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1014

RESULTS OF ANALYSES OF WATER SAMPLES

08/15/90

DOE-1482-90
DOE-FMPC/ALBRIGHT & WILSON
319
LETTER

[redacted]

1014

Department of Energy
FMPC Site Office
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6319

AUG 15 1990
DOE-1482-90

Nancyellen Keane
Albright & Wilson Americas, Inc.
100 Lakeridge Parkway
Ashland, VA 23005

Dear Ms. Keane:

RESULTS OF ANALYSES OF WATER SAMPLES

The purpose of this letter is to inform you of the results of analyses of water samples taken from wells located on your property. These wells were installed as groundwater monitoring wells and are not used to provide drinking water.

As you know, a representative of the Department of Energy (DOE) or its contractors collected samples from these wells as part of a comprehensive environmental investigation at the FMPC. This investigation, entitled the Remedial Investigation/Feasibility Study, or RI/FS, is focused on evaluating the environmental and public health impacts associated with past and present operations of the facility.

The laboratory's chemical and radiological results for the samples collected from wells located on your property are enclosed. For comparison, the applicable Federal drinking water standards and DOE concentration guidelines are also shown.

In addition to chemical and radiological parameters normally included in RI/FS groundwater analyses, a sample of water from well No. 2129 on February 1, 1990, was analyzed for semi-volatile organics and pesticides/PCBs. The results indicate that none of these compounds exist above the laboratory detection limits. These results are also enclosed for your information.

Mr. Rich Bendula of the Ohio Environmental Protection Agency (OEPA) has offered to respond to any questions you may have concerning the sampling or levels of contaminants. Mr. Bendula can be reached at (513) 449-6357.

If you have any questions, please contact Andy Avel, of my staff, at (513) 738-6161.

Sincerely,

Gerald W. Westerbeck
FMPC Site Manager

DP-84:Avel

Enclosure: As stated

cc w/encl.:

S. Goodson, Albright & Wilson-Columbus

bcc w/encl.:

G. E. Mitchell, OEPA-Dayton
R. Bendula, OEPA-Dayton
C. A. McCord, USEPA-5
J. P. Hopper, WMCO
R. W. Kasparek, WMCO
L. K. Rogers, WMCO
J. W. Wood, ASI

Advanced Sciences, Inc.
Date: March 27, 1990
Client Project ID: RI/FS Fernald

Job Number: ADV 35815

Well ID: 2129
Sample: 04182
Sample Date: 2/1/90

III. Quality Control

The matrix spike (MS) and matrix spike duplicate (MSD) for the organic analyses were performed on sample 04182.

The sample was analyzed for volatile organics on 02/10/90. The sample runs proceeded well. All surrogates and internal standards were within QC required limits. The MS/MSD percent recoveries were all within QC limits. There were no problems, QC or otherwise, seen in the final data review.

The sample was extracted on 02/07/90 and analyzed for semivolatile organics on 03/11/90. The analyses proceeded well with all surrogates and internal standards within QC required limits. The MS/MSD showed pyrene percent recoveries to be outside QC limits, but all percent RPD's are within QC limits. There were no other problems, QC or otherwise, seen in the final data review.

The pesticide and aroclor analyses were performed on 02/08/90. No confirmation analyses was needed. All samples and blank were prepared as low-level waters and analyzed by CLP protocol. All water pesticide surrogate recoveries were within QC limits. One (1) MS/MSD percent recovery was slightly below the QC limit. All RPD's were within QC limits.

Organic data was reported with the following qualifiers:

U - Compound analyzed for but not detected.
E - Compound exceeded calibration range of instrument.
D - Compound analyzed at a secondary dilution factor.
J - Compound detected but below the contract required quantitation limit. The value given was an estimate.
B - Compound was found in the method blank.
A - Suspected aldol condensation product.
Y - Indistinguishable isomer in tentatively identified compounds.

[redacted]

Advanced Sciences, Inc.
Date: 24-APR-90

IT CORPORATION
KNOXVILLE, TN

Client Project ID: Fernald RI/FS

Job Number: ADV35815

EPA CLP TCL Volatile Organics by GCMS - Current EPA CLP Protocol - MV 702

Well ID: 2129
Sample: 04182
Sample Date: 2/1/90

Client Sample ID: 04182

Sample Date: N/A
IT Sample ID: MM2971
Prep Date:
Analysis Date: (Completed) 02/10/90
Blank Sample ID: QXM09B002103VBK
Concentration Units: UG/LITER

