Sample 7**	**Sample 8**
Location	River (composite) Sediment Sample	SSGS SE Sump	South of Warehouse by Old Access Road	CV Area	CV Area, Near Switchyard	CV Area	CV Area	CV Area
Material Type	Sediment	Construction Debris	Fly Ash & Cinders	Back-Fill Materials	Fill Soil	Clay Material	Weathered Bedrock	Unweathered Bedrock (crushed)
Reference Grid No. & Coordinates	Bank Above Bridge & Off Tip Of Island	AV-133	AJ-131, 21' N by 2' W	AZ-129, 14' W by 10' N	BA-129, 1' N	BA-129, 1' N by 2' W	AZ-128, 13' N	AZ-129, 15' N by 12 to 18' E
Depth (Grade=811' El)	0' - 1' Below Sediment Surface	~787' El	~811'	~795'	~810.8'	~809.12'	~800'	~800'
Elements								
H	**~1**	**~1**	**~1**	**~1**	**~1**	**~1**	**~1**	**~1**
C	**~1**	**~1**	**~1**	**~1**	**~1**	**~1**	**~1**	**~1**
Ni	**10000**	**10000**	**4000**	**10000**	**10000**	**10000**	**1300**	**1500**
Zr, Nb	**600**	**80**	**500**	**500**	**500**	**500**	**500**	**500**
Tc	**8.1**	**54**	**54**	**8.6**	**1.4**	**1.6**	**1.3**	**1.3**
U	**37**	**16**	**5200**	**17**	**34**	**106**	**5200**	**226**
Pu	**600**	**160**	**600**	**400**	**400**	**400**	**600**	**400**
Ce, Eu	**1000**	**1000**	**1000**	**1000**	**1000**	**1000**	**1000**	**1000**
Co	**1000**	**1000**	**200**	**1000**	**1000**	**1000**	**1000**	**1000**
Cs	**2340**	**2433**	**2131**	**14149**	**13618**	**2864**	**9746**	**28341**
Fe	**10000**	**10000**	**10000**	**10000**	**10000**	**10000**	**10000**	**10000**
Am, Cm	**1000**	**1000**	**1000**	**1000**	**1000**	**1000**	**1000**	**1000**
Sr	**60**	**25**	**475**	**28**	**11**	**24**	**114**	**60**
Sb	**1100**	**153**	**5200**	**2070**	**1100**	**1800**	**5000**	**1900**
Pb	**46000**	**1.60E+05**	**58000**	**81000**	**31000**	**98000**	**9700**	**26000**

Question 7/RAI3: Licensee is planning as indicated:

1) disposal of the packaged one million pounds of asbestos containing debris to an approved facility – during the week of August 13, 2001. (Note: Per telephone conversation with the licensee on September 24, 2001, the debris was disposed of on August 20, 2001.)

2) disposal of 14 drums each containing PCBs to an approved disposal facility – before the week of August 27, 2001. (Note: Per telephone conversation with the licensee on September 24, 2001, the material will be disposed by the end of October 2001.)

Response:

Following the August 6, 2001 meeting, 13 additional drums of PCB waste were generated for a total of 27 drums. These drums were generated as a result of remediation efforts in Seal Chamber # 3 located in the SSGS Discharge Tunnel. Of this total, 14 drums were PCB waste and 13 drums were PCB and radioactive waste. The 14 drums of PCB waste were shipped for disposal in October of 2001. The remaining 13 drums will be disposed prior to site license termination.

3) Removal of the contaminated debris in the four SSGS sumps – early spring of 2001. (Note: Per telephone conversation with the licensee on September 24, 2001, this was completed as planned.)

