R-014-208.6

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RESPONSES TO COMMENTS ON THE OPERABLE UNIT (OU) 4 DECANT SUMP TANK FINAL REPORT

11/19/92

DOE-0343-93
DOE-FN/EPA
30
LETTER

R-014-208.6 [redacted]

[redacted]

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6357

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NOV 19 1992
DOE-0343-93

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HR-12
230 South Dearborn Street
Chicago, Illinois 60604

Mr. Graham E. Mitchell, Project Manager
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402

Dear Mr. Saric and Mr. Mitchell:

RESPONSES TO COMMENTS ON THE OPERABLE UNIT (OU) 4 DECANT SUMP TANK FINAL REPORT

Enclosed for your review are the responses to comments received from both the United States Environmental Protection Agency (EPA) and the Ohio Environmental Protection Agency (OEPA) on the OU 4 Decant Sump Tank Final Report. We anticipate that the Decant Sump Tank will be 75-80% full in December 1992. In accordance with the Final Report, this will trigger a site action to initiate pumping the contents of the tank. To assure that this action can be initiated in a timely fashion, we would appreciate that any additional concerns or questions concerning the Final Report or future actions be discussed in the near future with Randi Allen.

If you or your staff have any questions, please contact Randi Allen at FTS/Commercial 513-738-6158.

Sincerely,

Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Allen

Enclosure: As Stated

Recycled and Recyclable

cc w/enc.:

3895

W. E. Murphie, EM-42, TREV
K. A. Hayes, EM-424, TREV
L. Jensen, USEPA-V, AT-18J
B. Barwick, USEPA-V, 5CS-TUB-3
J. Kwasniewski, OEPA-Columbus
P. Harris, OEPA-Dayton
M. Proffitt, OEPA-Dayton
T. Schneider, OEPA-Dayton
F. Bell, ASTDR
T. W. Hahne, PRC
L. August, GeoTrans
R. L. Glenn, Parsons
N. C. Kaufman, FERMCO/72
J. A. Rasile, FERMCO/72
J. W. Thiesing, FERMCO/72
D. J. Carr, WEMCO/52-8
L. S. Farmer, WEMCO/2
J. P. Hopper, WEMCO/52-8
J. D. Wood, ASI/IT
J. E. Razor, ASI/IT
AR Coordinator, WEMCO

[redacted]

3895 [redacted]

Revision 0
November 16, 1992

COMMENTS IN RESPONSE TO U.S. EPA TECHNICAL COMMENTS ON THE K-65 DECANT SUMP TANK REMOVAL ACTION FINAL REPORT

U.S. EPA GENERAL COMMENT:

1) **The U.S. Department of Energy (DOE) cites an exclusion from Resource Conservation and Recovery Act (RCRA) requirements for the liquid and residuals in the decant sump tank. The exclusion apparently pertains to by-products from utilizing special nuclear material, but it is unclear why the decant sump tank liquids and sludge, which primarily include leachate from the K-65 silos, are excluded. The K-65 silos have not been used to accumulate slurry since the 1950's, when they were taken out of service. Since then, the Decant Sump Tank has been primarily used to accumulate resultant leachate. Because the sump has been accumulating leachate from a waste material and has not been used as part of a production process since the 1950's, the exclusion does not appear applicable. Considering the future use and handling of waste residuals from the Decant Sump Tank, DOE should outline procedures for future management of potentially hazardous waste from the sump.**

RESPONSE TO GENERAL COMMENT 1:

The exclusion, according to 40 CFR 261.4 (a)(4) applies to "...source, special nuclear or by-product material as defined in the ...[AEA]...". The AEA defines by-product as:

> "...(1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content" [AEA Section 112(e)].

The material stored in the K-65 silos is residue resulting from the processing of uranium ore. Under 40 CFR 261.1(a)(4), as applied here, the residues in the K-65 silos are excluded from regulation under RCRA as the residues resulted from the processing of uranium ores, and are not"... by-products from utilizing special nuclear material..." as stated by U.S. EPA.

3 [redacted]

The residue material present in the decant sump tank is from past decanting operations of the K-65 silos. During the original placement of the K-65 silo material, slurried liquid was decanted from the silos into the decant sump tank. K-65 residue in the form of suspended solids, present in this decanted liquid, settled to form the residue material in the decant sump tank. This residue, a "by-product" material by definition, is excluded from RCRA. Any liquid which accumulates in the tank is therefore mixed with this "by-product" material, and is itself excluded from RCRA. This interpretation is consistent with EPA guidance (see Article 1) for residual water and runoff from coal ash which is also excluded from regulation in 40 CFR 261.4. The sentiment indicated by this guidance is that residuals generated from an excluded material, can themselves be excluded.

During the operational period, decant water was removed from the slurried residue and deposited in the decant sump tank. This particle-rich decant liquor is the source of the K-65 radium-bearing sludge which was observed in the decant sump tank during the removal action. Approximately 300 gallons of sludge, originating from K-65 Silo decanting operations, currently remains in the decant sump tank.

The K-65 decant sump tank is still connected to an active underdrain system located below the K-65 Silos. Although this tank served to receive decant water from the residues slurried into Silo 1 and 2 (K-65 Silos) during the Silos' operational period, a secondary function of the tank was to contain any liquids collected below the base of these silos by the underdrain system. The decant sump tank continues today to act as a means to manage rainwater infiltration of subsoils beneath the silo base.

As is evident in Table I (see Response to General Comment 2), results from the pre-removal action sampling analyses (Attachment 'A' in Final Report) and the post-removal action sampling analyses (Attachment 'B' in Final Report) show that the radionuclide and heavy metal constituents in the liquid are the same as those seen in the K-65 residue. Furthermore, comparison of the results from the analyses of decant sump tank sludge (denoted by an "*") to the results of analyses of the K-65 residue (solid) shows that the decant sump tank sludge contains the same radionuclide constituents at concentration levels within the range observed for the constituents in the K-65 residue.

ARTICLE 1

EPA GUIDANCE FOR RESIDUAL WATER AND RUNOFF FROM COAL ASH

G.M. Weinreich, P.E.
Environmental Manager
ANG Coal Gasification Co.
P.O. Box 1149
Beulah, ND 58523

Dear Mr. Weinreich:

I am responding to your letter of March 18, 1986, in which you request a clarification of whether precipitation which contacts coal gasification ash waste resulting from the processing of coal, and becomes corrosive is subject to the hazardous waste provisions of RCRA. As you state in your letter, the ash is currently exempt from regulation under RCRA pursuant to 40 CFR 261.4(b)(4). See also Section 3001(b)(3)(A)(i) of RCRA. The precipitation becomes corrosive solely as a result of contact with the ash. Since the hazardous waste characteristic of the precipitation is derived from an exempt waste, the resulting corrosive water retains the exempt status of that waste (i.e., the water is also exempt from regulation as a hazardous waste).

I hope the above clarifies your concerns regarding the proper classification of this aqueous waste. If you have further questions please contact Mr. Edwin F. Abrams of my staff at (202) 382-4787.

Sincerely

Marcia E. Williams

Marcia E. Williams
Director
Office of Solid Waste

In conclusion, the rainwater infiltration into the tank is contaminated by K-65 residue sludge, a by-product material that is currently in the decant sump tank, and is therefore excluded from regulations under RCRA according to 40 CFR 261.4 (a)(4).

U.S. EPA GENERAL COMMENT:

2) **Analytical data is presented as raw data in Attachments A and B (in Final Report). The results should be summarized in tables within the report to allow direct comparability.**

RESPONSE TO GENERAL COMMENT 2:

The radiological data that was requested by U.S. EPA (U.S. EPA General Comment #3) for the pre-removal action sample is provided in Table I.