Parameter	Result	
Chloromethane	10	U
Bromomethane	10	U
Vinyl chloride	10	U
Chloroethane	10	U
Methylene chloride	5	U
Acetone	6	JB
Carbon disulfide	5	U
1,1-Dichloroethene	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethylene	5	U
Chloroform	5	U
1,2-Dichloroethane	5	U
2-Butanone	4	JB
1,1,1-Trichloroethane	5	U
Carbon Tetrachloride	5	U
Vinyl Acetate	10	U
Bromodichloromethane	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
Trichloroethene	5	U
Dibromochloromethane	5	U
1,1,2-Trichloroethane	5	U
Benzene	5	U
trans-1,3-Dichloropropene	5	U
Bromoform	5	U
4-Methyl-2-pentanone	10	U
2-Hexanone	10	U
Tetrachlorethene	5	U
1,1,2,2-Tetrachloroethane	5	U
Toluene	5	U
Chlorobenzene	5	U
Ethylbenzene	5	U
Styrene	5	U
Total xylenes	5	U

[redacted]

[redacted]

Advanced Sciences. Inc.
Date: 24-APR-90

IT CORPORATION
KNOXVILLE, TN

Client Project ID: Fernald RI/FS

Job Number: ADV35815

EPA CLP TCL BNA Organics by GCMS - Current EPA CLP Protocol - ME 702

Client Sample ID: 04182

Well ID: 2129
Sample: 04182
Sample Date: 2/1/90

Sample Date: N/A
IT Sample ID: MM2977
Prep Date: 02/07/90
Analysis Date: (Completed) 03/11/90
Blank Sample ID: QXM12B002071
Concentration Units: UG/LITER

Parameter	Result		Parameter	Result	
Phenol	10	U	2,4-Dinitrophenol	50	U
bis(2-Chloroethyl)ether	10	U	4-Nitrophenol	50	U
2-Chlorophenol	10	U	Dibenzofuran	10	U
1,3-Dichlorobenzene	10	U	2,4-Dinitrotoluene	10	U
1,4-Dichlorobenzene	10	U	Diethyl phthalate	10	U
Benzyl alcohol	10	U	4-Chlorophenylphenyl ether	10	U
1,2-Dichlorobenzene	10	U	Fluorene	10	U
2-Methylphenol	10	U	4-Nitroaniline	50	U
bis(2-Chloroisopropyl)ether	10	U	4,6-Dinitro-2-methylphenol	50	U
4-Methylphenol	10	U	N-Nitrosodiphenylamine	10	U
N-Nitroso-di-n-propylamine	10	U	4-Bromophenyl phenyl ether	10	U
Hexachloroethane	10	U	Hexachlorobenzene	10	U
Nitrobenzene	10	U	Pentachlorophenol	50	U
Isophorone	10	U	Phenanthrene	10	U
2-Nitrophenol	10	U	Anthracene	10	U
2,4-Dimethylphenol	10	U	Di-n-butyl phthalate	10	U
Benzoic acid	50	U	Fluoranthene	10	U
bis(2-Chloroethoxy)methane	10	U	Pyrene	10	U
2,4-Dichlorophenol	10	U	Butyl benzyl phthalate	10	U
1,2,4-Trichlorobenzene	10	U	3,3'-Dichlorobenzidine	20	U
Naphthalene	10	U	Benzo(a)anthracene	10	U
4-Chloroaniline	10	U	Chrysene	10	U
Hexachlorobutadiene	10	U	bis(2-Ethylhexyl) phthalate	10	U
4-Chloro-3-methylphenol	10	U	Di-n-octyl phthalate	10	U
2-Methylnaphthalene	10	U	Benzo(b)fluoranthene	10	U
Hexachlorocyclopentadiene	10	U	Benzo(k)fluoranthene	10	U
2,4,6-Trichlorophenol	10	U	Benzo(a)pyrene	10	U
2,4,5-Trichlorophenol	50	U	Indeno(1,2,3-cd)pyrene	10	U
2-Chloronaphthalene	10	U	Dibenzo(a,h)anthracene	10	U
2-Nitroaniline	50	U	Benzo(g,h,i)perylene	10	U
Dimethyl phthalate	10	U			
Acenaphthylene	10	U			
2,6-Dinitrotoluene	10	U			
3-Nitroaniline	50	U			
Acenaphthene	10	U			

[redacted]

[redacted]

Advanced Sciences, Inc.
Date: 24-APR-90

IT CORPORATION
KNOXVILLE, TN

Client Project ID: Fernald RI/FS

Job Number: ADV35815

TCL Pesticides/PCB's in Water - Current EPA CLP Protocol - GC 720

Client Sample ID: 04182

Well ID: 2129
Sample: 04182
Sample Date: 2/1/90

Sample Date: N/A
IT Sample ID: MM2974
Prep Date: 02/07/90
Analysis Date: (Completed) 02/08/90
Blank Sample ID: QXG19B002071
Concentration Units: UG/LITER

