



DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD, SUITE 3339
FT. BELVOIR, VIRGINIA 22060-6223



IN REPLY
REFER TO

DNCS-Q

February 26, 1996

MEMORANDUM FOR DNCS-P

SUBJECT: Summary of DNCS Zirconium Ore-Baddeleyite Analyses

Enclosed is a summary of zirconium ore-baddeleyite (Pile-111) analyses performed by the Luvak Inc., Boylston, MA. This summary is the average of 13 random sample analyses. This information should be made available to prospective bidders for their reference.

If you need additional information, please contact B.I. Min of my staff.

GILES E. LEPAGE
Director
Directorate of Quality Assurance
& Technical Services

Attachment



ANALYSES OF DNSC ZIRCONIUM ORE - BADDELEYITE

Percent by Weight (Dry Basis)

2/23/96

Pile No.	Depot	Minimum ZrO ₂ (%)	HfO ₂ (%)	SiO ₂ (%)	TiO ₂ (%)	Fe ₂ O ₃ (%)	Al ₂ O ₃ (%)	CaO (%)	MgO (%)	Y ₂ O ₃ (%)	P ₂ O ₅ (%)	CuO (%)	ThO ₂ (%)	U ₃ O ₈ (%)	CrO ₃ (%)	V ₂ O ₅ (%)
111	New Haven, IN	53.4	0.55	18.9	1.19	4.39	4.40	2.20	1.15	0.15	0.25	0.017	0.103	0.24	0.285	0.089

CODE- 586

NOTIFICATION OF STOCKPILE INSPECTION

3448

1. NAME AND LOCATION OF DEPOT OR FACILITY DLA/DNSZ New Haven Depot, IN 46774-9644		2. NAME AND TYPE OF COMMODITY ZIRCONIUM - ORE Baddelyite Material		3. SERIAL NO. 44
DATE	A. LAST 1-Jun-95	6. TYPE OF STORAGE AND SPECIFIC DEPOT AREA Open Storage Area 7-A, Pile # 111 ana 111A Type "C" Storage Pad		
	B. THIS 24-Jan-96			
7. NAME AND TITLE OF PERSON RESPONSIBLE FOR MATERIAL FREDERIC W. BROOKS, DEPOT MANAGER			7A. TEL. NO. OR CODE 219 749-5953	7B. EXTENSION

311-96

INSPECTION DATA (Check and complete. Explain negative responses.)

8. STORAGE	A. Storage Facilities Are of the Type Prescribed in the Storage Manual	YES	NO
	B. Storage Facilities Are Maintained in Good Order.		X
9. MATERIAL	A. Material Is Stored in the Manner Prescribed in the Storage Manual.		X
	B. Material Is Free of Deterioration, Infestation, Contamination, Commingling, Migration and Erosion.		X
10. RECORDS	A. Depot Manager Confirmed that all entries have been Posted.		X
	B. Depot Postings Indicate Last RR No. 19349 Dated 7-Sep-78		X
	Last OSR No. 18296 Dated 29-Oct-92		X
11. UNITS	Quantity indicated in Item 14. reflects Depot Postings and agrees with actual and/or computed count.		X
12. SECURITY AND FIRE PROTECTION	Security and Fire Protection are being provided in accordance with Quality Assurance and Materials Inspection Handbook and Storage Manual Requirements.		X
13. CONTAINERS, PILES OR OTHER UNITS	A. Material Is Stored in Proper Containers (Check only if applicable)		X
	B. All containers, Piles and/or Units Are Marked as Prescribed in the Storage Manual.		X
	C. Condition of Containers		X

(Give exact number in Class III under remarks) (1) CLASS I % (2) CLASS II % (3) CLASS III %

PRO-GRAM	TYPE (Pile, case, ingot, bale, etc.)	WIDTH	LENGTH	HEIGHT	DIAM-ETER	g. WEIGHT OF UNIT		TOTAL NUMBER OF UNITS	TOTAL WEIGHT LBS	
						(1) GROSS	(2) NET		NET	
NDS	Pile # 111		285"	25"				Bulk		31,981,398
NDS	Pile # 111-A		100"	20"				Contaminated material		2,783,706
								Total material =		34,765,104

15. REMARKS (Review all other appropriate questions contained in "guide for the inspection of stockpiled materials and storage facilities," and, if deficiencies are found, give the appropriate guide numbers and complete details in this block)

The weights were taken from the depot 46 record cards.
 Material is accessible by truck or rail service.
 * Radioactive Material * signs are posted on the fence surrounding the pile.
 Radioactive Report is attached.
 Pile # 111-A that is adjacent to Pile # 111 is contaminated material that was the base for this materials previous location.

16. RECOMMENDATIONS (Not to be construed by storage depot or facility as authorization to proceed with remedial measures beyond the scope of usual authority)
 None

17. DISTRIBUTION	<input checked="" type="checkbox"/> Q.A. DIVISION	<input checked="" type="checkbox"/> Q. A. ZONE BRANCH	<input type="checkbox"/> SUPERVISORY Q.A.
	<input checked="" type="checkbox"/> ORIGINATING DEPOT	<input checked="" type="checkbox"/> STOCKPILE OP. DIVISION	<input type="checkbox"/> CONTRACTING OFFICER
	<input type="checkbox"/> FINANCE	<input type="checkbox"/> CONTRACTOR	<input checked="" type="checkbox"/> OTHER HMQB, DNSC-O
18. NAME OF INSPECTOR William J. Till, QAS	18A. SIGNATURE <i>W. J. Till</i>		18. DATE OF SIGNATURE 26-Jan-96

DLAH FORM 30, Jul 93

This form is a computer generated version of DLAH Form 30 Dec 88

MONITORING RADIATION REPORT

Monitors BILL TILL

3448

Date 24 Jan 96

Report No. 44

Serial # GSA form 226

TIME	LOCATION	OBJECT OR PERSON MONITORED	INSTRUMENT USED	SHIELD		DISTANCE	RANGE	READING	DOSE RATE
				Open	Closed				
	Area 7-A	Zirconium - Baddeleyite Ore	Emberline E-120						
		Bulk Ore, Pile # 111			X	Contact	XI	2.5	2.5 mr/h
					X	Contact	XI	3.5	3.5 mr/h
					X	Contact	XI	4.0	4.0 mr/h
		Survey of Ground Area							
		Background Radiation	0.03 mr/hr						
		Temperature @ Location was	30 deg. F						

COMMENTS:

Maximum reading found.
 Condition of storage area is good.
 Depot personnel exposure records are maintained and exposure reading are recorded.
 Source material license # STC-133 and NRC regulations are posted in depot office.



DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD, SUITE 3339
FT. BELVOIR, VIRGINIA 22060-6223



IN REPLY
REFER TO

DNSC-Q

February 26, 1996

MEMORANDUM FOR DNSZ-HM

SUBJECT: Summary of DNSC Zirconium Ore-Baddeleyite Analyses

Enclosed is a summary of zirconium ore-baddeleyite (Pile-111 & 111-A) analyses performed by the Luvak Inc., Boylston, MA. This summary is for your information only: not to be handed out to any prospective buyers. Thank you for your assistance.

If you have any questions, please contact B.I. Min of my staff.

JAMES D. JENKINS, SR.
Chief, Technical Support and
Commodities Division

Attachment



ANALYSES OF DNSC ZIRCONIUM ORE - BADDELEYITE

Percent by Weight (Dry Basis)

2/20/96

Sample ID	Depot	Minimum ZrO2 (%)	HfO2 (%)	SiO2 (%)	TiO2 (%)	Fe2O3 (%)	Al2O3 (%)	CaO (%)	MgO (%)	Y2O3 (%)	P2O5 (%)	CuO (%)	ThO2 (%)	U3O8 (%)	CrO3 (%)	V2O5 (%)
1	New Haven, IN	58.4	0.54	18.7	1.20	4.77	4.74	0.52	0.83	0.14	0.27	0.019	0.080	0.24	0.42	0.084
2	New Haven, IN	58.0	0.55	12.6	1.09	4.34	4.21	0.66	0.65	0.17	0.25	0.010	0.082	0.25	0.17	0.082
3	New Haven, IN	57.6	0.60	17.5	1.45	3.66	4.16	0.57	0.96	0.15	0.32	0.011	0.093	0.25	0.29	0.093
4	New Haven, IN	61.2	0.63	19.1	1.27	3.83	4.20	0.32	0.45	0.32	0.019	0.089	0.24	0.19	0.093	0.15
5	New Haven, IN	58.9	0.64	18.7	1.19	3.65	3.74	0.69	1.31	0.19	0.32	0.008	0.096	0.29	0.37	0.095
6	New Haven, IN	53.4	0.54	19.6	1.16	3.96	4.14	1.73	0.99	0.15	0.25	0.006	0.088	0.34	0.33	0.075
7	New Haven, IN	54.8	0.54	18.0	1.29	4.03	4.34	2.63	1.33	0.15	0.27	0.006	0.11	0.33	0.10	0.087
8	New Haven, IN	54.6	0.54	19.7	1.28	4.20	4.84	2.52	1.31	0.14	0.25	0.006	0.10	0.27	0.15	0.11
9	New Haven, IN	42.9	0.47	20.3	1.11	4.94	5.80	5.97	2.57	0.13	0.27	0.019	0.10	0.17	0.33	0.093
10	New Haven, IN	46.1	0.53	20.8	1.21	5.24	5.72	4.03	1.74	0.15	0.27	0.021	0.094	0.18	1.17	0.079
11	New Haven, IN	43.9	0.42	16.6	1.06	4.48	3.98	3.99	1.58	0.12	0.23	0.010	0.088	0.20	0.19	0.066
12	New Haven, IN	54.9	0.58	22.0	1.05	4.56	3.20	1.89	0.46	0.11	0.24	0.008	0.083	0.21	0.052	0.068
13	New Haven, IN	48.8	0.54	23.0	1.09	5.46	4.14	3.06	0.81	0.085	0.34	0.008	0.086	0.25	0.044	0.070
Pile111	Average:	53.4	0.55	18.9	1.19	4.39	4.40	2.20	1.15	0.15	0.25	0.017	0.103	0.24	0.285	0.089
14	New Haven, IN	0.68	0.020	20.4	0.22	2.96	3.22	27.0	8.94	0.008	0.062	0.019	0.11	<0.005	0.021	0.012
15	New Haven, IN	6.58	0.071	25.7	0.47	7.89	6.81	16.6	1.97	0.010	0.078	0.016	0.074	<0.005	0.029	0.020
111-A	Average:	3.63	0.046	23.1	0.35	5.43	5.02	21.8	5.46	0.009	0.070	0.018	0.092	<0.005	0.025	0.016

Pile 111-A is a contaminated pile.