It must be noted that the radionuclide and metal results of Attachment 'B' of the K-65 Decant Sump Tank Final Report contained unit errors. This data was compared to the data in the recently received DOE-FN Internal Draft Operable Unit 4 Remedial Investigation (RI) Report and it was identified that the Attachment 'B' metal results were reported in "mg/l" rather than "ug/l". This explains the large variation between pre- and post-removal action sampling analyses results for metals included in the Final Report. A few of the radionuclide analysis results in Attachment 'B' also had the wrong units. The correct radionuclide and metal analyses results from the RI data are included as Attachment I. Table I presents the correct data.

The preliminary pre-removal data, presented in Attachment 'A' of the K-65 Decant Sump Tank Removal Action Final Report, was included solely for background information only. It was used as a basis for determining the health and safety requirements for handling the decant sump tank liquid. It should be noted that using these data for comparison is not relevant due to the fact that the pre-removal data were not validated by the laboratory that performed the analysis.

During the 1990-91 K-65 Removal Action, prior to the bentonite placement, samples were taken directly from the K-65 Silo residue. Analytical results for this sampling are listed as "K-65 Residue" in Table I. In 1990 a sample of the K-65 decant

TABLE I

Constituent	Attachment 'A' in Final Report Decant Sump Tank (Liquid)	Attachment 'B' in Final Report Decant Sump Tank (Liquid/ Sludge*)	Analysis of K-65 Silo Residue (Solid)
Total Uranium	57500 ug/l	77400 ug/l <1255 ug/g*	137-<18117 ug/g
Thorium 230	358 pCi/l	16 pCi/l 52130 pCi/g*	20500-160000 pCi/g
Radium 226	557 pCi/l	1640 pCi/l 128500 pCi/g*	657-890700 pCi/g
Arsenic	855 ug/l	720 ug/l	3.1-1960 mg/kg
Barium	683 ug/l	66 ug/l	89-22100 mg/kg
Cadmium	28 ug/l	14 ug/l	0.42-19.1 mg/kg
Chromium	417 ug/l	454 ug/l	12.9-165 mg/kg
Lead	39000 ug/l	627 ug/l	153-299000 mg/kg
Mercury	0.2 ug/l	0.2 ug/l	0.09-2.8 mg/kg
Selenium	5530 ug/l	7270 ug/l	0.32-2810 mg/kg
Silver	182 ug/l	230 ug/l	1.8-34.9 mg/kg

Note 1: (*) indicates the sample media was sludge.

sump liquid was taken from the liquid standing inside the access pipe of the decant sump tank. Analytical results for this sample are listed as "Attachment 'A' in Final Report" column in Table I. The column in Table I listed as "Attachment 'B' in Final Report" represents the analytical results of a 1991 sample of decant sump tank liquid that was removed during the removal action from the tank-truck prior to transportation and storage in the Plant 2/3 Refinery Tank F3E-408.

Comparative analyses of results of similar waste streams can be used for identification of material origin. Results from the pre-removal action, post-removal action, and K-65 Silo residue sampling and analyses are presented in Table I. Though the data for the constituents are reported in different units (e.g. solids vs. liquids), the presence of the radionuclide Radium in the decant sump tank liquid is, in itself, an indication that the decant sump tank contains K-65 residue from decanting operations.

U.S. EPA GENERAL COMMENT:

3) **Data from pre- and post-sampling of the decant sump tanks are compared. However, Attachment 'A' (in the Final Report) does not contain data for radionuclides. The final report should include this data, if available.**

RESPONSE TO GENERAL COMMENT 3:

Data for radionuclides has been included in Table I (see Response to U.S. EPA General Comment 2).

U.S. EPA GENERAL COMMENT:

4) **Liquid has been accumulating in the tank since the implementation of the removal action (RA). DOE should discuss the source of this liquid and its potential future disposition. Because about 300 gallons of residual sludge and additional liquid is present, the risks associated with this material should be evaluated to determine whether or not the RA was effective in remediating these risks. If not, future RA activities should be developed and implemented after review and**

approval by the U.S. Environmental Protection Agency (EPA).

RESPONSE TO GENERAL COMMENT 4:

The decant sump tank itself is capable of holding 9,000 gallons. The thirty-three foot, 30-inch diameter corrugated, galvanized steel pipe, welded onto the top manway access of the decant sump tank prior to placement of the earthen berm around the silos, and the associated piping of the underdrain system is estimated to hold at least 1,000 gallons. From observation of the presence of standing liquid in the access pipe prior to implementation of the removal action, it is logical to assume that the tank and access pipe system are intact and capable of holding 10,000+ gallons. The K-65 Decant Sump Tank Removal Action was originally initiated to reduce the risk associated with decant sump tank liquid release during the K-65 slant boring activities required in the K-65 decant sump tank area. Therefore, the integrity of the decant sump tank is not in question.

Furthermore, the K-65 Slant Boring Program revealed that high concentrations of the major constituents of the K-65 residues (i.e. Th-230, Ra-226, Pb-210) were not evident in the perched groundwater near the decant sump tank. In addition, periodic measurements of the tank's water level have revealed that the water level is increasing, most likely due to the infiltration of rainwater into the underdrain system. Both of these facts support the hypothesis that the tank is not leaking.

Being an "active system", the decant sump tank is expected to collect liquid as it has in the past and will continue to in the future. As the liquid in the decant sump tank approaches 75%-80% of the tank's capacity, periodic maintenance pumping activities are planned and will be implemented in accordance with the procedures outlined in the K-65 Decant Sump Tank Removal Action Work Plan (RAWP). The removed liquid would then be managed in accordance with the existing procedures and ARARs, as outlined in the RAWP. Future pumping at the 75-80% tank capacity makes sense from an ALARA standpoint. Since the tank is not suspected of leaking, more frequent pumping would create unnecessary risk from the repeated exposures associated with the handling and processing of small batches of liquids.

Therefore, consistent with the goals of Operable Unit (OU) 4

Final Remediation, periodic maintenance pumping actions will mitigate the threat of overfilling the decant sump tank and the potential release of liquid to the surrounding environment.

U.S. EPA SPECIFIC COMMENT:

1) **DOE states that pre- and post-removal action results are "similarly duplicated." A cursory review of Attachments A and B (in the Final Report) suggests considerable variability between the results for heavy metals. Also, no radionuclide data are provided in Appendix A to compare with Appendix B results; thus, direct comparison is not possible. DOE should further discuss pre- and post-removal action analytical results.**

RESPONSE TO SPECIFIC COMMENT 1:

As was stated in the response to General Comment 2, pre-removal data presented in Attachment 'A' in of the K-65 Decant Sump Tank Final Report consists of "unvalidated data". Its inclusion in the Final Report was included solely for background information. Also, the radiological data that was requested by U.S. EPA (U.S. EPA General Comment 3) from the pre-removal action sampling activity is provided in Table I.

See the Response to General Comment 2 for the discussion on the pre- and post- removal action analytical results.

U.S. EPA SPECIFIC COMMENT:

2) **DOE states that sampling and analysis yield "favorable results" for heavy metal and radionuclide treatment. Specific results, if available, should be included.**

RESPONSE TO SPECIFIC COMMENT 2:

The term "favorable results" used in the Final Report, is descriptive of a FEMP pre-wastewater treatment requirement, which does not allow volatile or semi-volatile organics to be present at levels above regulatory concern in FEMP wastewater prior to treatment in the wastewater treatment facility.

Since volatile and semi-volatile organics were present at levels below regulatory concern, as seen by the results of the post-removal action analyses, wastewater treatment for radionuclides and heavy metals was allowed.

The treatment process for radionuclides and heavy metals in the wastewater treatment facility was largely determined by the presence and content of Thorium in the wastewater to be treated (refer to Section IV, 2.0, page 6 of the Removal Action Work Plan).