Table 1: Ground and Surface Water Level Measurements
Saxton Nuclear Experimental Facility
Saxton, PA

Well #	T/Elevation	9/6/2000		9/27/2000		10/4/2000		10/5/2000		10/11/2000		10/18/2000		10/25/2000		36838.00		11/29/2000		*12/4/00		12/13/2000		1/3/2001		1/11/2001		1/24/2001		2/8/2001	
		Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level
1								21.70	790.85	21.70	790.85	21.44	791.11	21.60	790.95																
2								21.10	789.87	21.10	789.87	21.04	789.93	21.05	789.92																
3								20.70	790.91	20.70	790.91	20.48	791.13	20.60	791.01																
4	813.43	813.43						21.90	791.53	21.60	791.83	21.38	792.05	21.50	791.93	21.68	791.75	21.52	791.91	21.55	791.88	21.65	791.78	21.90	791.53	21.60	791.83	21.50	791.93	21.50	791.93
5								20.82	791.21	20.98	791.05	20.90	791.13	20.95	791.08																
6								21.05	789.83	21.02	789.86	20.96	789.92	21.00	789.88																
7								20.55	791.20	20.55	791.20	20.48	791.27	20.65	791.10																
8								21.60	790.87	21.63	790.84	21.35	791.12	21.53	790.94																
9	Abandoned																														
10								20.82	790.51	20.95	790.38	20.65	790.68	20.85	790.48																
11								22.15	790.47	22.26	790.36	22.10	790.52	22.20	790.42																
12&	802.16	802.42	789.13	10.59	791.83	10.50	791.92			10.64	791.78	10.37	792.05	10.51	791.91	10.80	791.62	10.58	791.84	10.65	791.77	10.70	791.46	11.15	791.01	10.68	791.48	10.33	791.83	10.25	791.91
OP-1	800.25	800.25		7.42	792.83	7.55	792.70			7.50	792.75	7.10	793.15	7.27	792.98	7.47	792.78	7.15	793.10	7.30	792.95	7.30	792.95	7.30	792.95	7.34	792.91	7.20	793.05	6.90	793.35
OP-2	808.21	808.21		18.19	790.02	18.05	790.16			18.10	790.11	18.10	790.11	17.65	790.56	17.96	790.25	17.92	790.29	17.83	790.38	17.88	790.33	17.75	790.46	17.93	790.28	17.60	790.61	16.90	791.31
OP-3	806.15																														
OP-4	805.62																														
OVERBURDEN WELLS																															
OW-1	802.51	802.74	794.10	7.19	795.55	7.10	795.64			7.10	795.64	7.22	795.52	7.05	795.69	7.13	795.61	7.00	795.74	7.00	795.74	6.85	795.66			6.98	795.53	6.80	795.71	6.55	795.96
OW-2	806.21	806.40	789.30	15.90	790.50	15.77	790.63			15.85	790.55	15.88	790.52	15.48	790.92	15.92	790.48	15.80	790.60	15.75	790.65	15.62	790.59			15.72	790.49	15.05	791.16	14.00	792.21
OW-3	825.06																							4.60	820.46	5.50	819.56	6.80	818.26	6.55	818.51
OW-4	809.96																							***		***		***		***	
OW-5	794.48																							8.33	786.15	8.53	785.95	8.35	786.13	6.60	787.88
OW-6	801.08																							1.80	799.28	1.88	799.20	1.80	799.28	1.75	799.33