ANALYSES OF DNSC ZIRCONIUM ORE - BADDELEYITE

Percent by Weight (Dry Basis)

2/20/96

Sample ID	Depot	Minnimum ZrO2 (%)	HfO2 (%)	SiO2 (%)	TiO2 (%)	Fe2O3 (%)	Al2O3 (%)	CaO (%)	MgO (%)	Y2O3 (%)	P2O5 (%)	CuO (%)	ThO2 (%)	U3O8 (%)	CrO3 (%)	V2O5 (%)
1	New Haven, IN	58.4	0.54	18.7	1.20	4.77	4.74	0.52	0.83	0.14	0.27	0.019	0.080	0.24	0.42	0.084
2	New Haven, IN	58.0	0.55	12.6	1.09	4.34	4.21	0.66	0.65	0.17	0.25	0.010	0.082	0.25	0.17	0.082
3	New Haven, IN	57.6	0.60	17.5	1.45	3.66	4.16	0.57	0.96	0.15	0.32	0.011	0.093	0.25	0.29	0.093
4	New Haven, IN	61.2	0.63	19.1	1.27	3.83	4.20	0.32	0.45	0.32	0.019	0.089	0.24	0.19	0.093	0.15
5	New Haven, IN	58.9	0.64	18.7	1.19	3.65	3.74	0.69	1.31	0.19	0.32	0.008	0.096	0.29	0.37	0.095
6	New Haven, IN	53.4	0.54	19.6	1.16	3.96	4.14	1.73	0.99	0.15	0.25	0.006	0.088	0.34	0.33	0.075
7	New Haven, IN	54.8	0.54	18.0	1.29	4.03	4.34	2.63	1.33	0.15	0.27	0.006	0.11	0.33	0.10	0.087
8	New Haven, IN	54.6	0.54	19.7	1.28	4.20	4.84	2.52	1.31	0.14	0.25	0.006	0.10	0.27	0.15	0.11
9	New Haven, IN	42.9	0.47	20.3	1.11	4.94	5.80	5.97	2.57	0.13	0.27	0.019	0.10	0.17	0.33	0.093
10	New Haven, IN	46.1	0.53	20.8	1.21	5.24	5.72	4.03	1.74	0.15	0.27	0.021	0.094	0.18	1.17	0.079
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15	New Haven, IN	6.58	0.071	25.7	0.47	7.89	6.81	16.6	1.97	0.010	0.078	0.016	0.074	<0.005	0.029	0.020

RECORD OF SAMPLES TRANSMITTED AND REQUEST FOR ANALYSES

1. Date 19-Dec-95	2. PURCHASE OR SALES CONTRACT NO. DLA300-96-M-0014	3. EX VESSEL (if any) N/A	4. PROGRAM NDS	5. RELEASE NO. N/A
6. MATERIAL (Grade and/or type) Zirconium Ore Baddeleyite Material		7. NUMBER AND ADDRESS OF REGION CONCERNED DLA/DNSZ Hammond Zone 3200 Sheffield Ave HMQ Hammond, IN 46327-1002		
8. NAME AND ADDRESS OF ANALYST Luvak Incorporated 722 Main Street P.O. Box 597 Boylston, MA 01505		9. NAME AND ADDRESS OF MATERIAL SUPPLIER/PURCHASER Defense Logistics Agency / Defense National Stockpile New Haven Depot State Rt. 14 East New Haven, IN 46774-9644		
		219-937-5383 Ext 111		FAX (219) 749-5284
		(219) 749 - 5953		FAX- (219)749-8467

TO THE ANALYST - It is requested that analyses, including preparation if necessary, in accordance with stated provisions and specifications, be made on samples identified below.

ANALYSTS SAMPLE NO.	GOVERNMENT SAMPLE NO.	LOT NO. AND MARKS	NUMBER AND TYPE OF UNITS	WEIGHT OF LOT
Samples No. 1 - 15	1 - 15	Samples No. 1 - 15	15 1 Lbs Cans	Weight of Samples approximately (20) Lbs Net Weight Pile 111 31,981,402 Net Weight Pile 111-A 2,783,706

15. MANNER TRANSMITTED <input type="checkbox"/> TAKEN BY ANALYST <input checked="" type="checkbox"/> BY MAIL	16. DETERMINATION <input checked="" type="checkbox"/> ALL CHEMICAL AND PHYSICAL REQUIREMENTS OF SPECIFICATION NO. <input type="checkbox"/> THE FOLLOWING ONLY per Contract Per Contract DLA300-96-M-0014
17. AUTHORITY <input checked="" type="checkbox"/> SERVICE	OPEN MARKET BASIS <input type="checkbox"/> FOR WHICH NO CONTRACT EXISTS

18. PURPOSE <input checked="" type="checkbox"/> GOVERNMENT CONTROL <input type="checkbox"/> UMPIRE <input type="checkbox"/> GENERAL INFORMATION	19. PORTIONS OF THE PREPARED SAMPLES SHALL BE DISTRIBUTED BY ANALYST TO <input type="checkbox"/> UMPIRE (Specify) <input type="checkbox"/> OTHER (Specify) <input checked="" type="checkbox"/> MATERIAL SUPPLIER PURCHASER ** Additional Material Retained @ Supplier.
--	--

20. DATE SAMPLED 6 - 13 NOV95	21. PLACE SAMPLED NEW HAVEN DEPOT	22. DISPOSITION OF SAMPLES 180 DAYS
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23. REMARKS (if more space is required, continue on separate sheet)

Samples # 1 - 15 1.3 Lbs Average Weight Each.

NO.	COPIES OF THIS FORM	NO.	ANALYSIS CERTIFICATES
	Mail to Analyst Shown Above (if possible, one of these copies shall accompany the sample. One copy shall be completed by analyst and sent to region shown in item 7.)		MATERIAL SUPPLIER/PURCHASER
			QUALITY ASSURANCE DIVISION
			REGION SHOWN IN ITEM 7
			OTHER (Specify)
			Defense Logistics Agency Defense National Stockpile Center DNSC-Q 8725 John J. Kingman Rd., Suite 3339 FT BELVOIR, VA 22060-6223 (703) 767 7642 FAX- (703) 767-7613
			27. SAMPLES RECEIVED
		A. BY (Signature)	B. DATE

25. REQUESTS BY (Signature and Title) <i>Clarance McDaniel</i> Clarance McDaniel, QAS	26. RESULTS REQUIRED BY (Date) Per Contract
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ORDER FOR SUPPLIES OR SERVICES

(Contractor must submit four copies of invoice.)

Form Approved
OMB No. 0704-0187
Expires Dec 31, 1993

PAGE 1 OF
6

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0187), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR FORM TO EITHER OF THESE ADDRESSES. SEND YOUR COMPLETED FORM TO THE PROCUREMENT OFFICIAL IDENTIFIED IN ITEM 6.

1. CONTRACT/PURCH ORDER NO. DLA300-96-M-0014	2. DELIVERY ORDER NO.	3. DATE OF ORDER (YYMMDD) 951212	4. REQUISITION/PURCH REQUEST NO.	5. PRIORITY
--	-----------------------	---	----------------------------------	-------------

6. ISSUED BY Defense Logistics Agency Defense National Stockpile Center 8725 John J. Kingman Road, Ste. 3339 Fort Belvoir, VA 22060-6223	7. ADMINISTERED BY (if other than #6) ATTN: Kerri B. Chambers (706) 767-5498	8. DELIVERY FOR <input checked="" type="checkbox"/> DESI <input type="checkbox"/> OTHER <small>(Use Schedule if other)</small>
--	--	---

9. CONTRACTOR Luvak, Incorporated 722 Main Street P.O. Box 597 Boylston, MA 01505	10. DELIVER TO FOR POINT BY (date) 660429	11. MARK IF BUSINESS IS <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> SMALL INQUIRY <input type="checkbox"/> VENTURE <input type="checkbox"/> WOMEN-OWNED
---	---	--

14. SHIP TO Defense National Stockpile Center ATTN: Kerri B. Chambers 8725 John J. Kingman Road, Suite 4528 Fort Belvoir, VA 22060-6223	15. PAYMENT WILL BE MADE BY Defense Finance and Accounting Services ATTN: DFAS-CO-LC-OF P.O. Box 369016 Columbus, OH 43230-9016	13. MAIL INVOICE TO Original to block #14 and two copies to block #15.
---	---	--

16. DELIVERY TYPE OF ORDER <input checked="" type="checkbox"/> PURCHASE	This delivery order is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract. Reference your written quotations dated 11/17/95 ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.
--	--

NAME OF CONTRACTOR Luvak, Incorporated	SIGNATURE <i>[Signature]</i>	TYPED NAME AND TITLE WILLIAM G. ARNOLD	DATE SIGNED 12/18/95
--	---------------------------------	--	--------------------------------

17. ACCOUNTING AND APPROPRIATION DATA/LOCAL USE
9760100.5145 001 P772.30 QT 25.27 S33181 \$3420.00

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/SERVICE	20. QUANTITY ORDERED/ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
0001	ANALYSES SERVICES Contractor shall provide services necessary for the chemical analysis of Government furnished/delivered samples in accordance with the enclosed specifications on pages 2 to 5 and attached MATERIAL SAFETY DATA SHEETS. Zirconium Ore - Baddeleyite	15	EA	\$228.00	\$3,420.00

24. UNITED STATES OF AMERICA BY: Rozelyn E. Durant CONTRACTING/ORDERING OFFICER	25. TOTAL \$3,420.00
--	--------------------------------

26. QUANTITY IN COLUMN 20 HAS BEEN <input type="checkbox"/> INSPECTED <input type="checkbox"/> RECEIVED <input type="checkbox"/> ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED	27. QMB NO. <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL	28. I.O. VOUCHER NO.	29. PAID BY
DATE _____ SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE _____	30. DIFFERENCES INITIALS _____	31. PAYMENT <input type="checkbox"/> COMPLETE <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL	32. AMOUNT VERIFIED CORRECT FOR
33. I certify this account is correct and proper for payment.	34. CHECK NUMBER	35. BILL OF LADING NO.	36. DATE RECEIVED

DEC 18 '95 13:58

FROM DNSZ-HM

TO NH

PAGE.002

DEC-18-1995 14:57

DNOSC-Q

*ARC
12/12/95*

703 607 0271

P.01



**DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD, SUITE 3339
FT. BELVOIR, VIRGINIA 22060-6223**



IN REPLY
REFER TO

DNOSC-Q

December 18, 1995

MEMORANDUM FOR DNSZ-HM

SUBJECT: Request for Zirconium Ore-Baddeleyite samples
Shipment to Analytical Laboratory

The Luvak, Inc. Laboratory has been awarded the analytical service contract for fifteen samples of Zirconium Ore-Baddeleyite. Please send all the samples to the following address:

Luvak, Incorporated
722 Main Street
P.O. Box 597
Boylston, MA 01505
Phone: (508) 869-6401
Fax: (508) 869-6213
Attn: Joseph P. Flanagan

I am enclosing a copy of Order for Services for the Contract No: DLA300-96-M-0014.

If you have any questions, please contact B.I. Min of my staff.