U.S. EPA SPECIFIC COMMENT:

3) **DOE indicates that the decant sump tank liquids are excluded from RCRA regulation under 40 CFR 261.4(a)(4). DOE later indicates that metals analyses indicate that the liquids yield results above RCRA regulatory levels. DOE should discuss the implications of liquid characteristics on future wastes generated by the decant sump tank.**

RESPONSE TO SPECIFIC COMMENT 3:

See the Response to General Comment 1.

U.S. EPA SPECIFIC COMMENT:

4) **DOE states that future pumping of liquid from the tank should be initiated as a maintenance activity. EPA notes that the material may be considered a waste, possibly hazardous. Future activities should take this fact into account. Also, a hazardous waste determination should be obtained for tank residuals.**

RESPONSE TO SPECIFIC COMMENT 4:

Future pumping of the liquid in the decant sump tank will be implemented as a maintenance activity. See the Response to General Comment 1 as to why the liquid and residuals in the tank are exempt from RCRA. A Material Evaluation Form (MEF) was generated during the removal action. A non-RCRA determination was made on the liquid removed from the decant

sump tank. The evaluator considered the decant sump tank residue as "byproduct" material, and therefore, exempt from RCRA regulations.

U.S. EPA SPECIFIC COMMENT:

5) **DOE refers to the RA work plan as "Removal Action No. 9." The correct reference is "Removal Action No. 5."**

RESPONSE TO SPECIFIC COMMENT 5:

Your comment is noted. The correct reference is "Removal Action No. 5."

Revision 0
November 16, 1992

ATTACHMENT I

RADIOLOGICAL AND METALS ANALYSES RESULTS
FROM THE DRAFT OPERABLE UNIT 4 REMEDIAL INVESTIGATION REPORT

RADIOLOGICAL QUALIFIERS

D	=	Denotes possible false negative, i.e., the reported non-positive value is greater than the CRDL.
C	=	Denotes calculated total uranium value from uranium isotopic results does not agree within 20% of the reported uranium results.
E	=	Denotes calculated enrichment of uranium 235 outside of acceptance limits.
F	=	Denotes calculated uranium 234/uranium 235 ratio is outside of acceptance limits.
J	=	Denotes analyte present, reported value may not be accurate or precise.
M	=	Denotes matrix spike recovery out of bounded limit.
R	=	Denotes that the results are unusable.

INORGANIC QUALIFIERS

U	=	Analyte was analyzed for but not detected.
J	=	Indicates an estimated value.
B	=	Reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the instrument Detection Limit (IDL).
E	=	The reported value is estimated because of the presence of interference.
N	=	Spiked sample recovery not within control limits.
S	=	The reported value was determined by the Method of Standard Additions.
W	=	Post-digestion spike for Furnace AA analysis in not out of control limits (85-110%), while sample absorbance is less than 50% of spike absorbance.
X	=	Detection limit is higher than normal due to sample matrix interferences.
*	=	Duplicate analysis not within control limits.
R	=	Denotes that the results are unusable.

ORGANIC QUALIFIERS

U = Indicates compound was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.

J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds were a 1:1 response is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

E = This flag identifies compounds whose concentrations exceed the calibration range for the GC/MS instrument for that specific analysis.

D = This flag identifies all compounds identified in an analysis at a secondary dilution factor.

F = Estimated value due to a confirmed compound which is off-scale in both columns.

X = A flag that FORMASTER III CLP software automatically inserts to indicate that the data was entered manually.

* = Values outside of contract required QC limits.

R = Denotes that the results are unusable.

SAMPLE	SUFFIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099411		7429905	Aluminum	1990	UG/LITER		-	-	-
099411		7440360	Antimony	260	UG/LITER		-	-	-
099411		7440382	Arsenic	662	UG/LITER		-	-	-
099411		7440393	Barium	36.6	UG/LITER	BN	J	-	-
099411		7440417	Beryllium	9.9	UG/LITER		-	-	-
099411		7440439	Cadmium	12	UG/LITER		-	-	-
099411		7440702	Calcium	4020	UG/LITER	EE	J	-	-
099411		7440473	Chromium	377	UG/LITER		-	-	-
099411		7440484	Cobalt	70.8	UG/LITER		-	-	-
099411		7440508	Copper	99.4	UG/LITER		-	-	-
099411		7439896	Iron	284	UG/LITER		-	-	-
099411		7439921	Lead	182	UG/LITER	+	J	-	-
099411		7439954	Magnesium	3260	UG/LITER	EE	J	-	-
099411		7439965	Manganese	28.6	UG/LITER		-	-	-
099411		7439976	Mercury	.2	UG/LITER	U	-	-	-
099411		7439987	Molybdenum	7420	UG/LITER	E	J	-	-
099411		7440020	Nickel	65.2	UG/LITER		-	-	-
099411		7440097	Potassium	36400	UG/LITER		-	-	-
099411		7782492	Selenium	5090	UG/LITER		-	-	-
099411		7440224	Silver	210	UG/LITER		-	-	-
099411		7440235	Sodium	5570000	UG/LITER		-	-	-
099411		7440280	Thallium	2	UG/LITER	UW	UJ	-	-
099411		7440622	Vanadium	241	UG/LITER		-	-	-
099411		7440666	Zinc	80.6	UG/LITER		-	-	-
099411	F	7429905	Aluminum	1750	UG/LITER		-	-	-
099411	F	7440360	Antimony	262	UG/LITER		-	-	-
099411	F	7440382	Arsenic	720	UG/LITER		-	-	-
099411	F	7440393	Barium	28.3	UG/LITER	BN	J	-	-
099411	F	7440417	Beryllium	9.1	UG/LITER		-	-	-
099411	F	7440439	Cadmium	14.5	UG/LITER		-	-	-
099411	F	7440702	Calcium	3780	UG/LITER	EE	J	-	-
099411	F	7440473	Chromium	376	UG/LITER		-	-	-
099411	F	7440484	Cobalt	72.3	UG/LITER		-	-	-
099411	F	7440508	Copper	92.4	UG/LITER		-	-	-
099411	F	7439896	Iron	152	UG/LITER		-	-	-
099411	F	7439921	Lead	127	UG/LITER	S	-	-	-
099411	F	7439954	Magnesium	3000	UG/LITER	EE	J	-	-
099411	F	7439965	Manganese	26.2	UG/LITER		-	-	-
099411	F	7439976	Mercury	.2	UG/LITER	U	-	-	-
099411	F	7439987	Molybdenum	7360	UG/LITER	E	J	-	-
099411	F	7440020	Nickel	70.1	UG/LITER		-	-	-
099411	F	7440097	Potassium	36100	UG/LITER		-	-	-
099411	F	7782492	Selenium	5400	UG/LITER	S	-	-	-
099411	F	7440224	Silver	214	UG/LITER		-	-	-
099411	F	7440235	Sodium	5600000	UG/LITER		-	-	-

Chemical Validation Qualifiers for CO4 - 07/20/92

SAMPLE	SUFFIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099411	F	7440280	Thallium	2	UG/LITER	UW	UJ	-	-
099411	F	7440622	Vanadium	238	UG/LITER		-	-	-
099411	F	7440666	Zinc	43.7	UG/LITER		-	-	-

SAMPLE SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099411	CS-137	< 20		pCi/l	R
099411	NP-237	< 1.0		pCi/l	R
099411	PU-238	< 1.0		pCi/l	J
099411	PU-239/240	< 1.0		pCi/l	-
099411	RA-226	836	± 118	pCi/l	R
099411	RA-228	< 3.0		pCi/l	R
099411	RU-106	< 150		pCi/l	R
099411	SR-90	< 5.0		pCi/l	R
099411	TC-99	< 30.0		pCi/l	J
099411	TH-228	< 1.0		pCi/l	-
099411	TH-230	< 1.0		pCi/l	R
099411	TH-232	< 1.0		pCi/l	-
099411	TH-TOTAL	< 7.1		ug/l	D
099411	U-235	1310	± 170	pCi/l	-
099411	U-238	26000	± 2800	pCi/l	-
099411	U-TOTAL	77400	± 11500	ug/l	J