Parameter	Result	
alpha-BHC	.05	U
beta-BHC	.05	U
delta-BHC	.05	U
gamma-BHC (Lindane)	.05	U
Heptachlor	.05	U
Aldrin	.05	U
Heptachlor epoxide	.05	U
Endosulfan-I	.05	U
Dieldrin	.1	U
4,4'-DDE	.1	U
Endrin	.1	U
Endosulfan II	.1	U
4,4'-DDD	.1	U
Endosulfan sulfate	.1	U
4,4'-DDT	.1	U
Methoxychlor	.5	U
Endrin ketone	.1	U
alpha-Chlordane	.5	U
gamma-Chlordane	.5	U
Toxaphene	1	U
Aroclor-1016	.5	U
Aroclor-1221	.5	U
Aroclor-1232	.5	U
Aroclor-1242	.5	U
Aroclor-1248	.5	U
Aroclor-1254	1	U
Aroclor-1260	1	U

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS
RADIOLOGICAL PARAMETERS

Property Owner : Albright & Wilson Americas, Inc.
Attn: Nancyellen Keane
[redacted]

New Well ID: 2129
Sample : 04182
Sample Date: 2/1/90

SUBSTANCE	CONCENTRATION	STANDARD	REFERENCE
CESIUM-137	<20.0 pCi/l	120 pCi/l	C
NEPTUNIUM-237	<1.0 pCi/l	1.2 pCi/l	C
PLUTONIUM-238	<1.0 pCi/l	1.6 pCi/l	C
PLUTONIUM-239,240	<1.0 pCi/l	1.2 pCi/l	C
RADIUM-226	1.80 pCi/l	5 pCi/l *	D
RADIUM-228	<3.0 pCi/l	5 pCi/l *	D
RUTHENIUM-106	<150 pCi/l	240 pCi/l	C
STRONTIUM-90	<5.0 pCi/l	8 pCi/l	E
TECHNETIUM-99	<30.0 pCi/l	4000 pCi/l	C
THORIUM-228	2.4 pCi/l	16 pCi/l	C
THORIUM-230	<1.0 pCi/l	12 pCi/l	C
THORIUM-232	1.8 pCi/l	2 pCi/l	C
THORIUM-TOTAL	16.0 ug/l	NONE	
URANIUM-234	2.4 pCi/l	20 pCi/l	C
URANIUM-235,236	<1.0 pCi/l	20 pCi/l	C
URANIUM-238	2.8 pCi/l	24 pCi/l	C
URANIUM-TOTAL	11.1 ug/l	NONE	**

C = United States Department of Energy; Order 5400.5, "Radiation Protection of the Public and the Environment;" Feb. 8, 1990.

D = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.15

E = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.16

* = Note: The standard of 5 pCi/l is based upon the combined activity concentrations of Radium-226 and Radium-228

** = Note: A groundwater study conducted by an independent consultant for the FMPC determined that background concentrations of naturally-occurring uranium in the groundwater for this area, range from less than < 0.1 ug/l to 2.7 ug/l. Also, a U. S. Geological Survey study (J. D. Hem, 1970, Geological Survey Water-Supply Paper 1473) reported a range of uranium concentration of < 0.1 ug/l to 10.0 ug/l in most natural water within the United States.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS (CHEMICAL/METAL PARAMETERS)

[redacted]

Property Owner : Albright & Wilson Americas, Inc.
Attn: Nancyellen Keane
[redacted]

New Well ID : 2129
Sample : 04182
Sample Date: 2/1/90

SUBSTANCE	CONCENTRATIONS		STANDARD	REFERENCE
Ammonia	.37	ppm	None	
Arsenic	.0518	ppm	0.05 ppm	A
Barium	.044	ppm	1.0 ppm	A
Cadmium	.0027	ppm	0.01 ppm	A
Calcium	82.7	ppm	None	
Chloride	28.8	ppm	250 ppm	B
Chromium	.0244	ppm	0.05 ppm	A
Copper	.0193	ppm	1.0 ppm	B
Fluoride	<.05	ppm	4(A),2(B) ppm	***
Iron	.660	ppm	0.3 ppm	B
Lead	.004	ppm	0.05 ppm	A
Magnesium	34.1	ppm	None	
Manganese	.0248	ppm	0.05 ppm	B
Mercury	.0002	ppm	0.002 ppm	A
Molybdenum	.0125	ppm	None	
Nickel	<.02	ppm	None	
Nitrates	2.76	ppm	10 ppm	A
Phenols	.021	ppm	None	
Phosphorus	27.2	ppm	None	
Potassium	328.0	ppm	None	
Selenium	.0037	ppm	0.01 ppm	A
Silver	<.01	ppm	0.05 ppm	A
Sodium	88.8	ppm	None	
Sulfate	117	ppm	250 ppm	B
Total Kjeldahl Nitrogen	2.14	ppm	None	
Total Organic Nitrogen	1.77	ppm	None	

A = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.11

B = United States Environmental Protection Agency; Safe Drinking Water Act; National Secondary Drinking Water Regulations; 40 CFR 143.3

*** = The National Primary Drinking Water Standard for flouride is 2 ppm. The National Secondary Drinking Water Standard for flouride is 4 ppm.