GILES E. LEPAGE
Director
Directorate of Quality Assurance
& Technical Services

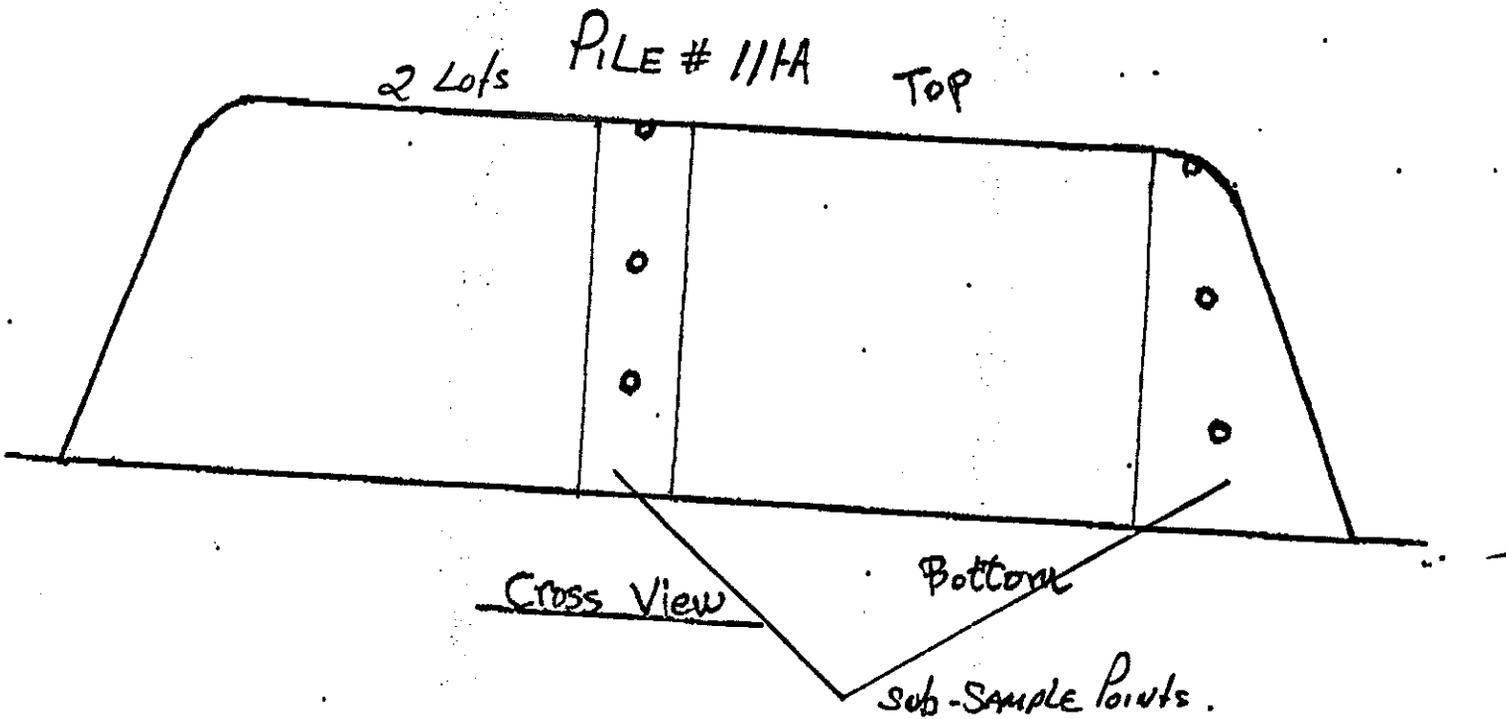
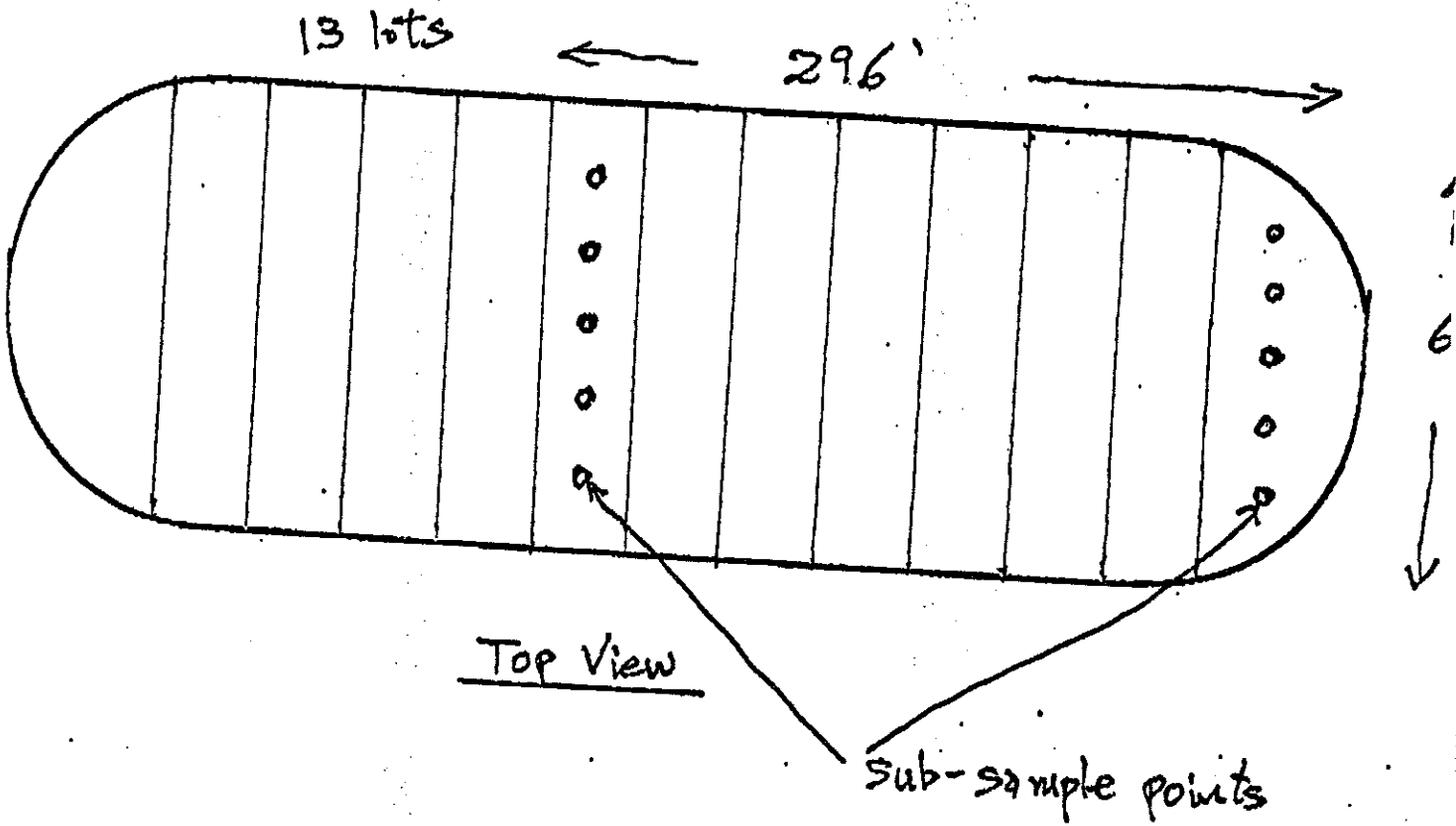
Attachment

ZIRCONIUM ORE BADDELEYITE
 NEW HAVEN DEPOT
 NOVEMBER 7, 1995

PILE NO. 111															PILE NO. 111-A		
LOT NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL	14	15	TOTAL
Sieve Size 4" No. of lbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent of Sample	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.00
Sieve Size 2" No. of lbs	0.00	3.75	0.00	0.00	0.75	2.50	0.50	0.50	1.00	2.25	0.50	1.00	0.00	12.75	0.0	0.0	0.00
Percent of Sample	0.0	14.4	0.0	0.0	3.0	9.8	2.0	2.0	3.8	8.7	1.9	3.8	0.0	78.75	0.0	0.0	0.00
Sieve Size 1" No. of lbs	7.25	5.25	6.25	5.75	8.50	3.25	6.50	5.50	5.50	6.25	7.25	6.25	5.25	78.75	2.75	4.25	7.00
Percent of Sample	27.3	20.2	23.5	23.5	34.3	12.7	26.0	21.8	21.2	24.3	28.2	24.3	20.6	93.25	11.0	16.7	13.8
Sieve Size 1/2" No. of lbs	6.50	6.75	8.50	5.75	7.50	5.00	6.75	9.25	6.75	7.00	7.50	7.75	8.25	93.25	5.50	3.00	8.50
Percent of Sample	24.5	25.9	32.0	23.4	30.3	19.6	27.0	36.8	25.9	27.2	29.1	30.1	32.4	28.2	22.0	11.8	16.7
Sieve Size 1/4" No. of lbs	5.25	5.00	6.00	7.00	4.25	7.25	6.25	6.00	7.25	4.50	6.25	7.25	7.25	78.50	5.00	4.50	9.50
Percent of Sample	19.8	19.2	22.6	28.5	17.2	28.4	25.0	23.7	27.8	17.5	24.3	28.1	28.4	23.8	20.0	17.6	18.6
Sieve Size 1/4" No. of lbs	7.50	5.25	5.75	6.00	3.75	7.50	5.00	4.00	5.50	5.75	4.25	3.50	4.75	68.60	11.75	13.75	25.50
Percent of Sample	28.3	20.2	21.7	24.5	15.2	29.4	2.0	15.8	21.2	22.3	16.5	13.8	18.6	20.5	47.2	53.9	50.0
Total No. Lbs.	26.50	26.00	26.50	24.50	24.75	25.50	25.00	25.25	26.00	25.75	25.75	25.75	25.50	332.75	25.00	25.50	50.5

Note: Total sample taken from pile 111 was 332.75 pounds.
 Total Sample taken from pile 111-A was 50.5 pounds.
 There were no four inch and larger pieces in the sample.
 The four inch and larger pieces seem to be located at the base of the pile.
 We estimate that four inch and larger size pieces comprise 1% or less of the pile.

Pile # 111





DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD, SUITE 3339
FT. BELVOIR, VIRGINIA 22060-6223



IN REPLY
REFER TO

DNSC-Q

December 4, 1995

MEMORANDUM FOR DNSC-P

SUBJECT: Zirconium Ore-Baddeleyite Analytical Laboratory
Technical Evaluation

As requested, we have completed the technical evaluation of three bid proposals for solicitation number DLA300-96-Q-0014. Based on the technical evaluation, we are recommending the contract be awarded to one of the following bidders: Laboratory Testing Inc. or Luvak Inc. Both laboratories are capable of performing Zirconium Ore-Baddeleyite analysis as specified.

If you have any question, please contact B.I. Min of my staff.

GILES E. LEPAGE
Director
Directorate of Quality Assurance
& Technical Services

Attachment



Zirconium Ore-Baddeleyite Analytical Laboratories Technical Evaluation

	<u>Bidders</u>		
	<u>LTI</u>	<u>Luvak</u>	<u>NSL</u>
Past Performance	B+	B+	
Personnel	B+	B+	
Method	A	A	
Q.C. Procedure	B	B	
Equipment	A	A	
Facility	B+	B+	
<u>Overall Rating</u>	B+	B+	N/A

N/A: Not acceptable because NSL is proposing to obtain Zirconium Dioxide by difference rather than by analysis as specified in the solicitation.