Radiological Validation Qualifiers for OU4 (Revision 1) - 08/04/92

SAMPLE SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099412	CS-137	< 20		pCi/l	R
099412	NP-237	1.2	± 0.8	pCi/l	-
099412	PU-238	< 1.0		pCi/l	J
099412	PU-239/240	< 1.0		pCi/l	-
099412	RA-226	1120	± 158	pCi/l	J
099412	RA-228	4.81	± 1.11	pCi/l	J
099412	RU-106	< 150		pCi/l	R
099412	SR-90	< 5.0		pCi/l	-
099412	TC-99	< 30.0		pCi/l	-
099412	U-235	1362	± 187	pCi/l	R
099412	U-238	22490	± 4269	pCi/l	R
099412	U-TOTAL	75000	± 11400	ug/l	J

SAMPLE	SUFFIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099412		0-002	Fluoride	22	MG/LITER		-	-	-
099412		0-004	Phenols	.02	MG/LITER	3895	-	-	-
099412		7664417	Ammonia	11.5	MG/LITER		-	-	-
099412		16887006	Chloride	103.4	MG/LITER		-	-	-
099412		14797558	Nitrate	884	MG/LITER		-	-	-
099412		12143452	Sulfate	9812.6	MG/LITER		-	-	-
099412		1-012	Total Organic Carbon	31.8	MG/LITER		-	-	-
099412		0-011	Total Organic Halides	.164	MG/LITER		-	-	-
099412		0-005	Total Organic Nitrogen	24.55	MG/LITER		-	-	-
099412		7723140	Phosphorus	3.03	MG/LITER		-	-	-
099412		7440213	Silicon	91800	UG/LITER		-	-	-
099412		7429905	Aluminum	1940	UG/LITER		-	-	-
099412		7440360	Antimony	256	UG/LITER		-	-	-
099412		7440382	Arsenic	683	UG/LITER		-	-	-
099412		7440393	Barium	21.6	UG/LITER	BN	-	J	-
099412		7440417	Beryllium	9.8	UG/LITER		-	-	-
099412		7440439	Cadmium	14.3	UG/LITER		-	-	-
099412		7440702	Calcium	3520	UG/LITER	EE	-	J	-
099412		7440473	Chromium	404	UG/LITER		-	-	-
099412		7440484	Cobalt	74.3	UG/LITER		-	-	-
099412		7440508	Copper	184	UG/LITER		-	-	-
099412		7439896	Iron	309	UG/LITER		-	-	-
099412		7439921	Lead	138	UG/LITER		-	-	-
099412		7439954	Magnesium	3190	UG/LITER	EE	-	J	-
099412		7439965	Manganese	51.6	UG/LITER		-	-	-
099412		7439976	Mercury	.2	UG/LITER	U	-	J	-
099412		7439987	Molybdenum	7740	UG/LITER	E	-	J	-
099412		7440020	Nickel	77.9	UG/LITER		-	-	-
099412		7440097	Potassium	37600	UG/LITER		-	-	-
099412		7782492	Selenium	2900	UG/LITER		-	J	-
099412		7440224	Silver	230	UG/LITER		-	-	-
099412		7440235	Sodium	5950000	UG/LITER		-	-	-
099412		7440280	Thallium	2	UG/LITER	UW	-	J	-
099412		7440622	Vanadium	256	UG/LITER		-	-	-
099412		7440666	Zinc	30.9	UG/LITER		-	J	-
099412		57125	Cyanide	318	UG/LITER		-	-	-
099412		319846	alpha-BHC	.1	UG/LITER	U	-	-	-
099412		319857	beta-BHC	.1	UG/LITER	U	-	-	-
099412		319868	delta-BHC	.1	UG/LITER	U	-	-	-
099412		58899	gamma-BHC (Lindane)	.1	UG/LITER	U	-	-	-
099412		76448	Heptachlor	.1	UG/LITER	U	-	-	-
099412		309002	Aldrin	.1	UG/LITER	U	-	-	-
099412		1024573	Heptachlor epoxide	.1	UG/LITER	U	-	-	-
099412		959988	Endosulfan-I	.1	UG/LITER	U	-	-	-
099412		60571	Dieldrin	.2	UG/LITER	U	-	-	-

SAMPLE	SUFFIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099412	DL	5103742	gamma-Chlordane	2.5	UG/LITER	U	-	R	-
099412	DL	8001352	Toxaphene	5	UG/LITER	U	-	R	-
099412	DL	12674112	Aroclor-1016	2.5	UG/LITER	U	-	R	-
099412	DL	11104282	Aroclor-1221	2.5	UG/LITER	U	-	R	-
099412	DL	11141165	Aroclor-1232	2.5	UG/LITER	U	-	R	-
099412	DL	53469219	Aroclor-1242	1.1	UG/LITER	DJX	-	R	-
099412	DL	12672296	Aroclor-1248	2.5	UG/LITER	U	-	R	-
099412	DL	11097691	Aroclor-1254	5	UG/LITER	U	-	R	-
099412	DL	11096825	Aroclor-1260	5	UG/LITER	U	-	R	-
099412	F	7440213	Silicon	92200	MG/KG		-	-	-
099412	F	7429905	Aluminum	1730	MG/KG		-	-	-
099412	F	7440360	Antimony	251	MG/KG		-	-	-
099412	F	7440382	Arsenic	489	MG/KG		-	-	-
099412	F	7440393	Barium	18.9	MG/KG	BN	-	J	-
099412	F	7440417	Beryllium	9	MG/KG		-	-	-
099412	F	7440439	Cadmium	11.8	MG/KG		-	-	-
099412	F	7440702	Calcium	3280	MG/KG	EE	-	J	-
099412	F	7440473	Chromium	367	MG/KG		-	-	-
099412	F	7440484	Cobalt	68.5	MG/KG		-	-	-
099412	F	7440508	Copper	94.1	MG/KG		-	-	-
099412	F	7439896	Iron	141	MG/KG		-	-	-
099412	F	7439921	Lead	97.7	MG/KG	S	-	-	-
099412	F	7439954	Magnesium	2890	MG/KG	EE	-	J	-
099412	F	7439965	Manganese	25.2	MG/KG		-	-	-
099412	F	7439976	Mercury	.2	MG/KG	U	-	J	-
099412	F	7439987	Molybdenum	7820	MG/KG	E	-	J	-
099412	F	7440020	Nickel	58.4	MG/KG		-	-	-
099412	F	7440097	Potassium	37000	MG/KG		-	-	-
099412	F	7782492	Selenium	5400	MG/KG		-	J	-
099412	F	7440224	Silver	209	MG/KG		-	-	-
099412	F	7440235	Sodium	6110000	MG/KG		-	-	-
099412	F	7440280	Thallium	2	MG/KG	UW	-	J	-
099412	F	7440622	Vanadium	218	MG/KG		-	-	-
099412	F	7440666	Zinc	18.9	MG/KG	B	-	J	-