< Denotes that the applicable concentration in the sample is less than that which the analytical method used is capable of detecting. The number shown is the lowest quantity that the analytical method used is capable of detecting.

Note: The standards set by the National Primary Drinking Water Regulations (40 CFR 141) are to ensure public health protection. The standards set by the National Secondary Drinking Water Regulations control contaminants in drinking water that primarily affect the aesthetic qualities relating to the public acceptance of drinking water. Contaminant concentrations higher than the secondary limits may also have public health implications.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS
RADIOLOGICAL PARAMETERS

[redacted]

Property Owner : Albright & Wilson Americas, Inc.
Attn: Nancyellen Keane
[redacted]

New Well ID : 2128
Sample : 04181
Sample Date: 1/23/90

SUBSTANCE	CONCENTRATION	STANDARD		REFERENCE
CESIUM-137	<20.0 pCi/l	120 pCi/l		C
NEPTUNIUM-237	<1.0 pCi/l	1.2 pCi/l		C
PLUTONIUM-238	<1.0 pCi/l	1.6 pCi/l		C
PLUTONIUM-239,240	<1.0 pCi/l	1.2 pCi/l		C
RADIUM-226	<1.0 pCi/l	5 pCi/l	*	D
RADIUM-228	<3.0 pCi/l	5 pCi/l	*	D
RUTHENIUM-106	<150 pCi/l	240 pCi/l		C
STRONTIUM-90	17.4 pCi/l	8 pCi/l		E
TECHNETIUM-99	<30.0 pCi/l	4000 pCi/l		C
THORIUM-228	<1.0 pCi/l	16 pCi/l		C
THORIUM-230	1.32 pCi/l	12 pCi/l		C
THORIUM-232	<1.0 pCi/l	2 pCi/l		C
THORIUM-TOTAL	<2.2 ug/l	NONE		
URANIUM-234	2.06 pCi/l	20 pCi/l		C
URANIUM-235,236	<1.0 pCi/l	20 pCi/l		C
URANIUM-238	1.90 pCi/l	24 pCi/l		C
URANIUM-TOTAL	7.96 ug/l	NONE		**

C = United States Department of Energy; Order 5400.5, "Radiation Protection of the Public and the Environment;" Feb. 8, 1990.

D = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.15

E = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.16

* = Note: The standard of 5 pCi/l is based upon the combined activity concentrations of Radium-226 and Radium-228

** = Note: A groundwater study conducted by an independent consultant for the FMPC determined that background concentrations of naturally-occurring uranium in the groundwater for this area, range from less than < 0.1 ug/l to 2.7 ug/l. Also, a U. S. Geological Survey study (J. D. Hem, 1970, Geological Survey Water-Supply Paper 1473) reported a range of uranium concentration of < 0.1 ug/l to 10.0 ug/l in most natural water within the United States.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS (CHEMICAL/METAL PARAMETERS) [redacted]

Property Owner : Albright & Wilson Americas, Inc.
Attn: Nancyellen Keane
[redacted]

New Well ID : 2128
Sample : 04181
Sample Date: 1/23/90

SUBSTANCE	CONCENTRATIONS		STANDARD	REFERENCE
Ammonia	<.1	ppm	None	
Arsenic	<.002	ppm	0.05 ppm	A
Barium	.051	ppm	1.0 ppm	A
Cadmium	<.002	ppm	0.01 ppm	A
Calcium	112.0	ppm	None	
Chloride	25.2	ppm	250 ppm	B
Chromium	.026	ppm	0.05 ppm	A
Copper	<.01	ppm	1.0 ppm	B
Fluoride	.28	ppm	4(A),2(B) ppm	***
Iron	.065	ppm	0.3 ppm	B
Lead	<.002	ppm	0.05 ppm	A
Magnesium	27.7	ppm	None	
Manganese	.04	ppm	0.05 ppm	B
Mercury	<.0002	ppm	0.002 ppm	A
Molybdenum	<.01	ppm	None	
Nickel	<.02	ppm	None	
Nitrates	1.76	ppm	10 ppm	A
Phenols	.013	ppm	None	
Phosphorus	.13	ppm	None	
Potassium	1.74	ppm	None	
Selenium	<.002	ppm	0.01 ppm	A
Silver	<.01	ppm	0.05 ppm	A
Sodium	26.6	ppm	None	
Sulfate	65.9	ppm	250 ppm	B
Total Kjeldahl Nitrogen	<.1	ppm	None	
Total Organic Nitrogen	<.1	ppm	None	

A = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.11

B = United States Environmental Protection Agency; Safe Drinking Water Act; National Secondary Drinking Water Regulations; 40 CFR 143.3

*** = The National Primary Drinking Water Standard for flouride is 2 ppm. The National Secondary Drinking Water Standard for flouride is 4 ppm.