12.01.95

COMMODITY INSPECTION REPORT

CONTRACT NUMBER DLA302-96-M-0052		COMMODITY Zirconium Baddeleyite, Ore		<input checked="" type="checkbox"/> SALES		<input type="checkbox"/> PROCUREMENT					
RELEASE OR S/I NUMBER N/A		LOT NUMBER Sub Lots 1-15		PROGRAM NDS		INSPECT REPORT NO. 1					
PURCHASER OR CONTRACTOR Andrew S. McCreath & Son Inc.				REGION NUMBER Hammond Zone		DATE OF INSPECTION 6 -13 Nov 95					
CONSIGNEE OR SUBCONTRACTOR N/A				ADDRESS 610 Willow St. Box 1453 Harrisburg, PA 17105-1453							
PERSON CONTACTED (NAME & TITLE) Frederic W. Brooks, Depot Manager				LOCATION OF MATERIAL INSPECTED New Haven Depot New Haven, IN 46774-9644							
INSPECTION, SAMPLING AND ANALYSIS				DESCRIPTION OF PACKING (INCLUDE TYPE OF CONVEYANCE) Zirconium Baddeleyite, Ore (13) 25 lbs Sub. lot samples were selected from pile 111 Which contains 31,981,402 lbs weight of record. (2) 25 lbs Sub. lot samples were selected from the contaminated, pile 111-A that contains 2,783,706 lbs weight of record. See attached sub lot record which is divided into grit sizes and quantity. All sampling and sieve size requirements were accomplished by the Quality Assurance Specialists on site.							
SAMPLES TAKEN <input checked="" type="checkbox"/>		ANALYSIS <input type="checkbox"/> (X) Yes									
BY CONTRACT		BY PURCHASER DLA									
SAMPLER/ANALYST		OR CONTRACTOR									
WITNESSED <input type="checkbox"/> YES <input type="checkbox"/> NO		WITNESSED <input type="checkbox"/> YES <input type="checkbox"/> NO									
OTHER (15) Sub Samples selected & Processed and on hold for a Lab. to send samples.		TYPES OF ANALYSE						NO. UNITS			
								PER			
								PER			
INSPECTION		IDENTITY OF SAMPLE									
VISUAL 100%		FORWARDING DATE Open									
DIMENSIONAL 100%		SAMPLE NUMBER 15									
FOR MARKING 100%		LOT NUMBER 1 of 15									

DISTRIBUTION OF SAMPLES (GIVE COMPLETE ADDRESS)

DESCRIBE METHOD OF INSPECTION, SAMPLING AND/OR SAMPLE PREPARATION (USE ATTACHED SHEETS, IF NECESSARY)

Above listed samples were selected, screened for specific sieve size and recorded.
See attached record for sieve size and percentage information of each sub lot size and quantity.

McCreath & Son Inc. was contracted to crush and split each sub-lot sample into two (2) 1-lbs,
samples one (1) laboratory and one (1) reserve sample. The crushing was complete as of 11/13/95.

Samples are in hold status @ New Haven Depot

ITEM OR LOT NO.	QUANTITY SAMPLED	QUANTITY ACCEPTED OR SOLD	QUANTITY REJECTED	APPROXIMATE VALUE QTY REJECTED	DESCRIPTION OF MATERIAL
Pile-111	Lbs 332,75	Lbs 332,75	0		Zirconium Ore (Baddeleyite) Pile-111 (26) one (1) lbs samples were obtained one (1) Laboratory and one (1) Reserve from each sub-lot. Pile-111-A Contaminated (4) one lbs samples were obtained, one (1) Laboratory and (1) Reserve from each sub-lot. Samples are ready to be shipped to analytical Laboratory on your request.
Contaminated Pile-111-A	50.5	50.5	0		

REASON FOR REJECTION

<input checked="" type="checkbox"/> Q.A. DIVISION		<input checked="" type="checkbox"/> Q.A. ZONE BRANCH		<input type="checkbox"/> SUPERVISORY Q.A.	
<input checked="" type="checkbox"/> ORIGINATING DEPOT		<input checked="" type="checkbox"/> STOCKPILE DIVISION		<input type="checkbox"/> CONTRACTING OFFICER	
<input type="checkbox"/> FINANCE		<input type="checkbox"/> CONTRACTOR		<input checked="" type="checkbox"/> OTHER (SPECIFY) HMQB	

INSPECTOR (SIGNATURE)
Clarence McDaniel, QAS \ BIN Till, QAS

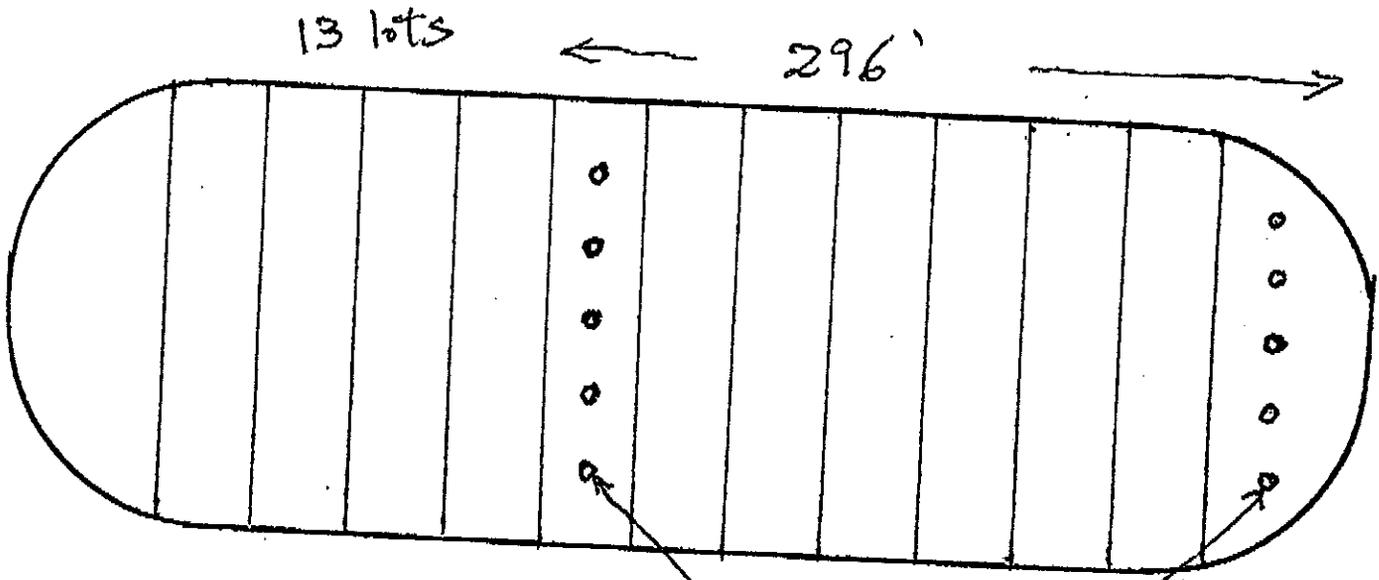
DATE
21-Nov-95

ZIRCONIUM ORE BADDELEYITE
 NEW HAVEN DEPOT
 NOVEMBER 7, 1995

	PILE NO. 111														PILE NO. 111-A		
LOT NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL	14	15	TOTAL
Sieve Size 4" No. of lbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent of Sample	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
Sieve Size 2" No. of lbs	0.00	3.75	0.00	0.00	0.75	2.50	0.50	0.50	1.00	2.25	0.50	1.00	0.00	12.75	0.0	0.0	0.0
Percent of Sample	0.0	14.4	0.0	0.0	3.0	9.8	2.0	2.0	3.8	8.7	1.9	3.8	0.0	78.75	0.00	0.00	0.00
Sieve Size 1" No. of lbs	7.25	5.25	6.25	5.75	8.50	3.25	6.50	5.50	5.50	6.25	7.25	6.25	5.25	78.75	0.0	0.0	0.0
Percent of Sample	27.3	20.2	23.5	23.5	34.3	12.7	26.0	21.8	21.2	24.3	28.2	24.3	5.25	78.75	2.75	4.25	7.00
Sieve Size 1/2" No. of lbs	6.50	6.75	8.50	5.75	7.50	5.00	6.75	9.25	6.75	7.00	7.50	7.75	8.25	93.25	11.0	16.7	13.8
Percent of Sample	24.5	25.9	32.0	23.4	30.3	19.6	27.0	36.6	25.9	27.2	29.1	30.1	32.4	93.25	5.50	3.00	8.50
Sieve Size 1/4" No. of lbs	5.25	5.00	6.00	7.00	4.25	7.25	6.25	6.00	7.25	4.50	6.25	7.25	7.25	79.50	22.0	11.8	16.7
Percent of Sample	19.8	19.2	22.6	28.5	17.2	28.4	25.0	23.7	27.8	17.5	24.3	28.1	28.4	79.50	5.00	4.50	9.50
Sieve Size 1/4" No. of lbs	7.50	5.25	5.75	6.00	3.75	7.50	5.00	4.00	5.50	5.75	4.25	3.50	4.75	68.50	20.0	17.6	18.6
Percent of Sample	28.3	20.2	21.7	24.5	15.2	29.4	2.0	15.8	21.2	22.3	16.5	13.6	18.6	68.50	11.75	13.75	25.50
Total No. Lbs.	26.50	26.00	26.50	24.50	24.75	25.50	25.00	25.25	26.00	25.75	25.75	25.75	25.50	332.75	47.2	53.9	50.0
															25.00	25.50	50.5

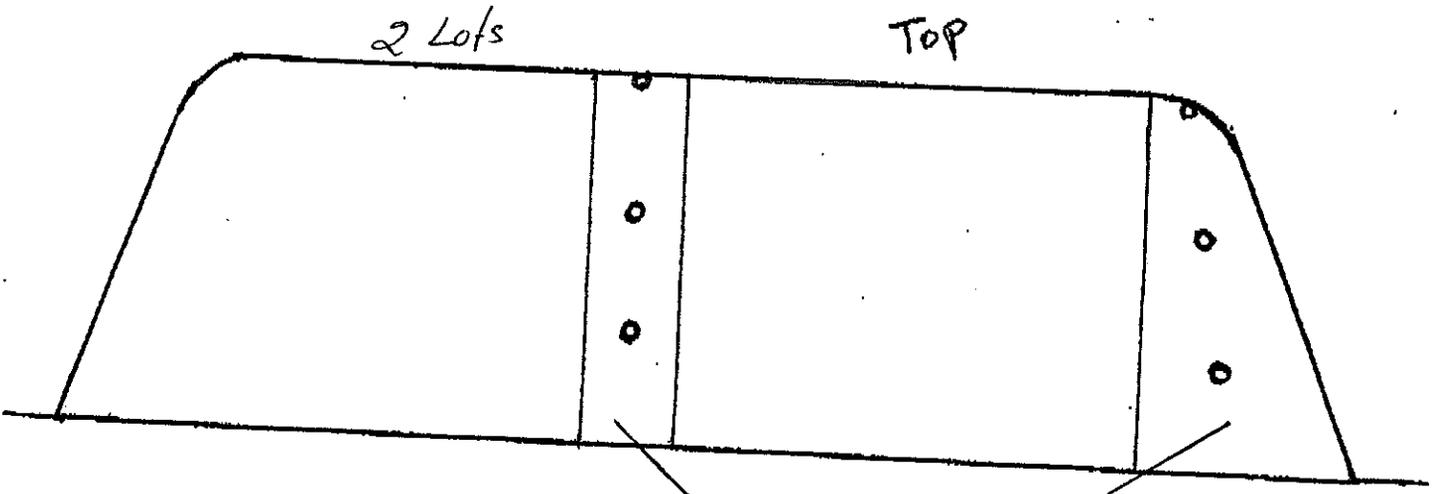
Note: Total sample taken from pile 111 was 332.75 pounds.
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Pile # 111



Top View

Sub-sample points



Cross View

Sub-sample Points



DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN ROAD, SUITE 3339
FT. BELVOIR, VIRGINIA 22060-6223



IN REPLY
REFER TO

DNSC-Q

October 25, 1995

MEMORANDUM FOR DNSC-P

SUBJECT: Request for Zirconium Ore - Baddeleyite Analytical Services

This is a request for a purchase order to perform chemical analyses for fifteen (15) samples of zirconium ore - baddeleyite.