SAMPLE	SUBFIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099415	DL	319846	alpha-BHC	.1	UG/LITER	U	-	-	-
099415	DL	319857	beta-BHC	.1	UG/LITER	U	-	-	-
099415	DL	319868	delta-BHC	.1	UG/LITER	U	-	-	-
099415	DL	58899	gamma-BHC (Lindane)	.1	UG/LITER	U	-	-	-
099415	DL	76448	Heptachlor	.1	UG/LITER	U	-	-	-
099415	DL	309002	Aldrin	.1	UG/LITER	U	-	-	-
099415	DL	1024573	Heptachlor epoxide	.1	UG/LITER	U	-	-	-
099415	DL	959988	Endosulfan-I	.1	UG/LITER	U	-	-	-
099415	DL	60571	Dieldrin	.2	UG/LITER	U	-	-	-
099415	DL	72559	4,4'-DDE	.2	UG/LITER	U	-	-	-
099415	DL	72208	Endrin	.2	UG/LITER	U	-	-	-
099415	DL	33213659	Endosulfan II	.2	UG/LITER	U	-	-	-
099415	DL	72548	4,4'-DDD	.2	UG/LITER	U	-	-	-
099415	DL	1031078	Endosulfan sulfate	.2	UG/LITER	U	-	-	-
099415	DL	50293	4,4'-DDT	.2	UG/LITER	U	-	-	-
099415	DL	72435	Methoxychlor	1	UG/LITER	U	-	-	-
099415	DL	53494705	Endrin ketone	.2	UG/LITER	U	-	-	-
099415	DL	5103719	alpha-Chlordane	1	UG/LITER	U	-	-	-
099415	DL	5103742	gamma-Chlordane	1	UG/LITER	U	-	-	-
099415	DL	8001352	Toxaphene	2	UG/LITER	U	-	-	-
099415	DL	12674112	Aroclor-1016	1	UG/LITER	U	-	-	-
099415	DL	11104282	Aroclor-1221	1	UG/LITER	U	-	-	-
099415	DL	11141165	Aroclor-1232	1	UG/LITER	U	-	-	-
099415	DL	53469219	Aroclor-1242	1.2	UG/LITER	DX	-	-	-
099415	DL	12672296	Aroclor-1248	1	UG/LITER	U	-	-	-
099415	DL	11097691	Aroclor-1254	2	UG/LITER	U	-	-	-
099415	DL	11096825	Aroclor-1260	2	UG/LITER	U	-	-	-
099415	F	7440213	Silicon	69700	UG/LITER		-	-	-
099415	F	7429905	Aluminum	1430	UG/LITER		-	-	-
099415	F	7440360	Antimony	203	UG/LITER		-	-	-
099415	F	7440382	Arsenic	559	UG/LITER		-	J	-
099415	F	7440393	Barium	20.4	UG/LITER	BN	-	J	-
099415	F	7440417	Beryllium	8.3	UG/LITER		-	-	-
099415	F	7440439	Cadmium	12	UG/LITER		-	-	-
099415	F	7440702	Calcium	6480	UG/LITER	E	-	J	-
099415	F	7440473	Chromium	312	UG/LITER		-	-	-
099415	F	7440484	Cobalt	65.9	UG/LITER		-	-	-
099415	F	7440508	Copper	86.5	UG/LITER		-	-	-
099415	F	7439896	Iron	159	UG/LITER		-	-	-
099415	F	7439921	Lead	156	UG/LITER	S	-	-	-
099415	F	7439954	Magnesium	4230	UG/LITER	EE	-	J	-
099415	F	7439965	Manganese	28	UG/LITER		-	-	-
099415	F	7439976	Mercury	.2	UG/LITER	U	-	J	-
099415	F	7439987	Molybdenum	6270	UG/LITER	E	-	J	-
099415	F	7440020	Nickel	63.2	UG/LITER		-	-	-

[redacted]

SAMPLE	MATRIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099415	F	7440097	Potassium	29600	UG/LITER		-	-	-
099415	F	7782492	Selenium	7270	UG/LITER		-	J	-
099415	F	7440224	Silver	185	UG/LITER		-	-	-
099415	F	7440235	Sodium	1900000	UG/LITER		-	-	-
099415	F	7440280	Thallium	2	UG/LITER	UW	-	J	-
099415	F	7440622	Vanadium	222	UG/LITER		-	-	-
099415	F	7440666	Zinc	37	UG/LITER		-	-	-
099415	R	108952	Phenol	10	UG/LITER	U	-	R	-
099415	R	111444	bis(2-Chloroethyl)ether	10	UG/LITER	U	-	R	-
099415	R	95578	2-Chlorophenol	10	UG/LITER	U	-	R	-
099415	R	541731	1,3-Dichlorobenzene	10	UG/LITER	U	-	R	-
099415	R	106467	1,4-Dichlorobenzene	10	UG/LITER	U	-	R	-
099415	R	100516	Benzyl alcohol	10	UG/LITER	U	-	R	-
099415	R	95501	1,2-Dichlorobenzene	10	UG/LITER	U	-	R	-
099415	R	95487	2-Methylphenol	10	UG/LITER	U	-	R	-
099415	R	108601	bis(2-Chloroisopropyl) ether	10	UG/LITER	U	-	R	-
099415	R	106445	4-Methylphenol	10	UG/LITER	U	-	R	-
099415	R	621647	N-Nitroso-di-n-propylamine	10	UG/LITER	U	-	R	-
099415	R	67721	Hexachloroethane	10	UG/LITER	U	-	R	-
099415	R	98953	Nitrobenzene	10	UG/LITER	U	-	R	-
099415	R	78591	Isophorone	10	UG/LITER	U	-	R	-
099415	R	88755	2-Nitrophenol	10	UG/LITER	U	-	R	-
099415	R	105679	2,4-Dimethylphenol	10	UG/LITER	U	-	R	-
099415	R	65850	Benzoic acid	50	UG/LITER	U	-	R	-
099415	R	111911	bis(2-Chloroethoxy)methane	10	UG/LITER	U	-	R	-
099415	R	120832	2,4-Dichlorophenol	10	UG/LITER	U	-	R	-
099415	R	120821	1,2,4-Trichlorobenzene	10	UG/LITER	U	-	R	-
099415	R	91203	Naphthalene	10	UG/LITER	U	-	R	-
099415	R	106478	4-Chloroaniline	10	UG/LITER	U	-	R	-
099415	R	87683	Hexachlorobutadiene	10	UG/LITER	U	-	R	-
099415	R	59507	4-Chloro-3-methylphenol	10	UG/LITER	U	-	R	-
099415	R	91576	2-Methylnaphthalene	10	UG/LITER	U	-	R	-
099415	R	77474	Hexachlorocyclopentadiene	10	UG/LITER	U	-	R	-
099415	R	88062	2,4,6-Trichlorophenol	10	UG/LITER	U	-	R	-
099415	R	95954	2,4,5-Trichlorophenol	50	UG/LITER	U	-	R	-
099415	R	91587	2-Chloronaphthalene	10	UG/LITER	U	-	R	-
099415	R	88744	2-Nitroaniline	50	UG/LITER	U	-	R	-
099415	R	131113	Dimethyl phthalate	10	UG/LITER	U	-	R	-
099415	R	208968	Acenaphthylene	10	UG/LITER	U	-	R	-
099415	R	99092	3-Nitroaniline	50	UG/LITER	U	-	R	-
099415	R	83329	Acenaphthene	10	UG/LITER	U	-	R	-
099415	R	51285	2,4-Dinitrophenol	50	UG/LITER	U	-	R	-
099415	R	100027	4-Nitrophenol	50	UG/LITER	U	-	R	-
099415	R	132649	Dibenzofuran	10	UG/LITER	U	-	R	-
099415	R	121142	2,4-Dinitrotoluene	10	UG/LITER	U	-	R	-