< Denotes that the applicable concentration in the sample is less than that which the analytical method used is capable of detecting. The number shown is the lowest quantity that the analytical method used is capable of detecting.

Note: The standards set by the National Primary Drinking Water Regulations (40 CFR 141) are to ensure public health protection. The standards set by the National Secondary Drinking Water Regulations control contaminants in drinking water that primarily affect the aesthetic qualities relating to the public acceptance of drinking water. Contaminant concentrations higher than the secondary limits may also have public health implications.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS
RADIOLOGICAL PARAMETERS

[redacted]

Property Owner : Albright & Wilson Americas, Inc.
Attn: Nancyellen Keane
[redacted]

New Well ID : 3128
Sample : 04180
Sample Date: 1/19/90

SUBSTANCE	CONCENTRATION	STANDARD		REFERENCE
CESIUM-137	<20.0 pCi/l	120 pCi/l		C
NEPTUNIUM-237	<1.0 pCi/l	1.2 pCi/l		C
PLUTONIUM-238	<1.0 pCi/l	1.6 pCi/l		C
PLUTONIUM-239,240	<1.0 pCi/l	1.2 pCi/l		C
RADIUM-226	<1.0 pCi/l	5 pCi/l	*	D
RADIUM-228	<3.0 pCi/l	5 pCi/l	*	D
RUTHENIUM-106	<150 pCi/l	240 pCi/l		C
STRONTIUM-90	<5.0 pCi/l	8 pCi/l		E
TECHNETIUM-99	<30.0 pCi/l	4000 pCi/l		C
THORIUM-228	<1.0 pCi/l	16 pCi/l		C
THORIUM-230	1.15 pCi/l	12 pCi/l		C
THORIUM-232	<1.0 pCi/l	2 pCi/l		C
THORIUM-TOTAL	<1.9 ug/l	NONE		
URANIUM-234	11.0 pCi/l	20 pCi/l		C
URANIUM-235,236	<1.0 pCi/l	20 pCi/l		C
URANIUM-238	8.98 pCi/l	24 pCi/l		C
URANIUM-TOTAL	30.6 ug/l	NONE		**

C = United States Department of Energy; Order 5400.5, "Radiation Protection of the Public and the Environment;" Feb. 8, 1990.

D = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.15

E = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.16

* = Note: The standard of 5 pCi/l is based upon the combined activity concentrations of Radium-226 and Radium-228

** = Note: A groundwater study conducted by an independent consultant for the FMPC determined that background concentrations of naturally-occurring uranium in the groundwater for this area, range from less than < 0.1 ug/l to 2.7 ug/l. Also, a U. S. Geological Survey study (J. D. Hem, 1970, Geological Survey Water-Supply Paper 1473) reported a range of uranium concentration of < 0.1 ug/l to 10.0 ug/l in most natural water within the United States.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS (CHEMICAL/METAL PARAMETERS)

Property Owner : Albright & Wilson Americas, Inc.
Attn: Nancyellen Keane
[redacted]

New Well ID : 3128
Sample : 04180
Sample Date: 1/19/90

SUBSTANCE	CONCENTRATIONS		STANDARD	REFERENCE
Ammonia	.15	ppm	None	
Arsenic	<.002	ppm	0.05 ppm	A
Barium	.068	ppm	1.0 ppm	A
Cadmium	<.002	ppm	0.01 ppm	A
Calcium	90.0	ppm	None	
Chloride	29.6	ppm	250 ppm	B
Chromium	.02	ppm	0.05 ppm	A
Copper	.011	ppm	1.0 ppm	B
Fluoride	.18	ppm	4(A),2(B) ppm	***
Iron	.117	ppm	0.3 ppm	B
Lead	<.002	ppm	0.05 ppm	A
Magnesium	21.8	ppm	None	
Manganese	.211	ppm	0.05 ppm	B
Mercury	<.0002	ppm	0.002 ppm	A
Molybdenum	<.01	ppm	None	
Nickel	<.02	ppm	None	
Nitrates	<.1	ppm	10 ppm	A
Phenols	.021	ppm	None	
Phosphorus	.1	ppm	None	
Potassium	2.63	ppm	None	
Selenium	<.002	ppm	0.01 ppm	A
Silver	<.01	ppm	0.05 ppm	A
Sodium	21.4	ppm	None	
Sulfate	796	ppm	250 ppm	B
Total Kjeldahl Nitrogen	.58	ppm	None	
Total Organic Nitrogen	.44	ppm	None	

A = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.11

B = United States Environmental Protection Agency; Safe Drinking Water Act; National Secondary Drinking Water Regulations; 40 CFR 143.3

*** = The National Primary Drinking Water Standard for flouride is 2 ppm. The National Secondary Drinking Water Standard for flouride is 4 ppm.

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Note: The standards set by the National Primary Drinking Water Regulations (40 CFR 141) are to ensure public health protection. The standards set by the National Secondary Drinking Water Regulations control contaminants in drinking water that primarily affect the aesthetic qualities relating to the public acceptance of drinking water. Contaminant concentrations higher than the secondary limits may also have public health implications.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS
RADIOLOGICAL PARAMETERS

[redacted]

Property Owner : [redacted]
Ashland, VA 23005

New Well ID: 2129
Sample : 04182
Sample Date: 2/1/90

SUBSTANCE	CONCENTRATION	STANDARD		REFERENCE
CESIUM-137	<20.0 pCi/l	120 pCi/l		C
NEPTUNIUM-237	<1.0 pCi/l	1.2 pCi/l		C
PLUTONIUM-238	<1.0 pCi/l	1.6 pCi/l		C
PLUTONIUM-239,240	<1.0 pCi/l	1.2 pCi/l		C
RADIUM-226	1.80 pCi/l	5 pCi/l	*	D
RADIUM-228	<3.0 pCi/l	5 pCi/l	*	D
RUTHENIUM-106	<150 pCi/l	240 pCi/l		C
STRONTIUM-90	<5.0 pCi/l	8 pCi/l		E
TECHNETIUM-99	<30.0 pCi/l	4000 pCi/l		C
THORIUM-228	2.4 pCi/l	16 pCi/l		C
THORIUM-230	<1.0 pCi/l	12 pCi/l		C
THORIUM-232	1.8 pCi/l	2 pCi/l		C
THORIUM-TOTAL	16.0 ug/l	NONE		
URANIUM-234	2.4 pCi/l	20 pCi/l		C
URANIUM-235,236	<1.0 pCi/l	20 pCi/l		C
URANIUM-238	2.8 pCi/l	24 pCi/l		C
URANIUM-TOTAL	11.1 ug/l	NONE		**

C = United States Department of Energy; Order 5400.5, "Radiation Protection of the Public and the Environment;" Feb. 8, 1990.

D = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.15

E = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.16

* = Note: The standard of 5 pCi/l is based upon the combined activity concentrations of Radium-226 and Radium-228

** = Note: A groundwater study conducted by an independent consultant for the FMPC determined that background concentrations of naturally-occurring uranium in the groundwater for this area, range from less than < 0.1 ug/l to 2.7 ug/l. Also, a U. S. Geological Survey study (J. D. Hem, 1970, Geological Survey Water-Supply Paper 1473) reported a range of uranium concentration of < 0.1 ug/l to 10.0 ug/l in most natural water within the United States.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS (CHEMICAL/METAL PARAMETERS)

[redacted]

Property Owner : [redacted]
Ashland, VA 23005

New Well ID : 2129
Sample : 04182
Sample Date: 2/1/90

SUBSTANCE	CONCENTRATIONS		STANDARD		REFERENCE
Ammonia	.37	ppm	None		
Arsenic	.0518	ppm	0.05	ppm	A
Barium	.044	ppm	1.0	ppm	A
Cadmium	.0027	ppm	0.01	ppm	A
Calcium	82.7	ppm	None		
Chloride	28.8	ppm	250	ppm	B
Chromium	.0244	ppm	0.05	ppm	A
Copper	.0193	ppm	1.0	ppm	B
Fluoride	<.05	ppm	4(A),2(B)	ppm	***
Iron	.660	ppm	0.3	ppm	B
Lead	.004	ppm	0.05	ppm	A
Magnesium	34.1	ppm	None		
Manganese	.0248	ppm	0.05	ppm	B
Mercury	.0002	ppm	0.002	ppm	A
Molybdenum	.0125	ppm	None		
Nickel	<.02	ppm	None		
Nitrates	2.76	ppm	10	ppm	A
Phenols	.021	ppm	None		
Phosphorus	27.2	ppm	None		
Potassium	328.0	ppm	None		
Selenium	.0037	ppm	0.01	ppm	A
Silver	<.01	ppm	0.05	ppm	A
Sodium	88.8	ppm	None		
Sulfate	117	ppm	250	ppm	B
Total Kjeldahl Nitrogen	2.14	ppm	None		
Total Organic Nitrogen	1.77	ppm	None		

A = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.11

B = United States Environmental Protection Agency; Safe Drinking Water Act; National Secondary Drinking Water Regulations; 40 CFR 143.3

*** = The National Primary Drinking Water Standard for flouride is 2 ppm. The National Secondary Drinking Water Standard for flouride is 4 ppm.