A total of fifteen samples will be taken from DNSZ-HM: New Haven Depot, New Haven, IN.

Estimated cost will be under \$20,000.00.

Enclosed are the Statement of Work for analytical services and a list of the laboratories to be contacted for the solicitation.

GILES E. LEPAGE

Director

Directorate of Quality Assurance
& Technical Services

Attachments

9760100.5145 001 P772.30 QT 25.27 S33181
Contract No: DLA30096_0014



I. STATEMENT OF WORK

The Contractor shall provide all labor, supervision, facilities, supplies, equipment, and services necessary for chemical analyses of fifteen (15) Government furnished/delivered samples of Zirconium Ore-Baddeleyite.

II. PERIOD OF PERFORMANCE

The term of this contract shall be for the period of one hundred and twenty (120) days from the date of award.

III. SAMPLE IDENTIFICATION/TRANSMITTAL

All samples will be supplied by the Government and delivered directly to the testing laboratory. A DLAH Form 35, Record of Samples Transmitted and Request for Analyses, will accompany all samples forwarded for analysis by the Government Representative. All samples will be identified by a DLAH Form 34, Sample Identification Label, or equivalent.

IV. ANALYSIS

a. Each sample shall be tested for the complete chemical analysis to the number of decimal points as listed in the following chemical requirements for Zirconium Ore-Baddeleyite.

b. All proposed methods of analysis shall be identified for each element or compound for which analysis is required and the methods shall be acceptable to the Government. The Contractor shall indicate the proposed method of analysis for each element specified below:

<u>Elements</u>	<u>Percent by Weight (Dry Basis)</u>			<u>Test Method</u>
Zirconium Dioxide	(ZrO ₂)	65.00	Min.	_____
Hafnium Oxide	(HfO ₂)	1.00	Max.	_____
Silica	(SiO ₂)	20.00	Max.	_____
Titanium Dioxide	(TiO ₂)	0.50	Max.	_____
Ferric Oxide	(Fe ₂ O ₃)	10.00	Max.	_____
Aluminum Oxide	(Al ₂ O ₃)	5.00	Max.	_____
Calcium Oxide	(CaO)	0.20	Max.	_____
Magnesium Oxide	(MgO)	0.20	Max.	_____
Yttrium Oxide	(Y ₂ O ₃)	1.00	Max.	_____
Phosphorus Pentoxide	(P ₂ O ₅)	1.00	Max.	_____
Copper Oxide	(CuO)	0.02	Max.	_____
Thorium Dioxide	(ThO ₂)	0.15	Max.	_____
Triuranium Octoxide	(U ₃ O ₈)	0.50	Max.	_____
Chromium Trioxide	(CrO ₃)	0.01	Max.	_____
Vanadium Pentoxide	(V ₂ O ₅)	0.10	Max.	_____

V. SAMPLE RETENTION

The analytical samples shall be retained for a period of ninety (90) days after contract completion. Thereafter, the Contractor may dispose of the material at its discretion.

VI. ANALYSIS PROCEDURE MODIFICATION

No modification to the analysis procedure shall be valid unless issued in writing by the Contracting Officer.

VII. REPORTS

a. Certificate of Analysis. The Contractor shall prepare a separate Certificate of Analysis containing the test results for each sample. The certificate shall be completely typewritten in English except for the original signature of the responsible individual.

b. Certificate of Analysis Contents. The Certificates of Analysis shall include the complete chemical analysis, percent by weight. The Certificates of Analysis shall make no comment as to whether the material meets or does not meet the maximum or minimum limits of the specification. The following information shall also be listed on the Certificate of Analysis:

Commodity Name
DLA Sample Number
Date of Analysis
Name of Analyst
Contract Number

VIII. DELIVERY OF REPORT

Maximum time for completion of analysis and reporting of results shall be fifteen (15) working days (Saturday, Sunday, and Federal Holidays excluded) after receipt of each sample at the Contractor's laboratory. The original plus one copy of each report shall be sent via overnight delivery service to the address shown below:

Defense Logistics Agency
Defense National Stockpile Center
Director
Directorate of Quality Assurance and Technical Services
8725 John J. Kingman Rd. Suite 4528
Ft. Belvoir, VA 22060-6223

No copies of the Certificate of Analysis shall be furnished to any other person except as directed by the Contracting Officer. The Contractor is not to discuss sample analysis status, procedures, or results with any other party unless approved by the Contracting Officer.

IX. DELAY IN PERFORMANCE

Any delays in performance shall be reported by telephone within eight (8) hours to the Contracting Officer. The reason(s) for the delay and the corrective action being taken shall be explained in detail. The Contractor shall proceed diligently with performance of this contract, as soon as conditions permit, pending final resolution of the problem(s) causing the delay.

X. ACCEPTANCE/PAYMENT

The Contractor shall be paid only for the services it rendered and the number of samples actually analyzed and accepted at the stated unit price in accordance with the provisions of this contract. For the purpose of payment for services, the term "date of completion of performance of services" shall be deemed the date the report is accepted by the Government. The Government will have five (5) workdays to accept or reject the report after receipt. In order to expedite payment, send a copy of the invoice to the address in paragraph VIII.

XI. SUBCONTRACTING PROHIBITED

There shall be no subcontracting of any portion of the work contained in this contract.

XII. HEALTH WARNING

As part of this Statement of Work, a specific detailed Materials Safety Data Sheet has been provided. This data provides specific toxicity and health-related data for the protection of human health and the environment. Bidders should review this information carefully prior to submitting a bid. This data sheet should be reviewed carefully by all who use, handle, transport, and/or store this material. Guidance in these documents should be adhered to and communicated to all involved.

XIII. PRE-AWARD SURVEY

The offeror's facilities, equipment, qualifications of key personnel, laboratory methodology, and past performance and experience may be subject to a pre-award survey.

XIV. EVALUATION FACTORS

Offerors will be evaluated in the following areas in descending order of importance supported by documentation submitted as outlined in Paragraph XV:

- a. Past performance and experience.
- b. Qualifications of key management and technical personnel.
- c. Laboratory analytical methods and manuals.

- d. Quality control procedure.
- e. Equipment.
- f. Facilities.
- g. Price.

XV. CONTENTS OF OFFER

Each offeror shall submit the most current information, within the past three (3) years if possible, as follows:

- a. Qualifications of laboratory personnel, including names, education, and individual experience.
- b. Detailed analytical methods to be used.
- c. Past performance, including the names of customers, addresses, names of contact points, and telephone numbers.
- d. Laboratory Quality Control Procedures employed and/or a copy of the relevant portions of the Quality Control Manual as applicable to this service.
- e. A list of analytical equipment to be used, including make, model, and year manufactured.
- f. Contractor facilities.
- g. Price.

An offeror who submitted the above information in prior bids may submit only the changes made since the previous submission. This information shall be used as a part of the technical evaluation.

| SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION |

DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
1746 JEFFERSON DAVIS HIGHWAY
CRYSTAL SQUARE 4, SUITE 100
ARLINGTON, VA 22202

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

CAS NUMBER: 1314-23-4
RTECS NUMBER: ZH8800000

SUBSTANCE: BADDELYITE (ZIRCONIUM ORE)

TRADE NAMES/SYNONYMS:

ZIRCONIUM DIOXIDE; ZIRCONIC ANHYDRIDE; ZIRCONIA; ZIRCONIUM(IV) OXIDE;
BADDELEYITE; ZIRCONIUM ANHYDRIDE; ZIRCONIUM OXIDE (ZRO2); ZIRCONIA (ZRO2);
ZIRCON ALBA; ZIRCONIUM WHITE; ZIRCONIUM OXIDE TABLETS PATINAL (EM SCIENCE);
O2ZR; DLA25635

CHEMICAL FAMILY:

Metal oxide

CREATION DATE: 07/01/92

REVISION DATE: 03/30/95

| SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS |

COMPONENT : BADDELYITE (ZIRCONIUM ORE)
CAS NUMBER: 1314-23-4
PERCENTAGE: 100.0

OTHER CONTAMINANTS: NONE

| SECTION 3 HAZARDS IDENTIFICATION |

CERCLA RATINGS (SCALE 0-3): HEALTH=U FIRE=0 REACTIVITY=0 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=U FIRE=0 REACTIVITY=0

EMERGENCY OVERVIEW:

Odorless, tasteless, white to yellow-brown, heavy, amorphous
powder or monoclinic crystals.

No significant target effects reported.
Handle with caution.

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EFFECTS: No information available on significant adverse effects.

LONG TERM EFFECTS: No information available on significant adverse effects.

SKIN CONTACT:

SHORT TERM EFFECTS: No information available on significant adverse effects.

LONG TERM EFFECTS: May cause redness of the skin.

EYE CONTACT:

SHORT TERM EFFECTS: No information available on significant adverse effects.

LONG TERM EFFECTS: No information available on significant adverse effects.

INGESTION:

DLA25635

Page 002 of 007

SHORT TERM EFFECTS: No information available on significant adverse effects.
LONG TERM EFFECTS: No information available on significant adverse effects.

CARCINOGEN STATUS:

OSHA: N

NTP: N

IARC: N

| SECTION 4

FIRST AID MEASURES

INHALATION:

FIRST AID- Remove from exposure area to fresh air immediately. Perform artificial respiration if necessary. Keep person warm and at rest. Treat symptomatically and supportively. Get medical attention immediately.

SKIN CONTACT:

FIRST AID- Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

EYE CONTACT:

FIRST AID- Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

INGESTION:

FIRST AID- If vomiting occurs, keep head lower than hips to help prevent aspiration. Treat symptomatically and supportively. Get medical attention if needed.

NOTE TO PHYSICIAN

ANTIDOTE:

No specific antidote. Treat symptomatically and supportively.

| SECTION 5

FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARD:

Negligible fire hazard when exposed to heat or flame.

EXTINGUISHING MEDIA:

Extinguish using agent suitable for type of surrounding fire.

FIREFIGHTING:

No acute hazard. Move container from fire area if possible. Avoid breathing vapors or dusts; keep upwind.