SAMPLE	SOURCE	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099415	R	606202	2,6-Dinitrotoluene	10	UG/LITER	U	-	R	-
099415	R	84662	Diethyl phthalate	10	UG/LITER	U	-	R	-
099415	R	7005723	4-Chlorophenylphenyl ether	10	UG/LITER	U	-	R	-
099415	R	86737	Fluorene	10	UG/LITER	U	-	R	-
099415	R	100016	4-Nitroaniline	50	UG/LITER	U	-	R	-
099415	R	534521	4,6-Dinitro-2-methylphenol	50	UG/LITER	U	-	R	-
099415	R	86306	N-Nitrosodiphenylamine	10	UG/LITER	U	-	R	-
099415	R	101553	4-Bromophenyl phenyl ether	10	UG/LITER	U	-	R	-
099415	R	118741	Hexachlorobenzene	10	UG/LITER	U	-	R	-
099415	R	87865	Pentachlorophenol	50	UG/LITER	U	-	R	-
099415	R	85018	Phenanthrene	10	UG/LITER	U	-	R	-
099415	R	120127	Anthracene	10	UG/LITER	U	-	R	-
099415	R	84742	Di-n-butyl phthalate	10	UG/LITER	U	-	R	-
099415	R	206440	Fluoranthene	10	UG/LITER	U	-	R	-
099415	R	129000	Pyrene	10	UG/LITER	U	-	R	-
099415	R	85687	Butyl benzyl phthalate	10	UG/LITER	U	-	R	-
099415	R	91941	3,3'-Dichlorobenzidine	20	UG/LITER	U	-	R	-
099415	R	56553	Benzo(a)anthracene	10	UG/LITER	U	-	R	-
099415	R	117817	bis(2-Ethylhexyl) phthalate	1	UG/LITER	BJ	-	R	-
099415	R	218019	Chrysene	10	UG/LITER	U	-	R	-
099415	R	117840	Di-n-octyl phthalate	10	UG/LITER	U	-	R	-
099415	R	205992	Benzo(b)fluoranthene	10	UG/LITER	U	-	R	-
099415	R	207089	Benzo(k)fluoranthene	10	UG/LITER	U	-	R	-
099415	R	50328	Benzo(a)pyrene	10	UG/LITER	U	-	R	-
099415	R	193395	Indeno(1,2,3-cd)pyrene	10	UG/LITER	U	-	R	-
099415	R	53703	Dibenzo(a,h)anthracene	10	UG/LITER	U	-	R	-
099415	R	191242	Benzo(g,h,i)perylene	10	UG/LITER	U	-	R	-
099415	U	7440213	Silicon	68500	UG/LITER		-	-	-
099415	U	7429905	Aluminum	1430	UG/LITER		-	-	-
099415	U	7440360	Antimony	207	UG/LITER		-	J	-
099415	U	7440382	Arsenic	502	UG/LITER		-	J	-
099415	U	7440393	Barium	21.8	UG/LITER	BN	-	-	-
099415	U	7440417	Beryllium	8.4	UG/LITER		-	-	-
099415	U	7440439	Cadmium	11.9	UG/LITER		-	-	-
099415	U	7440702	Calcium	6510	UG/LITER	E	-	J	-
099415	U	7440473	Chromium	311	UG/LITER		-	-	-
099415	U	7440484	Cobalt	66	UG/LITER		-	-	-
099415	U	7440508	Copper	87.8	UG/LITER		-	-	-
099415	U	7439896	Iron	272	UG/LITER		-	-	-
099415	U	7439921	Lead	213	UG/LITER	S	-	-	-
099415	U	7439954	Magnesium	4190	UG/LITER	E	-	J	-
099415	U	7439965	Manganese	29.3	UG/LITER		-	-	-
099415	U	7439976	Mercury	.2	UG/LITER	U	-	J	-
099415	U	7439987	Molybdenum	6170	UG/LITER	E	-	J	-
099415	U	7440020	Nickel	64.7	UG/LITER		-	-	-

SAMPLE	SUFFIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB	QUAL	Q3	Q4	Q5
099415	U	7440097	Potassium	28300	UG/LITER			-	-	-
099415	U	7782492	Selenium	5550	UG/LITER			-	J	-
099415	U	7440224	Silver	184	UG/LITER			-	-	-
099415	U	7440235	Sodium	1900000	UG/LITER			-	-	-
099415	U	7440280	Thallium	2	UG/LITER	UW		-	J	-
099415	U	7440622	Vanadium	220	UG/LITER			-	-	-
099415	U	7440666	Zinc	67.3	UG/LITER			-	-	-
099415	U	57125	Cyanide	429	UG/LITER			-	-	-

[redacted]

SAMPLE	SUFFIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099416		0-002	Fluoride	120	MG/LITER		-	-	-
099416		0-004	Phenols	.03	MG/LITER		-	-	-
099416		7664417	Ammonia	.1	MG/LITER	U	R	R	R
099416		16887006	Chloride	93.2	MG/LITER		-	R	R
099416		14797558	Nitrate	2280	MG/LITER		-	-	-
099416		12143452	Sulfate	4605	MG/LITER	*	-	-	-
099416		18496258	Sulfide	.5	MG/LITER	U	-	-	-
099416		1-012	Total Organic Carbon	52.1	MG/LITER		-	-	-
099416		0-011	Total Organic Halides	.261	MG/LITER		-	-	-
099416		0-005	Total Organic Nitrogen	.309	MG/LITER		-	-	-
099416		7723140	Phosphorus	1.53	MG/LITER		-	-	-
099416		7440213	Silicon	73300	UG/LITER	*	-	J	-
099416		7429905	Aluminum	1830	UG/LITER	*	-	J	-
099416		7440360	Antimony	188	UG/LITER	N	-	J	-
099416		7440382	Arsenic	601	UG/LITER	N	-	J	-
099416		7440393	Barium	65.8	UG/LITER	BN	-	J	-
099416		7440417	Beryllium	11.6	UG/LITER		-	-	-
099416		7440439	Cadmium	5.3	UG/LITER		-	-	-
099416		7440702	Calcium	4870	UG/LITER	B	-	J	-
099416		7440473	Chromium	430	UG/LITER	*	-	J	-
099416		7440484	Cobalt	79.9	UG/LITER		-	-	-
099416		7440508	Copper	120	UG/LITER		-	-	-
099416		7439896	Iron	1040	UG/LITER	*	-	J	-
099416		7439921	Lead	602	UG/LITER	N	-	J	-
099416		7439954	Magnesium	3490	UG/LITER	B	-	J	-
099416		7439965	Manganese	50.7	UG/LITER		-	-	-
099416		7439976	Mercury	.2	UG/LITER	U	-	-	-
099416		7439987	Molybdenum	6260	UG/LITER	*	-	J	-
099416		7440020	Nickel	129	UG/LITER		-	-	-
099416		7440097	Potassium	40100	UG/LITER	*	-	-	-
099416		7782492	Selenium	6020	UG/LITER		-	-	-
099416		7440224	Silver	159	UG/LITER		-	-	-
099416		7440235	Sodium	100	UG/LITER	U	-	-	-
099416		7440280	Thallium	2	UG/LITER	UWN	-	R	-
099416		7440622	Vanadium	233	UG/LITER	*	-	J	-
099416		7440666	Zinc	486	UG/LITER		-	-	-
099416		57125	Cyanide	310.572	UG/LITER		-	-	-
099416		319846	alpha-BHC	.05	UG/LITER	U	-	-	-
099416		319857	beta-BHC	.05	UG/LITER	U	-	-	-
099416		319868	delta-BHC	.05	UG/LITER	U	-	-	-
099416		58899	gamma-BHC (Lindane)	.05	UG/LITER	U	-	-	-
099416		76448	Heptachlor	.05	UG/LITER	U	-	-	-
099416		309002	Aldrin	.05	UG/LITER	U	-	-	-
099416		1024573	Heptachlor epoxide	.05	UG/LITER	U	-	-	-
099416		959988	Endosulfan-I	.05	UG/LITER	U	-	-	-