OW-7	811.28																														
Geo#1	815.06	815.25																7.32	807.93	8.72	806.53	10.13	804.93	9.37	805.69	9.24	805.82	6.90	808.16	5.60	809.46
Geo # 2		-	800.52					11.00	800.82	11.20	800.62	10.93	800.89	9.58	802.24																
Geo # 3	812.74	813.01						13.60	799.41	17.1**	795.91	12.50	800.51	12.75	800.26	13.65	799.36	12.47	800.54	13.00	800.01	13.55	799.19	13.84	798.90	14.00	798.74	12.70	800.04	12.60	800.14
Geo # 4	812.22	812.60	805.63							5.43	807.17	#	812.60	4.50	808.10	6.03	806.57	4.80	807.80	5.22	807.38	5.50	806.72	4.30	807.92	4.57	807.65	3.80	808.42	2.25	809.97
Geo # 5	813.13	813.34	807.22							6.30	807.04	4.50	808.84	4.70	808.64	6.10	807.24	4.85	808.49	4.98	808.36	5.40	807.73	4.60	808.53	4.45	808.68	3.45	809.68	2.20	810.93
Geo # 8	811.14	811.53																11.43	800.10	10.35	801.18	12.20	798.94	12.25	798.89	13.27	797.87	9.35	801.79	6.80	804.34
Geo # 10	811.92	812.30	804.63							7.45	804.85	4.97	807.33	5.90	806.40	8.13	804.17	6.40	805.90	7.10	805.20	7.66	804.26	6.03	805.89	6.52	805.40	5.10	806.82	3.65	808.27
BDRX ROCK WELLS																															
MW-2	812.77$																														
MW-3	818.63	819.20								14.30	804.90	10.98	808.22	11.00	808.20	12.47	806.73	10.70	808.50	10.90	808.30	11.00	807.63	10.59	808.04	10.50	808.13	8.90	809.73	7.05	811.58
MW-4	813.59	814.17																5.70	808.47	6.43	807.74	6.80	806.79	5.70	807.89	6.00	807.59	5.20	808.39	4.30	809.29
OW-3R	825.26																							11.30	813.96	11.45	813.81	11.15	814.11	9.80	815.46
OW-4R	810.05																							20.90	789.15	21.37	788.68	21.20	788.85	20.25	789.80
OW-5R	794.18																							7.20	786.98	7.43	786.75	7.10	787.08	6.30	787.88
OW-7R	811.14																														
SURFACE WATER MEASUREMENT POINTS ^^																															
Weir headwall	788.12	788.12																3.00	785.12	3.00	785.12	3.55	784.57	3.05	785.07	3.60	784.52	3.15	784.97	2.80	785.32
Rock Outcropping	787.39	787.39																2.19	785.20	2.22	785.17	2.80	784.59	2.15	785.24	2.50	784.89	2.35	785.04	1.90	785.49
DAM $$	790.30	790.30																1.70	788.60	2.10	788.20	2.35	787.95	1.50	788.80	2.15	788.15	1.70	788.60	0.60	789.70
Shoup Run tree mk1	805.20	805.20																5.46	799.74	5.55	799.65	5.50	799.70	5.35	799.85	5.55	799.65	5.47	799.73	5.35	799.85
Shoup Run Dam	806.30	806.30																2.50	803.80	2.52	803.78	2.50	803.80	2.35	803.95	2.55	803.75	2.50	803.80	2.35	803.95
Shoup Run Bridge	825.47	825.47																17.08	808.39	17.15	808.32	17.16	808.31	17.10	808.37	17.15	808.32	17.10	808.37	16.93	808.54