FLASH POINT: no data available

LOWER FLAMMABLE LIMIT: no data available

UPPER FLAMMABLE LIMIT: no data available

AUTOIGNITION: no data available

HAZARDOUS COMBUSTION PRODUCTS:

Thermal decomposition may release toxic and/or hazardous gases.

SECTION 6

ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL SPILL:

For large spills, sweep up with a minimum of dusting and place into suitable clean, dry containers for reclamation or later disposal.

Residue should be cleaned up using a high-efficiency particulate filter vacuum.

SECTION 7

HANDLING AND STORAGE

Observe all federal, state and local regulations when storing this substance.

Store in a tightly closed container.

SECTION 8

EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

ZIRCONIUM COMPOUNDS (as Zr):

5 mg/m³ OSHA TWA; 10 mg/m³ OSHA STEL

5 mg/m³ ACGIH TWA; 10 mg/m³ ACGIH STEL

5 mg/m³ NIOSH recommended TWA; 10 mg/m³ NIOSH recommended STEL

5 mg/m³ DFG MAK TWA (total dust);

50 mg/m³ DFG MAK 30 minute peak, average value, 1 time/shift

Measurement method: Particulate filter; acid; inductively coupled plasma; (NIOSH Vol. III # 7300, Elements).

OSHA revoked the final rule limits of January 19, 1989 in response to the 11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective June 30, 1993. See 29 CFR 1910.1000 (58 FR 35338)

VENTILATION:

Provide local exhaust ventilation system to meet published exposure limits.

EYE PROTECTION:

Employee must wear splash-proof or dust-resistant safety goggles to prevent eye contact with this substance.

Emergency eye wash: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.

CLOTHING:

Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.

GLOVES:

Employee must wear appropriate protective gloves to prevent contact with this substance.

RESPIRATOR:

The following respirators and maximum use concentrations are recommendations by the U.S. Department of Health and Human Services, NIOSH Pocket Guide to

Chemical Hazards; NIOSH criteria documents or by the U.S. Department of Labor, 29 CFR 1910 Subpart Z.

The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA).

ZIRCONIUM COMPOUNDS (as Zr):

25 mg/m³- Any dust and mist respirator.

50 mg/m³- Any dust and mist respirator except single-use and quarter-mask respirators.

Any supplied-air respirator.

Any self-contained breathing apparatus.

125 mg/m³- Any powered, air-purifying respirator with a dust and mist filter.
Any supplied-air respirator operated in a continuous-flow mode.

250 mg/m³- Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter.

Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.

Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode.

Any self-contained breathing apparatus with a full facepiece.

Any supplied-air respirator with a full facepiece.

500 mg/m³- Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode.

Escape- Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter.

Any appropriate escape-type, self-contained breathing apparatus.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

SECTION 9

PHYSICAL AND CHEMICAL PROPERTIES

DESCRIPTION: Odorless, tasteless, white to yellow-brown, heavy, amorphous powder or monoclinic crystals.

MOLECULAR WEIGHT: 123.22

MOLECULAR FORMULA: ZR-O₂

BOILING POINT: 9032 F (5000 C)

MELTING POINT: 4919 F (2715 C)

VAPOR PRESSURE: no data available

VAPOR DENSITY: not applicable

SPECIFIC GRAVITY: 5.6-6.2
WATER SOLUBILITY: insoluble
PH: not applicable
ODOR THRESHOLD: no data available
EVAPORATION RATE: not applicable
SOLVENT SOLUBILITY: Soluble in nitric acid and hot concentrated sulfuric, hydrochloric, and hydrofluoric acids; insoluble in alkalis.
HARDNESS (MOHS): 6.5

| SECTION 10

STABILITY AND REACTIVITY |

REACTIVITY:

Stable under normal temperatures and pressures.

CONDITIONS TO AVOID:

Prevent dispersion of dust in air.

INCOMPATIBILITIES:

ZIRCONIUM OXIDE:

No data available.

HAZARDOUS DECOMPOSITION:

Thermal decomposition may release toxic and/or hazardous gases.

POLYMERIZATION:

Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

| SECTION 11

TOXICOLOGICAL INFORMATION |

ZIRCONIUM OXIDE:

CARCINOGEN STATUS: None.

ACUTE TOXICITY LEVEL: No data available.

TARGET EFFECTS: Poisoning may affect abraded skin.

AT INCREASED RISK FROM EXPOSURE: Persons with preexisting skin disorders.

HEALTH EFFECTS

INHALATION:

ZIRCONIUM OXIDE:

500 mg(Zr)/m³ Immediately Dangerous to Life or Health.

ACUTE EXPOSURE- A single intratracheal instillation to rats produced fibrogenic and proliferative changes and sclerosis in lung tissue.

CHRONIC EXPOSURE- Inhalation exposure studies to zirconium oxide for 30 days, 60 days, and 1 year at 75 mg, 11 mg, and 3.5 mg Zr/m³, respectively, resulted in no detectable effects in animals. Industrial exposure to zirconium compounds has revealed no respiratory or other pathological problems. However, one study reported pulmonary granulomas in rabbits exposed to zirconium compounds.

SKIN CONTACT:

ZIRCONIUM OXIDE:

ACUTE EXPOSURE- Application to abraded skin may cause allergic granuloma formation in previously exposed persons.

CHRONIC EXPOSURE- Repeated or prolonged contact to abraded skin may cause allergic granuloma, characterized by red-brown, firm, shiny, erythematous,

EYE CONTACT:

ZIRCONIUM OXIDE:

ACUTE EXPOSURE- No available data.

CHRONIC EXPOSURE- No available data.

INGESTION:

ZIRCONIUM OXIDE:

ACUTE EXPOSURE- Gastrointestinal absorption is poor and therefore oral toxicity is low. Ingestion of small doses equivalent to 2, 4, 8, or 10 mg/kg resulted in no deaths in rats.

CHRONIC EXPOSURE- Repeated or prolonged ingestion of a diet containing 20% by weight of a moist paste containing 20.9% of zirconium oxide has produced no harmful effects in rats, or in kittens ingesting food containing 5% of the compound.

SECTION 12

ECOLOGICAL INFORMATION

ENVIRONMENTAL IMPACT RATING (0-4): no data available

ACUTE AQUATIC TOXICITY: no data available

DEGRADABILITY: no data available

LOG BIOCONCENTRATION FACTOR (BCF): no data available

LOG OCTANOL/WATER PARTITION COEFFICIENT: no data available

SECTION 13

DISPOSAL CONSIDERATIONS

Observe all federal, state and local regulations when disposing of this substance.

SECTION 14

TRANSPORT INFORMATION

No classification currently assigned

SECTION 15

REGULATORY INFORMATION

TSCA STATUS: Y

- CERCLA SECTION 103 (40CFR302.4): N
- SARA SECTION 302 (40CFR355.30): N
- SARA SECTION 304 (40CFR355.40): N
- SARA SECTION 313 (40CFR372.65): N
- OSHA PROCESS SAFETY (29CFR1910.119): N
- CALIFORNIA PROPOSITION 65: N

- SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40 CFR 370.21)
- ACUTE HAZARD: N
- CHRONIC HAZARD: N
- FIRE HAZARD: N

REACTIVITY HAZARD:
SUDDEN RELEASE HAZARD:

N
N

DLA25635

Page 007 of 007

| SECTION 16

OTHER INFORMATION |

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LIST OF LABORATORIES

1. Laboratory Testing Inc.
120 Mill Street, P.O. Box 249
Dublin, PA 18917
Attn: Lee E. Dilks
Phone: (215) 249-9898
Fax: (215) 249-9656
2. Luvak Inc.
722 Main Street, P.O. Box 597
Boylston, MA 01505
Attn: Jpseph P. Flannigan
Phone: (508) 869-6401
Fax: (508) 869-6213
3. NSL Analytical Services Inc.
7650 Hub Parkway
Cleveland, OH 44125
Attn: Steven M. Podolan
Phone: (216) 447-1550
Fax: (216) 447-0716



DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
8725 JOHN J. KINGMAN RD. STE. 3339
FT. BELVOIR, VA 22060-6223



IN REPLY

REFER TO DNSC-Q

October 19, 1995

MEMORANDUM FOR DNSZ-HM

SUBJECT: Zirconium Ore-Baddeleyite Sampling

In order to support the sales program for zirconium ore-baddeleyite, we have developed the following sampling plan.

Take a total of fifteen (15) representative baddeleyite samples from the New Haven Depot, New Haven, IN:

<u>Depot</u>	<u>Pile No.</u>	<u>Stockpile Weight (lbs)</u>	<u>No. of Samples</u>
New Haven, IN	111	31,981,402	13
New Haven, IN	111-A	2,783,706	2
			<u>Total: 15</u>

For sampling purposes, divide Pile #111 into thirteen (13) approximately equal lots and divide Pile #111-A into two (2) equal lots. One sample shall be taken from each lot and each sample will consist of five (5) equal amounts of representative sub-samples taken at five approximately equal distant sample points.

Take two (2) sub-samples from each side of each lot and one (1) sub-sample from top of each lot as illustrated in the attached plan.

Before taking samples, remove 1 foot of baddeleyite from the surface to avoid sampling contaminated material. Make sure to include a fair proportion of representative sizes reflecting particle sizes of the lot. Each sub-sample shall be approximately 5 pounds and combined five (5) sub-samples will make one (1) gross sample of 25 pounds.

Perform sieve tests for each 25 pound gross sample using the U.S.A. Standard Sieves: 4-in., 2-in., 1-in., 1/2-in. and 1/4-in. sieves, and report percent passing each sieve.

Crush the large-size samples to make uniform small particle sizes with a mechanical crusher, or by hammers or mauls if no crusher is available. Make sure to prevent contamination of other material in the crushing process.

The pulverized sample shall be mixed thoroughly and divided into a 1 pound test sample for laboratory and the rest as a reserve sample.

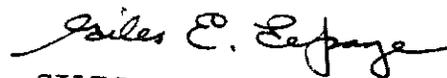
Each 1 pound test sample shall be put into a clean plastic bag in a sample can for a laboratory sample, and shall be identified by a DLAH Form 34 label. The sample container shall be sealed, with DLAH Form 35 inside, and be marked by identifying the sample with the sample number, contract number, lot number, name of commodity, date sampled, and place sampled. The remaining sample shall be put into another container, identified, and stored at the depot as a reserve sample.

The same sampling procedure shall be used for each sample. When all the sampling has been completed, there shall be a total of fifteen (15) samples for the laboratory and fifteen (15) samples for a reserve.

The samples for analysis shall be held at the depot until an analytical laboratory has been selected. We will notify DNSZ-HM when and where to send the samples.

Please review the baddeleyite Materials Safety Data Sheet for safety precautions.

If you have any questions, contact B.I. Min of my staff on (703) 767-7622.