SAMPLE	SUFFIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099416	EL	5103719	alpha-Chlordane	5	UG/LITER	U	-	-	-
099416	EL	5103742	gamma-Chlordane	5	UG/LITER	U	-	-	-
099416	EL	8001352	Toxaphene	10	UG/LITER	U	-	-	-
099416	EL	12674112	Aroclor-1016	5	UG/LITER	U	-	-	-
099416	EL	11104282	Aroclor-1221	5	UG/LITER	U	-	-	-
099416	EL	11141165	Aroclor-1232	5	UG/LITER	U	-	-	-
099416	EL	53469219	Aroclor-1242	5	UG/LITER	U	-	-	-
099416	EL	12672296	Aroclor-1248	5	UG/LITER	U	-	-	-
099416	EL	11097691	Aroclor-1254	10	UG/LITER	U	-	-	-
099416	EL	11096825	Aroclor-1260	10	UG/LITER	U	-	-	-
099416	F	7440213	Silicon	77900	UG/LITER	*	-	J	-
099416	F	7429905	Aluminum	1930	UG/LITER	*	-	J	-
099416	F	7440360	Antimony	195	UG/LITER	N	-	J	-
099416	F	7440382	Arsenic	674	UG/LITER	N	-	J	-
099416	F	7440393	Barium	49.1	UG/LITER	BN	-	J	-
099416	F	7440417	Beryllium	12.1	UG/LITER		-	-	-
099416	F	7440439	Cadmium	6.7	UG/LITER		-	-	-
099416	F	7440702	Calcium	4980	UG/LITER	B	-	J	-
099416	F	7440473	Chromium	454	UG/LITER	*	-	J	-
099416	F	7440484	Cobalt	83.5	UG/LITER		-	-	-
099416	F	7440508	Copper	124	UG/LITER		-	-	-
099416	F	7439896	Iron	1040	UG/LITER	*	-	J	-
099416	F	7439921	Lead	627	UG/LITER	SN	-	J	-
099416	F	7439954	Magnesium	3660	UG/LITER	B	-	J	-
099416	F	7439965	Manganese	52.8	UG/LITER		-	-	-
099416	F	7439976	Mercury	.2	UG/LITER	U	-	-	-
099416	F	7439987	Molybdenum	6630	UG/LITER	*	-	J	-
099416	F	7440020	Nickel	124	UG/LITER		-	-	-
099416	F	7440097	Potassium	35300	UG/LITER	*	-	-	-
099416	F	7782492	Selenium	6040	UG/LITER		-	-	-
099416	F	7440224	Silver	167	UG/LITER		-	-	-
099416	F	7440235	Sodium	5750000	UG/LITER		-	-	-
099416	F	7440280	Thallium	2	UG/LITER	UN	-	R	-
099416	F	7440622	Vanadium	248	UG/LITER	*	-	J	-
099416	F	7440666	Zinc	463	UG/LITER		-	-	-
099416	R	108952	Phenol	10	UG/LITER	U	-	R	-
099416	R	111444	bis(2-Chloroethyl)ether	10	UG/LITER	U	-	R	-
099416	R	95578	2-Chlorophenol	10	UG/LITER	U	-	R	-
099416	R	541731	1,3-Dichlorobenzene	10	UG/LITER	U	-	R	-
099416	R	106467	1,4-Dichlorobenzene	10	UG/LITER	U	-	R	-
099416	R	100516	Benzyl alcohol	5	UG/LITER	J	-	R	-
099416	R	95501	1,2-Dichlorobenzene	10	UG/LITER	U	-	R	-
099416	R	95487	2-Methylphenol	10	UG/LITER	U	-	R	-
099416	R	108601	bis(2-Chloroisopropyl) ether	10	UG/LITER	U	-	R	-
099416	R	106445	4-Methylphenol	10	UG/LITER	U	-	R	-

SAMPLE SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099415	CS-137	< 20		pCi/l	J
099415	NP-237	< 1.0		pCi/l	R
099415	PU-238	< 1.0		pCi/l	R
099415	PU-239/240	< 1.0		pCi/l	J
099415	RA-226	797	± 113	pCi/l	R
099415	RA-228	< 3.0		pCi/l	-
099415	RU-106	< 150		pCi/l	J
099415	SR-90	6.47	± 1.35	pCi/l	J
099415	TC-99	43.8	± 20.7	pCi/l	-
099415	TH-228	2.72	± 1.53	pCi/l	R
099415	TH-230	197	± 27	pCi/l	R
099415	TH-232	< 1.8		pCi/l	J
099415	TH-TOTAL	< 16		ug/l	J
099415	U-235	1074	± 111	pCi/l	J
099415	U-238	20390	± 2110	pCi/l	J
099415	U-TOTAL	70400	± 11000	ug/l	R

Radiological Validation Qualifiers for OU4 (Revision 1) - 08/04/92

SAMPLE SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099416	AC-227	< 91.1		pCi/l	-
099416	PA-231	< 431		pCi/l	J
099416	PB-210	8660	± 866	pCi/l	J
099416	PO-210	7080	± 930	pCi/l	-
099416	RA-224 (GAMMA)	< 27		pCi/l	J
099416	RA-226	1640	± 230	pCi/l	J
099416	RA-226 (GAMMA)	973	± 81	pCi/l	R
099416	RA-228	8.80	± 1.56	pCi/l	J
099416	RA-228 (GAMMA)	< 76		pCi/l	DJ

Radiological Validation Qualifiers for OU4 (Revision 1) - 08/04/92

SAMPLE SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099417	AC-227	5783	± 603	pCi/g	J
099417	PA-231	< 855		pCi/g	DJ
099417	PB-210	123200	± 12330	pCi/g	J
099417	RA-224	< 41		pCi/g	J
099417	RA-226	128500	± 6440	pCi/g	J
099417	RA-228	< 140		pCi/g	DJ
099417	TH-230	52130	± 7582	pCi/g	J
099417	U-TOTAL	< 1255		ug/g	DJ

3895[redacted]

SAMPLE	SUFFIX	CAS NUMBER	CONSTITUENT	RESULT	UNITS	LAB QUAL	Q3	Q4	Q5
099420		0-002	Fluoride	14	MG/LITER		-	-	-
099420		0-004	Phenols	.01	MG/LITER	U	-	-	-
099420		7664417	Ammonia	.1	MG/LITER	U	-	-	-
099420		16887006	Chloride	13.8	MG/LITER		-	-	-
099420		14797558	Nitrate	30	MG/LITER		-	-	-
099420		12143452	Sulfate	55.5	MG/LITER		-	-	-
099420		18496258	Sulfide	.5	MG/LITER	U	-	-	-
099420		1-012	Total Organic Carbon	2.01	MG/LITER		-	-	-
099420		0-005	Total Organic Nitrogen	1.12	MG/LITER		-	-	-
099420		7723140	Phosphorus	.61	MG/LITER		-	-	-
099420		7440213	Silicon	7310	UG/LITER		-	-	-
099420		7429905	Aluminum	629	UG/LITER		-	-	-
099420		7440360	Antimony	31	UG/LITER	BN	-	J	-
099420		7440382	Arsenic	2	UG/LITER	UN	-	R	-
099420		7440393	Barium	26.1	UG/LITER	BN	-	J	-
099420		7440417	Beryllium	2	UG/LITER	U	-	-	-
099420		7440439	Cadmium	2.1	UG/LITER	B	-	J	-
099420		7440702	Calcium	16500	UG/LITER		-	-	-
099420		7440473	Chromium	128	UG/LITER		-	-	-
099420		7440484	Cobalt	37.3	UG/LITER	B	-	J	-
099420		7440508	Copper	28.9	UG/LITER		-	-	-
099420		7439896	Iron	3470	UG/LITER		-	-	-
099420		7439921	Lead	202	UG/LITER	N	-	R	-
099420		7439954	Magnesium	13400	UG/LITER		-	-	-
099420		7439965	Manganese	46.7	UG/LITER		-	-	-
099420		7439976	Mercury	.2	UG/LITER	U	-	-	-
099420		7439987	Molybdenum	10	UG/LITER	U	-	-	-
099420		7440020	Nickel	116	UG/LITER		-	-	-
099420		7440097	Potassium	3400	UG/LITER	B	-	J	-
099420		7782492	Selenium	5.6	UG/LITER	+N	-	R	-
099420		7440224	Silver	18.8	UG/LITER		-	-	-
099420		7440235	Sodium	11900	UG/LITER		-	-	-
099420		7440280	Thallium	2.4	UG/LITER	BN	-	R	-
099420		7440622	Vanadium	20.4	UG/LITER	B	-	J	-
099420		7440666	Zinc	786	UG/LITER	*	-	J	-
099420		319846	alpha-BHC	.05	UG/LITER	U	-	R	-
099420		319857	beta-BHC	.05	UG/LITER	U	-	R	-
099420		319868	delta-BHC	.05	UG/LITER	U	-	R	-
099420		58899	gamma-BHC (Lindane)	.05	UG/LITER	U	-	R	-
099420		76448	Heptachlor	.05	UG/LITER	U	-	R	-
099420		309002	Aldrin	.05	UG/LITER	U	-	R	-
099420		1024573	Heptachlor epoxide	.05	UG/LITER	U	-	R	-
099420		959988	Endosulfan-I	.05	UG/LITER	U	-	R	-
099420		60571	Dieldrin	.1	UG/LITER	U	-	R	-
099420		72559	4,4'-DDE	.1	UG/LITER	U	-	R	-