Footnote: Data Provided by GPU Nuclear.

Notes:

Depth =Top of Water from benchmark (I.E. Top of wells,elevation pin etc. in ft.)

Level =Top Of Water in Elevation

$ inclined well
$$ elevation represent elev on pin at Dam point 1.
$$$ elev. used to adjust level
? Water edge 3' away from wall
?? Water edge 5' away from wall
** unusual reading
*** Dry Well OW-4 15'/13.5', OW-7 7.8'/6.5', Geo-10 10', OW-5 9.15', Geo-1 12.15' deep
**** Almost Dry Well OP-3 16.2', OP-4 18.25', Geo-8 14.25'
# well flooded to top
- indicates well flooded above top of pipe
@ (pin under water at 1) water at top of dam 1.2' above pin
^^ readings may vary due to icy condition
& well pulled out 8/15/01. T/Plate EL. 802.81
* Measurement from T/pipe from 12/13/00. Measurements before 12/13 are from T/casing.

Table 1: Ground and Surface Water Level Measurements
Saxton Nuclear Experimental Facility
Saxton, PA

Well #	T/Elevation	2/22/2001		3/8/2001		3/19/2001		3/28/2001		4/12/2001		4/26/2001		5/10/2001		5/30/2001	
		Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level
1																	
2																	
3																	
4	813.43	21.25	792.18	21.50	791.93	20.75	792.68	21.00	792.43	20.25	793.18	21.25	792.18	21.60	791.83	21.50	791.93
5																	
6																	
7																	
8																	
9	Abandoned																
10																	
11																	
12&	802.16	10.05	792.11	10.30	791.86	9.50	792.66	9.75	792.41	9.10	793.06	10.02	792.14	10.37	791.79	10.30	791.86
OP-1	800.25	6.90	793.35	7.00	793.25	6.35	793.90	6.55	793.70	5.88	794.37	6.80	793.45	7.25	793.00	7.15	793.10
OP-2	808.21	17.00	791.21	17.25	790.96	16.70	791.51	16.65	791.56	16.28	791.93	16.55	791.66	17.00	791.21	16.90	791.31
OP-3	806.15															14.50	791.65
OP-4	805.62															16.55	789.07
OVERBURDEN WELLS																	
OW-1	802.51	6.48	796.03	6.53	795.98	6.10	796.41	6.25	796.26	5.60	796.91	5.80	796.71	6.50	796.01	6.40	796.11
OW-2	806.21	14.25	791.96	14.85	791.36	12.80	793.41	12.65	793.56	10.95	795.26	12.90	793.31	14.55	791.66	14.30	791.91
OW-3	825.06	6.40	818.66	6.40	818.66	6.05	819.01	5.85	819.21	3.90	821.16	4.30	820.76	5.80	819.26	6.30	818.76
OW-4	809.96	***		***		14.95	795.01	14.10	795.86	***		***		***		***	
OW-5	794.48	6.55	787.93	6.90	787.58	5.15	789.33	5.10	789.38	4.20	790.28	5.48	789.00	6.80	787.68	7.55	786.93