< Denotes that the applicable concentration in the sample is less than that which the analytical method used is capable of detecting. The number shown is the lowest quantity that the analytical method used is capable of detecting.

Note: The standards set by the National Primary Drinking Water Regulations (40 CFR 141) are to ensure public health protection. The standards set by the National Secondary Drinking Water Regulations control contaminants in drinking water that primarily affect the aesthetic qualities relating to the public acceptance of drinking water. Contaminant concentrations higher than the secondary limits may also have public health implications.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS
RADIOLOGICAL PARAMETERS

[redacted]

Property Owner : [redacted]
Ashland, VA 23005

New Well ID : 2128
Sample : 04181
Sample Date: 1/23/90

SUBSTANCE	CONCENTRATION	STANDARD	REFERENCE
CESIUM-137	<20.0 pCi/l	120 pCi/l	C
NEPTUNIUM-237	<1.0 pCi/l	1.2 pCi/l	C
PLUTONIUM-238	<1.0 pCi/l	1.6 pCi/l	C
PLUTONIUM-239,240	<1.0 pCi/l	1.2 pCi/l	C
RADIUM-226	<1.0 pCi/l	5 pCi/l	* D
RADIUM-228	<3.0 pCi/l	5 pCi/l	* D
RUTHENIUM-106	<150 pCi/l	240 pCi/l	C
STRONTIUM-90	17.4 pCi/l	8 pCi/l	E
TECHNETIUM-99	<30.0 pCi/l	4000 pCi/l	C
THORIUM-228	<1.0 pCi/l	16 pCi/l	C
THORIUM-230	1.32 pCi/l	12 pCi/l	C
THORIUM-232	<1.0 pCi/l	2 pCi/l	C
THORIUM-TOTAL	<2.2 ug/l	NONE	
URANIUM-234	2.06 pCi/l	20 pCi/l	C
URANIUM-235,236	<1.0 pCi/l	20 pCi/l	C
URANIUM-238	1.90 pCi/l	24 pCi/l	C
URANIUM-TOTAL	7.96 ug/l	NONE	**

C = United States Department of Energy; Order 5400.5, "Radiation Protection of the Public and the Environment;" Feb. 8, 1990.

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E = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.16

* = Note: The standard of 5 pCi/l is based upon the combined activity concentrations of Radium-226 and Radium-228

** = Note: A groundwater study conducted by an independent consultant for the FMPC determined that background concentrations of naturally-occurring uranium in the groundwater for this area, range from less than < 0.1 ug/l to 2.7 ug/l. Also, a U. S. Geological Survey study (J. D. Hem, 1970, Geological Survey Water-Supply Paper 1473) reported a range of uranium concentration of < 0.1 ug/l to 10.0 ug/l in most natural water within the United States.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS (CHEMICAL/METAL PARAMETERS)

Property Owner : [redacted]
Ashland, VA 23005

New Well ID : 2128
Sample : 04181
Sample Date: 1/23/90

SUBSTANCE	CONCENTRATIONS		STANDARD	REFERENCE
Ammonia	<.1	ppm	None	
Arsenic	<.002	ppm	0.05 ppm	A
Barium	.051	ppm	1.0 ppm	A
Cadmium	<.002	ppm	0.01 ppm	A
Calcium	112.0	ppm	None	
Chloride	25.2	ppm	250 ppm	B
Chromium	.026	ppm	0.05 ppm	A
Copper	<.01	ppm	1.0 ppm	B
Fluoride	.28	ppm	4(A),2(B) ppm	***
Iron	.065	ppm	0.3 ppm	B
Lead	<.002	ppm	0.05 ppm	A
Magnesium	27.7	ppm	None	
Manganese	.04	ppm	0.05 ppm	B
Mercury	<.0002	ppm	0.002 ppm	A
Molybdenum	<.01	ppm	None	
Nickel	<.02	ppm	None	
Nitrates	1.76	ppm	10 ppm	A
Phenols	.013	ppm	None	
Phosphorus	.13	ppm	None	
Potassium	1.74	ppm	None	
Selenium	<.002	ppm	0.01 ppm	A
Silver	<.01	ppm	0.05 ppm	A
Sodium	26.6	ppm	None	
Sulfate	65.9	ppm	250 ppm	B
Total Kjeldahl Nitrogen	<.1	ppm	None	
Total Organic Nitrogen	<.1	ppm	None	

A = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.11

B = United States Environmental Protection Agency; Safe Drinking Water Act; National Secondary Drinking Water Regulations; 40 CFR 143.3

*** = The National Primary Drinking Water Standard for flouride is 2 ppm. The National Secondary Drinking Water Standard for flouride is 4 ppm.