[redacted]

SAMPLE	SUFFIX	RADIONUCLIDE	RESULTS	2-SIGMA	UNITS	Q5
099420		AC-227	< 2.2		pCi/l	-
099420		PA-231	< 506		pCi/l	DJ
099420		PB-210	2650	± 270	pCi/l	J
099420		PO-210	2490	± 350	pCi/l	J
099420		RA-224	< 33		pCi/l	J
099420		RA-226	481.0	± 68.0	pCi/l	J
099420		RA-226 (GAMMA)	782	± 72	pCi/l	J
099420		RA-228	< 3.0		pCi/l	J
099420		RA-228 (GAMMA)	< 57		pCi/l	DJ
099420		TH-228	< 2.4		pCi/l	DJ
099420		TH-230	16.5	± 4.3	pCi/l	J
099420		TH-232	< 1.0		pCi/l	-
099420		TH-TOTAL	< 5.3		ug/l	D

COMMENTS IN RESPONSE TO OHIO EPA TECHNICAL COMMENTS ON THE K-65 DECANT SUMP TANK REMOVAL ACTION FINAL REPORT

OHIO EPA COMMENT:

1) **DOE fails to provide any justification for the 75-80% full pumping decision. A discussion of the reasoning behind this decision is warranted. It would seem based upon the questionable integrity of the tank that more frequent pumping would be justified.**

RESPONSE TO COMMENT 1:

As stated in the final report, the 75-80% full pumping decision was based on engineering judgement. The decision allows for time to implement the maintenance activity of pumping the tank (it would not be sensible to wait until the tank reached its full capacity before implementing the maintenance activity due to the possibility of unforeseen delays).

The decant sump tank itself is capable of holding 9,000 gallons. The thirty-three foot, 30-inch diameter corrugated, galvanized steel pipe, welded onto the top manway access of the decant sump tank prior to placement of the earthen berm around the silos, and the associated piping of the underdrain system is estimated to hold at least 1,000 gallons. From observation of the presence of standing liquid in the access pipe prior to implementation of the removal action, it is logical to assume that the tank and access pipe system are intact and capable of holding 10,000+ gallons. The K-65 Decant Sump Tank Removal Action was originally initiated to reduce the risk associated with decant sump tank liquid release during the K-65 slant boring activities required in the K-65 decant sump tank area. Therefore, the integrity of the decant sump tank is not in question.

Furthermore, the K-65 Slant Boring Program revealed that high concentrations of the major constituents of the K-65 residues (i.e. Th-230, Ra-226, Pb-210) were not evident in the perched groundwater near the decant sump tank. In addition, periodic measurements of the tank's water level have revealed that the water level is increasing, most likely due to the infiltration of rainwater into the underdrain system. Both of these facts support the hypothesis that the tank is not leaking.

Being an "active system", the decant sump tank is expected to collect liquid as it has in the past and will continue to in the future. As the liquid in the decant sump tank approaches 75%-80% of the tank's capacity, periodic maintenance pumping activities are planned and will be implemented in accordance with the procedures outlined in the K-65 Decant Sump Tank Removal Action Work Plan (RAWP). The removed liquid would then be managed in accordance with the existing procedures and ARARs, as outlined in the RAWP. Future pumping at the 75-80% tank capacity makes sense from an ALARA standpoint. Since the tank is not suspected of leaking, more frequent pumping would create unnecessary risk from the repeated exposures associated with the handling and processing of small batches of liquids.

Therefore, consistent with the goals of Operable Unit (OU) 4 Final Remediation, periodic maintenance pumping actions will mitigate the threat of overfilling the decant sump tank and the potential release of liquid to the surrounding environment.

OHIO EPA COMMENT:

2) **Attachment B: The radionuclides listed do not include actinium-227, protactinium-231, polonium-210 or lead-210. In DOE's response to Ohio EPA comments on the work plan (see letter from Jack Craig to Graham Mitchell, 3/18/92), DOE assured Ohio EPA that analyses for these compounds would be conducted. The data should be included in the report or an explanation of DOE's failure to complete these analyses provided.**

RESPONSE TO COMMENT 2:

As requested by the Ohio EPA, DOE-FN requested ASI/IT laboratories to perform additional analyses on the decant sump tank liquid for the additional radionuclides, **actinium-227, protactinium-231, polonium-210 and lead-210** (see Article 1). Due to the timing of the request relative to the progress of the post-removal action lab work, only a limited analyses for the

additional radionuclides was possible. The results are listed below.

Boring #	K-65 D	K-65 D
Sample #	099416	099417
Media Type	liquid	sludge
Units	pCi/l	pCi/g
Actinium-227	<91.1	5783
Protactinium-231	<431	<855
Polonium-210	7080	n/a
Lead-210	8660	123200

ARTICLE 1

LETTER FROM DOE-FN TO ASI/IT REQUESTING ADDITIONAL RADIOLOGICAL ANALYSES FOR K-65 AREA SAMPLES

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

APR 01 1991
DOE-855-91

John D. Wood, Project Director
Advanced Sciences, Inc.
11003 Hamilton-Cleves Road
P. O. Box 475
Ross, OH 45061

Dear Mr. Wood:

ADDITIONAL LABORATORY ANALYSES REQUIREMENTS FOR K-65 AREA SAMPLES

Reference: Letter, G. E. Mitchell to J. R. Craig, "Conditional Approval K-65 Silo Vertical Boring Sampling Plan," dated February 7, 1991.

As outlined in the Referenced letter, please add to the existing list of laboratory analyses parameters, for all samples obtained in the K-65 area, the following:

Polonium	-	Po-210
Lead	-	Pb-210
Protactinium	-	Pa-231
Actinium	-	Ac-227

Samples obtained in the K-65 area include, but are not limited to, samples generated by: Slant Borings, Vertical Borings (also known as "Berm Sampling"), Decant Sump, and Silo Resampling. Also, please prepare an estimate of the cost impacts associated with these laboratory analyses. The cost impacts must be presented to the CCB for approval.

If your staff has any questions, please ask them to contact Jack Craig at 738-6159.

Sincerely,

Bobby Davis
Contracting Officer's
Representative

OP-84:Craig

cc:

D. A. Nixon, WMCO
D. J. Carr, WMCO
J. P. Hopper, WMCO