OW-6	801.08	1.60	799.48	1.65	799.43	1.45	799.63	1.55	799.53	1.56	799.52	1.75	799.33	1.82	799.26	1.90	799.18
OW-7	811.28															***	
Geo#1	815.06	5.85	809.21	5.95	809.11	4.60	810.46	4.60	810.46	4.15	810.91	4.90	810.16	7.15	807.91	6.85	808.21
Geo # 2																	
Geo # 3	812.74	12.80	799.94	12.00	800.74	11.55	801.19	12.00	800.74	10.25	802.49	12.35	800.39	12.85	799.89	9.20	803.54
Geo # 4	812.22	2.55	809.67	1.80	810.42	1.60	810.62	1.70	810.52	1.50	810.72	3.25	808.97	4.40	807.82	5.60	806.62
Geo # 5	813.13	2.30	810.83	2.45	810.68	1.60	811.53	1.60	811.53	1.70	811.43	2.60	810.53	3.80	809.33	4.15	808.98
Geo # 8	811.14	7.95	803.19	9.00	802.14	5.30	805.84	4.90	806.24	3.50	807.64	5.15	805.99	8.80	802.34	8.35	802.79
Geo # 10	811.92	3.65	808.27	3.30	808.62	2.40	809.52	2.50	809.42	2.30	809.62	4.70	807.22	6.70	805.22	8.55	803.37
BDRX ROCK WELLS																	
MW-2	812.77$	12.90		12.70		11.50		11.75		10.95		12.20		14.00		13.90	
MW-3	818.63	7.25	811.38	7.50	811.13	6.33	812.30	6.50	812.13	6.25	812.38	7.90	810.73	8.45	810.18	8.90	809.73
MW-4	813.59	3.40	810.19	-0.40	813.99	0.15	813.44	2.80	810.79	-0.60	814.19	4.00	809.59	5.00	808.59	5.90	807.69
OW-3R	825.26	9.35	815.91	9.20	816.06	8.00	817.26	7.15	818.11	7.90	817.36	8.40	816.86	8.90	816.36	10.00	815.26
OW-4R	810.05	19.15	790.90	19.30	790.75	18.80	791.25	18.80	791.25	18.10	791.95	19.60	790.45	19.70	790.35	19.25	790.80
OW-5R	794.18	5.75	788.43	6.20	787.98	4.80	789.38	5.20	788.98			7.00	787.18	7.00	787.18	7.60	786.58
OW-7R	811.14															17.84	793.30
SURFACE WATER MEASUREMENT POINTS ^^																	
Weir headwall	788.12	1.35	786.77	1.65	786.47	0.90	787.22	1.00	787.12	0.10	788.02	1.32	786.80	1.50	786.62	1.50	786.62
Rock Outcropping	787.39	0.55	786.84	0.90	786.49	0.05	787.34	0.24	787.15	-0.60	787.99	0.55	786.84	0.75	786.64	0.75	786.64
DAM $$	790.30	0.30	790.00	1.30	789.00	-1.20	791.50	0.00	790.30	-2.20	792.50	0.27	790.03	1.70	788.60	1.65	788.65
Shoup Run tree mk145	805.20	5.10	800.10	5.13	800.07	4.80	800.40	4.90	800.30	4.70	800.50	5.00	800.20	5.22	799.98	5.35	799.85
Shoup Run Dam	806.30	2.20	804.10	2.30	804.00	1.90	804.40	2.05	804.25	1.75	804.55	2.05	804.25	2.32	803.98	2.45	803.85
Shoup Run Bridge	825.47	16.70	808.77	16.85	808.62	16.25	809.22	16.40	809.07	16.10	809.37	16.50	808.97	16.80	808.67	16.95	808.52