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Note: The standards set by the National Primary Drinking Water Regulations (40 CFR 141) are to ensure public health protection. The standards set by the National Secondary Drinking Water Regulations control contaminants in drinking water that primarily affect the aesthetic qualities relating to the public acceptance of drinking water. Contaminant concentrations higher than the secondary limits may also have public health implications.

FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS
RADIOLOGICAL PARAMETERS

[redacted]

Property Owner : [redacted]
Ashland, VA 23005

New Well ID : 3128
Sample : 04180
Sample Date: 1/19/90

SUBSTANCE	CONCENTRATION	STANDARD	REFERENCE
CESIUM-137	<20.0 pCi/l	120 pCi/l	C
NEPTUNIUM-237	<1.0 pCi/l	1.2 pCi/l	C
PLUTONIUM-238	<1.0 pCi/l	1.6 pCi/l	C
PLUTONIUM-239,240	<1.0 pCi/l	1.2 pCi/l	C
RADIUM-226	<1.0 pCi/l	5 pCi/l *	D
RADIUM-228	<3.0 pCi/l	5 pCi/l *	D
RUTHENIUM-106	<150 pCi/l	240 pCi/l	C
STRONTIUM-90	<5.0 pCi/l	8 pCi/l	E
TECHNETIUM-99	<30.0 pCi/l	4000 pCi/l	C
THORIUM-228	<1.0 pCi/l	16 pCi/l	C
THORIUM-230	1.15 pCi/l	12 pCi/l	C
THORIUM-232	<1.0 pCi/l	2 pCi/l	C
THORIUM-TOTAL	<1.9 ug/l	NONE	
URANIUM-234	11.0 pCi/l	20 pCi/l	C
URANIUM-235,236	<1.0 pCi/l	20 pCi/l	C
URANIUM-238	8.98 pCi/l	24 pCi/l	C
URANIUM-TOTAL	30.6 ug/l	NONE	**

C = United States Department of Energy; Order 5400.5, "Radiation Protection of the Public and the Environment;" Feb. 8, 1990.

D = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.15

E = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.16

* = Note: The standard of 5 pCi/l is based upon the combined activity concentrations of Radium-226 and Radium-228

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FEED MATERIALS PRODUCTION CENTER
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
ROUND 7 GROUND WATER QUALITY RESULTS (CHEMICAL/METAL PARAMETERS)

[redacted]

Property Owner : [redacted]. New Well ID : 3128
Sample : 04180
Sample Date: 1/19/90
Ashland, VA 23005

SUBSTANCE	CONCENTRATIONS		STANDARD	REFERENCE
Ammonia	.15	ppm	None	
Arsenic	<.002	ppm	0.05 ppm	A
Barium	.068	ppm	1.0 ppm	A
Cadmium	<.002	ppm	0.01 ppm	A
Calcium	90.0	ppm	None	
Chloride	29.6	ppm	250 ppm	B
Chromium	.02	ppm	0.05 ppm	A
Copper	.011	ppm	1.0 ppm	B
Fluoride	.18	ppm	4(A),2(B) ppm	***
Iron	.117	ppm	0.3 ppm	B
Lead	<.002	ppm	0.05 ppm	A
Magnesium	21.8	ppm	None	
Manganese	.211	ppm	0.05 ppm	B
Mercury	<.0002	ppm	0.002 ppm	A
Molybdenum	<.01	ppm	None	
Nickel	<.02	ppm	None	
Nitrates	<.1	ppm	10 ppm	A
Phenols	.021	ppm	None	
Phosphorus	.1	ppm	None	
Potassium	2.63	ppm	None	
Selenium	<.002	ppm	0.01 ppm	A
Silver	<.01	ppm	0.05 ppm	A
Sodium	21.4	ppm	None	
Sulfate	796	ppm	250 ppm	B
Total Kjeldahl Nitrogen	.58	ppm	None	
Total Organic Nitrogen	.44	ppm	None	

A = United States Environmental Protection Agency; Safe Drinking Water Act; National Primary Drinking Water Regulations; 40 CFR 141.11

B = United States Environmental Protection Agency; Safe Drinking Water Act; National Secondary Drinking Water Regulations; 40 CFR 143.3

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[redacted]