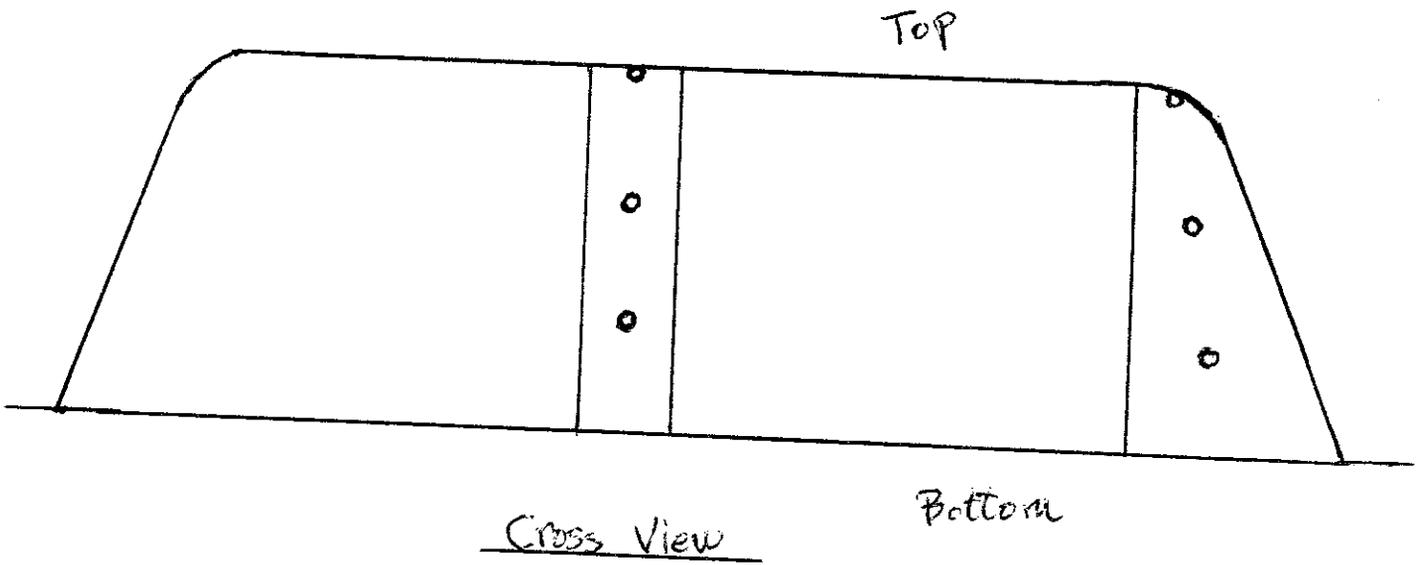
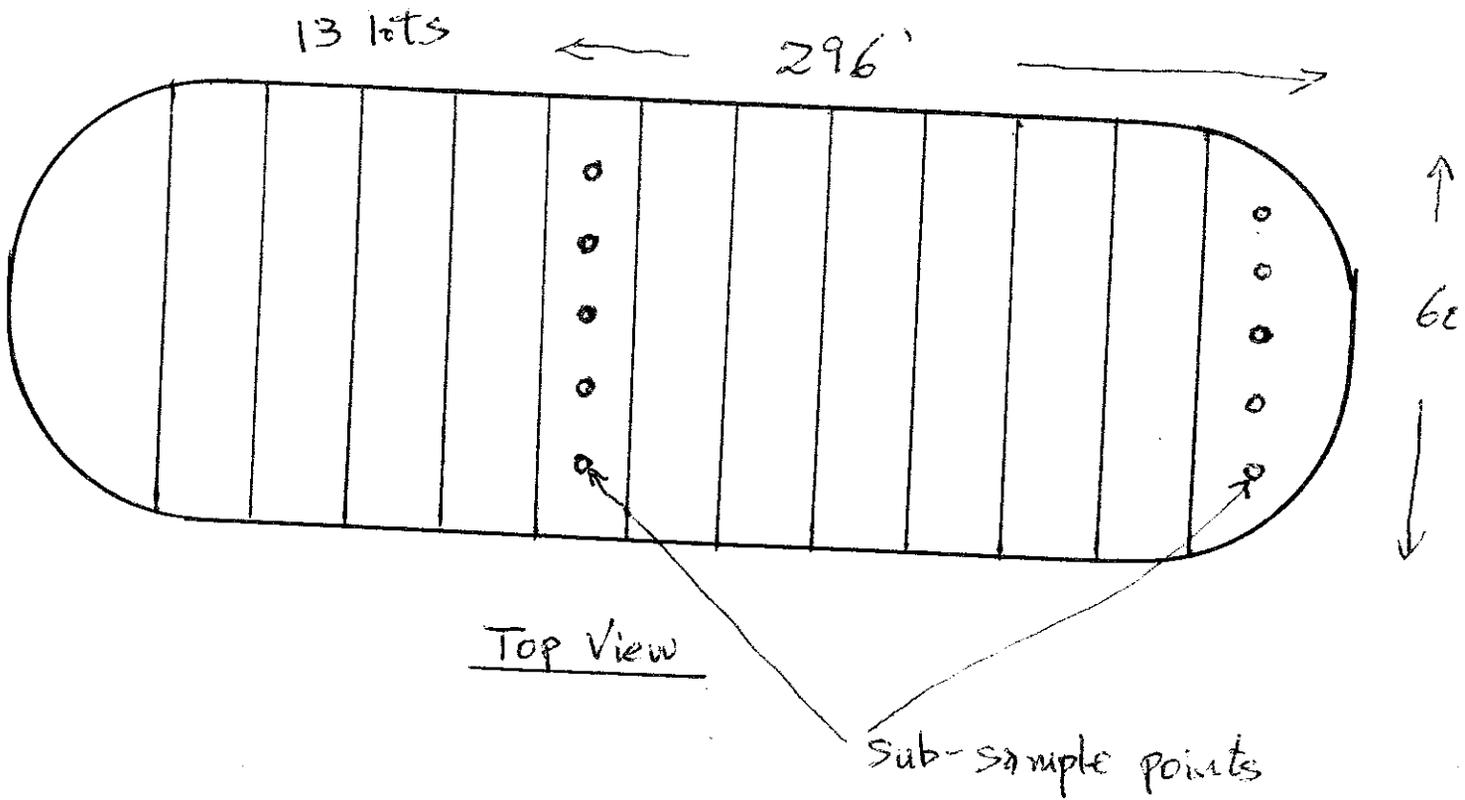


GILES E. LEPAGE

Director

Directorate of Quality Assurance
& Technical Services

Pile # 111



Purpose:

This report is to document the annual Radiological survey conducted at New Haven installation . The depot has in storage seven (7) commodities which are covered on the NRC Source licenses STC-133, expiration date Oct 31, 1999. The licensable commodities are Tantalum Natural mineral/Columbium Tantalum source material . Tantalum Oxide, Columbium Tantalum source material , Columbium Natural Mineral ,Tantalum Pentoxide/Columbium source Natural Minerals, Tantalum pentoxide ; Rare Earth/Sodium Sulphate; Zirconium Ore /Baddeleyite Material. which is stored in warehouse 214 section 3 and 4, warehouse 215 section 2 and pile 111 and 111-A Area 7-A open area storage.

Disposition of licenseable Commodity: The warehouse sizes are 180' X 960' and is divided into four (4) seperate 180' X 240' sections with 79 bays with eight (8) rollup doors per section. Licensable commodities are stored in accordance with the storage manual, specification and stack cards (DLAH-1660) are visible and accessible, Warning signs, labels, marking and placecards are in place. Accessibility is controlled by the Depot Manager and RPO on location, warehouse doors are locked for security, and additional security is maintained with seven a (7) foot high chainlink fence with three (3) strands of barbed wire on top. Perimeter fence is Six (6) miles enclosing 268 acres of depot property . guard service is provided 24-hours a day, which is contract service.

Safety:

This installation maintains a decontamination area in section 1, warehouse 214, west end, which is divided into two (2) section which provides showers, toilets, wash basins, laundry facilities and change locker room. All air in this area is filtered with self contained filtering system. Set up for asbestos particulates.

Equipment Procedure:

The procedure utilized during this survey involved three (3) integral parts:

1. Instrumentation/Calibration
2. Equipment
3. Source Chip Check

All radiological equipment is checked for calibration, proper operation using a CS-137 source chip.

3. Physical Survey

The subject materials were surveyed in two (2) seperate warehouse and one (1) open storage area. They were monitored using the FAG 40F6 Dosimeter model 50002 and the Eberline E-120 Geiger counter calibration date the FAG 8/5/94 due 8/5/95 and the E-120 10/31/94 due 10/31/95.

A-60
23 November 1944.

ARMY AND NAVY MUNITIONS BOARD
Washington, D. C.

MATERIAL ACCEPTANCE SPECIFICATIONS

ZIRCONIUM ORES - BADDELEYITE

1. DESCRIPTION

This specification covers two Types ("A" and "B") of baddeleyite, the natural zirconium dioxide sometimes called zircite or zirkite, intended for the production of ceramics and the alloy ferrozirconium, respectively, to be accepted by transfer from other Government Agencies.

2. CHEMICAL AND PHYSICAL REQUIREMENTS:

All material shall conform to the following:

a. Chemical Requirements:

	<u>TYPE "A"</u>	<u>TYPE "B"</u>
Zirconium Dioxide (ZrO_2)	Minimum 70%	Minimum 60%
Silica (SiO_2)	Maximum 25%	Maximum 25%

b. Physical Requirements:

Not more than 25 percent of any lot of either Type "A" or Type "B" material shall pass a $\frac{1}{2}$ -inch Tyler Standard Screen.

3. PACKAGING

Material shall be supplied in bulk.

4. INSPECTION

Material will be accepted on the basis of inspection and analysis by the recipient Government Agency or its designee. Any records of previous inspection and analysis of a given lot, satisfactorily identifiable and acceptable to the recipient Government Agency, may be used in lieu of a new inspection and analysis.

JUN - 6 1986

DNO

Settlement of Contract No. GS-00-DS-(S)- 43102

DNC

Reference your memo dated May 5, 1986 regarding the settlement of Contract No. GS-00-DS-(S) 43102. The following information is provided to clarify the proposed agreement.

1. Scales are available at the New Haven Depot and the weighing will be done at the Governments expense. The Government will also be responsible for providing weight certificates.
2. Safety, Health and the Environment
 - A. Prior to outloading, all personnel involved in the handling and sampling of the baddelyite ore will be issued radiological badges and dosimeters to wear each day during the relocation project. GSA will issue these badges and maintain records of all radiological monitoring as required by the Nuclear Regulatory Commission. (NRC)
 - B. Prior to outloading, the piles will be adequately wetted to reduce any potential dust generated during the outloading of the baddelyite ore.
 - C. Upon completion of each truckload, the transport vehicle will be properly tarped to prevent the loss of material. In addition, radiological monitoring of (3) sides of the truck and the truck cab will be performed to comply with NRC requirements. GSA will perform and maintain records of all such monitoring.
 - D. Upon complete relocation of the baddeleyite ore, GSA will survey the underlying surface of the piles for radiation. This surface, if necessary, will be by excavated by Phillip Brothers until radiation levels recorded are equal to background. The excavated material will also be relocated at Phillip Brothers expense to the New Haven Depot and unloaded in an area designated for this material.
 - E. All shipping papers shall be properly annotated Radioactive - LSA shipped in accordance with 49 CFR 173.425 through 441.
3. All material from Jeffersonville and Columbus, Ohio will be sampled by GSA however, pile integrity need not be maintained at the New Haven Depot. All material will be added to the existing pile at New Haven. GSA will properly shape and trim the pile as required at no cost to Phillip Bros.