Well #	6/13/2001		7/2/2001		7/31/2001		8/14/2001		8/29/2001		9/20/2001		10/4/2001		11/6/01	
	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level	Depth	Level
1																
2																
3																
4	21.50	791.93	21.43	792.00	21.57	791.86	21.95	791.48	21.60	791.83	26.78	786.65	30.73	782.70		
5																
6																
7																
8																
9																
10																
11																
12&	10.30	791.86	10.30	791.86	10.35	791.81	10.30	791.86	11.00	791.81						
OP-1	7.40	792.85	7.30	792.95	7.85	792.40	7.90	792.35	7.80	792.45	8.10	792.15	7.49	792.76	7.65	792.60
OP-2	17.00	791.21	17.00	791.21	17.65	790.56	17.85	790.36	17.90	790.31	18.19	790.02	17.15	791.06	18.10	790.11
OP-3	14.75	791.40	14.60	791.55	15.57	790.58	15.90	790.25	15.90	790.25	****		14.90	791.25	16.07	790.08
OP-4	16.85	788.77	16.70	788.92	17.72	787.90	18.00	787.62	18.10	787.52	****		16.96	788.66	18.15	787.47
OVERBURDEN WELLS																
OW-1	6.60	795.91	6.45	796.06	7.05	795.46	7.15	795.36	7.10	795.41	6.55	795.96	6.10	796.41	7.05	795.46
OW-2	14.55	791.66	14.55	791.66	15.60	790.61	15.85	790.36	16.00	790.21	16.15	790.06	14.93	791.28	16.05	790.16
OW-3	6.45	818.61	7.50	817.56	8.80	816.26	9.60	815.46	10.20	814.86	11.06	814.00	11.40	813.66	12.20	812.86
OW-4	***		***		***		***		***		***		***		***	
OW-5	7.55	786.93	7.75	786.73	8.45	786.03	8.95	785.53	***		***		***		***	
OW-6	1.95	799.13	2.00	799.08	2.20	798.88	2.15	798.93	2.15	798.93	2.10	798.98	2.25	798.83	2.20	798.88
OW-7	***		***		***		***		***		***		***		***	
Geo#1	7.85	807.21	7.35	807.71	10.30	804.76	10.60	804.46	9.75	805.31	****		11.50	803.56	6.22^^^	808.84
Geo # 2																
Geo # 3	7.05	805.69	3.10	809.64	14.70	798.04	16.02	796.72	13.90	798.84	15.60	797.14	13.05	799.69	16.40	796.34
Geo # 4	6.15	806.07	6.30	805.92	7.67	804.55	8.16	804.06	8.72	803.50	7.93	804.29	9.75	802.47	11.05	801.17
Geo # 5	4.40	808.73	4.50	808.63	6.15	806.98	7.00	806.13	7.90	805.23	9.44	803.69	9.30	803.83	10.40	802.73
Geo # 8	8.85	802.29	8.40	802.74	13.55	797.59	14.17	796.97	14.20	796.94	****		10.54	800.60	14.20	796.94
Geo # 10	10.05	801.87	9.05	802.87	***		***		***		***		***		***	
BDRX ROCK WELLS																
MW-2	15.00		14.30		17.20		17.71		17.65		18.10		16.35		20.15	
MW-3	9.30	809.33	9.40	809.23	11.30	807.33	12.32	806.31	13.20	805.43	15.00	803.63	14.49	804.14	15.00	803.63
MW-4	5.95	807.64	5.20	808.39	7.50	806.09	8.35	805.24	9.20	804.39	11.00	802.59	10.42	803.17	11.40	802.19
OW-3R	9.80	815.46	10.50	814.76	12.00	813.26	12.00	813.26	12.80	812.46	13.30	811.96	13.50	811.76	14.15	811.11
OW-4R	18.70	791.35	19.60	790.45	20.90	789.15	20.90	789.15	21.50	788.55	22.20	787.85	22.25	787.80	23.55	786.50
OW-5R	7.65	786.53	7.70	786.48	8.80	785.38	8.80	785.38	8.80	785.38	9.50	784.68	9.01	785.17	9.70	784.48
OW-7R	19.90	791.24	20.00	791.14	21.00	790.14	21.15	789.99	21.20	789.94	21.30	789.84	20.30	790.84	21.50	789.64
SURFACE WATER MEASUREMENT POINTS ^^																
Weir headwall	1.35	786.77	1.40	786.72	2.15	785.97	2.55	785.57	3.05	785.07	?		??		???	
Rock Outcropping	0.60	786.79	0.65	786.74	1.40	785.99	1.80	785.59	2.30	785.09	3.25	784.14	3.44	783.95	3.40	783.99
DAM $$	1.90	788.40	2.10	788.20	2.55	787.75	2.55	787.75	2.52	787.78	2.73	787.57	2.70	787.60	2.63	787.67
Shoup Run tree mk145	5.40	799.80	5.45	799.75	5.60	799.60	5.60	799.60	5.60	799.60	5.53	799.67	5.61	799.59	5.50	799.70
Shoup Run Dam	2.50	803.80	2.50	803.80	2.60	803.70	2.63	803.67	2.63	803.67	2.59	803.71	2.61	803.69	2.50	803.80
Shoup Run Bridge	17.00	808.47	17.10	808.37	17.25	808.22	17.27	808.20	17.30	808.17	17.19	808.28	17.30	808.17	17.30	808.17

Footnote: Data Provided by GPU Nuclear.

Notes:

Depth =Top of Water from benchmark (I.E. Top of wells,elevation pin etc. in ft.)
Level =Top Of Water in Elevation
$ inclined well
$$ elevation represent elev on pin at Dam point 1.
$$$ elev. used to adjust level
? Water edge 3' away from wall
?? Water edge 5' away from wall
** unusual reading
*** Dry Well OW-4 15'/13.5', OW-7 7.8'/6.5', Geo-10 10', OW-5 9.15', Geo-1 12.15' deep
**** Almost Dry Well OP-3 16.2', OP-4 18.25', Geo-8 14.25'
# well flooded to top
- indicates well flooded above top of pipe
@ (pin under water at 1) water at top of dam 1.2' above pin
^^ readings may vary due to icy condition
& well pulled out 8/15/01. T/Plate EL. 802.81
* Measurement from T/pipe from 12/13/00. Measurements before 12/13 are from T/casing.