4. Regarding the zirconium metal powder, the government will take the following steps to ultimately dispose of this material.

A. One quart container of material will be submitted to a qualified laboratory for analysis to comply with the Environmental Protection Agency EP Toxicity Test and to meet the State of Indiana disposal requirements.

B. A second quart container of this material will be submitted to Chem Waste Management, Fort Wayne, IN for their analysis.

C. Upon completion, a Material Profile Sheet will be completed and submitted to Chem Waste Management for State approval to dispose of this material in the State of Indiana.

D. Upon anticipated approval of the State Environmental Department, Chem Waste Management will properly package this material into approved lab packs, transport it, and dispose of the material at the Fort Wayne, IN disposal facility.

E. The cost of analysis at the independent laboratory to perform the EP Toxicity Test will be paid for by the Government.

F. The cost of Chem Waste Management analysis, lab packaging, transportation and disposal shall be paid by Phillip Brothers. Estimated cost \$4,500. This is an estimated cost for removal. This price may vary depending on the amount of material allowed to be lab packed into one container. We have estimated \$67.00 per drum for disposal at 100 lbs. per drum, \$200.00 for transportation and \$3,000.00 to lab pack the material by qualified Chem Waste personnel.

G. We expect to have a more definite cost estimate for the Zirconium Metal Powder disposal within 6 weeks.

I believe the major points of this proposed settlement have been addressed, however, we should meet to verbally discuss this entire arrangement one more time, to insure all aspects have been

107 ROBERT M. O'BRIEN

ROBERT M. O'BRIEN
Director
Storage Operations Division

cc: Off. file - DNO(Settle/pm)
D, DN, DNO, Reilly

DNO:KREILLY:pm:X535-7145:511x 6/5/86
RET:DNO:KREILLY:maj:X535-7145:6/5/86

- (9)Ea Pocket Dosimeter Victoreen/362
- (15)Ea V-138 Dosimeter used for backup
- (16)Ea Thermoluminescent Dosimeter TLD'S (Film Bagges) Rotated Quarterly with the Army Lexington, KY.

Pocket dosimeter are assigned only when duties require actual exposure in the handling stored licensable commodities. Film badges are issued each time personnel are in the general vicinity of source material. Evaluation of film badges is provided by USAIRDC, US Army TMDE ACT., Lexington, KY.

Source Chip CS-137 is available at New Haven Depot to check equipment accuracy.

1. Records Inspection:

Accurate records are maintained by the RPO and are in satisfactory condition.

2. Training :

All personnel are trained as to commodities and level of radiation in each area of responsibility, in addition to Data Safety Sheet and Hazardous Material.

I. STATEMENT OF WORK

The Contractor shall provide all labor, supervision, facilities, supplies, equipment, and services necessary for chemical analyses of fifteen (15) Government furnished/delivered samples of Zirconium Ore-Baddeleyite.

II. PERIOD OF PERFORMANCE

The term of this contract shall be for the period of one hundred and twenty (120) days from the date of award.

III. SAMPLE IDENTIFICATION/TRANSMITTAL

All samples will be supplied by the Government and delivered directly to the testing laboratory. A DLAH Form 35, Record of Samples Transmitted and Request for Analyses, will accompany all samples forwarded for analysis by the Government Representative. All samples will be identified by a DLAH Form 34, Sample Identification Label, or equivalent.

IV. ANALYSIS

A. Each sample shall be tested for the complete chemical analysis to the number of decimal points as listed in the following chemical requirements for Zirconium Ore-Baddeleyite.

B. All proposed methods of analysis shall be identified for each element or compound for which analysis is required and the methods shall be acceptable to the Government. The Contractor shall indicate the proposed method of analysis for each element specified below:

<u>Elements</u>	<u>Percent by Weight (Dry Basis)</u>			<u>Test Method</u>
Zirconium Dioxide	(ZrO ₂)	65.00	Min.	
Hafnium Oxide	(HfO ₂)	1.00	Max.	
Silica	(SiO ₂)	20.00	Max.	
Titanium Dioxide	(TiO ₂)	0.50	Max.	
Ferric Oxide	(Fe ₂ O ₃)	10.00	Max.	
Aluminum Oxide	(Al ₂ O ₃)	5.00	Max.	
Calcium Oxide	(CaO)	0.20	Max.	
Magnesium Oxide	(MgO)	0.20	Max.	
Yttrium Oxide	(Y ₂ O ₃)	1.00	Max.	
Phosphorus Pentoxide	(P ₂ O ₅)	1.00	Max.	
Copper Oxide	(CuO)	0.02	Max.	
Thorium Dioxide	(ThO ₂)	0.15	Max.	
Triuranium Octoxide	(U ₃ O ₈)	0.50	Max.	
Chromium Trioxide	(CrO ₃)	0.01	Max.	
Vanadium Pentoxide	(V ₂ O ₅)	0.10	Max.	

V. **SAMPLE RETENTION**

The analytical samples shall be retained for a period of ninety (90) days after contract completion. Thereafter, the Contractor may dispose of the material at its discretion.

VI. **ANALYSIS PROCEDURE MODIFICATION**

No modification to the analysis procedure shall be valid unless issued in writing by the Contracting Officer.

VII. **REPORTS**

A. Certificate of Analysis

The Contractor shall prepare a separate Certificate of Analysis containing the test results for each sample. The certificate shall be completely typewritten in English except for the original signature of the responsible individual.

B. Certificate of Analysis Contents

The Certificates of Analysis shall include the complete chemical analysis, percent by weight. The Certificates of Analysis shall make no comment as to whether the material meets or does not meet the maximum or minimum limits of the Specification. The following information shall also be listed on the Certificate of Analysis:

Commodity Name
DLA Sample Number
Date of Analysis
Name of Analyst
Contract Number

VIII. **DELIVERY OF REPORT**

Maximum time for completion of analysis and reporting of results shall be fifteen (15) working days (Saturday, Sunday, and Federal Holidays excluded) after receipt of each sample at the Contractor's laboratory. The original plus one copy of each report shall be sent via overnight delivery service to the address shown below:

Defense Logistics Agency
Defense National Stockpile Center
Director
Directorate of Quality Assurance and Technical Services
8725 John J. Kingman Rd. Suite 4528
Ft. Belvoir, VA 22060-6223

No copies of the Certificate of Analysis shall be furnished to any other person except as directed by the Contracting Officer. The

Contractor is not to discuss sample analysis status, procedures, or results with any other party unless approved by the Contracting Officer.

IX. DELAY IN PERFORMANCE

Any delays in performance shall be reported by telephone within eight (8) hours to the Contracting Officer. The reason(s) for the delay and the corrective action being taken shall be explained in detail. The Contractor shall proceed diligently with performance of this contract, as soon as conditions permit, pending final resolution of the problem(s) causing the delay.

X. ACCEPTANCE/PAYMENT

The Contractor shall be paid only for the services it rendered and the number of samples actually analyzed and accepted at the stated unit price in accordance with the provisions of this contract. For the purpose of payment for services, the term "date of completion of performance of services" shall be deemed the date the report is accepted by the Government. The Government will have five (5) workdays to accept or reject the report after receipt. In order to expedite payment, send a copy of the invoice to the address in paragraph VIII.

XI. SUBCONTRACTING PROHIBITED

There shall be no subcontracting of any portion of the work contained in this contract.

XII. HEALTH WARNING

As part of this Statement of Work, a specific detailed Materials Safety Data Sheet has been provided. This data provides specific toxicity and health related data for the protection of human health and the environment. Bidders should review this information carefully prior to submitting a bid. This data sheet should be reviewed carefully by all who use, handle, transport, and/or store this material. Guidance in these documents should be adhered to and communicated to all involved.

XIII. PRE-AWARD SURVEY

The offeror's facilities, equipment, qualifications of key personnel, laboratory methodology, and past performance and experience may be subject to a pre-award survey.

XIV. EVALUATION FACTORS

Offerors will be evaluated in the following areas in descending order of importance supported by documentation submitted as outlined in Paragraph XV:

- A. Past performance and experience.

- B. Qualifications of key management and technical personnel.
- C. Laboratory analytical methods and manuals.
- D. Quality control procedure.
- E. Equipment.
- F. Facilities.
- G. Price.

XV. **CONTENTS OF OFFER**

Each offeror shall submit the most current information, within the past three (3) years if possible, as follows:

- A. Qualifications of laboratory personnel, including names, education, and individual experience.
- B. Detailed analytical methods to be used.
- C. Past performance, including the names of customers, addresses, names of contact points, and telephone numbers.
- D. Laboratory Quality Control Procedures employed and/or a copy of the relevant portions of the Quality Control Manual as applicable to this service.
- E. A list of analytical equipment to be used, including make, model, and year manufactured.
- F. Contractor facilities.
- G. Price.

An offeror who submitted the above information in prior bids may submit only the changes made since the previous submission. This information shall be used as a part of the technical evaluation.

GS-00-DS-(S)-43102

BADDELEYITE - (ZIRCONIUM DIOXIDE)

EXHIBIT A
Page 7
%

<u>Item No.</u>	<u>Storage Location</u>	<u>File No.</u>	<u>Short Tons</u>	<u>% ZrO₂</u>	<u>% SiO₂</u>	<u>% U₃O₈</u>	<u>Hf O₂</u>
1	GSA-FSS Jeffersonville Depot Jeffersonville, Indiana	1	1,054	65.80	22.03	0.32	0.70
2	GSA-FSS Casad Depot New Haven, Indiana	III	7,821	67.63	18.39	0.38	0.81
3	Defense Construction Supply Center Columbus, Ohio	3,6,7, and 8	<u>7,124</u>	67.63	18.39	0.40	0.71
			15,999				

ZIRCONIUM METAL POWDER (In Metal Cans)

5	GSA-FSS Casad Depot New Haven, Indiana	<u>Pounds</u> 2,000
---	---	------------------------

Typical Analysis

89% Zr (Metallic)	<u>%</u>
Maximum Acid Sol. Calcine	.05
" Fe	.30
" Al	.10
" H	.20
" Cl	.03
" Si	.10
" Sn	.75

NOTE: The analytical data for each item were obtained by the Government at the time of acquisition and are believed to be correct but no guarantee or warranty is made thereof

GENERAL SERVICES ADMINISTRATION
FEDERAL SUPPLY SERVICE
STRATEGIC & CRITICAL MATERIALS BRANCH
MATERIAL PURCHASE SPECIFICATIONS

ZIRCONIUM ORES - BADDELEYITE

1. DESCRIPTION

This specification covers two Types ("A" and "B") of baddeleyite, the natural zirconium dioxide sometimes called zircite or zirkite, intended for the production of ceramics and the alloy ferrozirconium respectively.

2. CHEMICAL AND PHYSICAL REQUIREMENTS

All material shall conform to the following:

a. Chemical Requirements:

	Type "A"	Type "B"
Zirconium Dioxide (ZrO ₂)	Minimum 75%	Minimum 65%
Silica (SiO ₂)	- -	Maximum 20%

b. Physical Requirements:

Not more than 25 percent of any lot of either Type "A" or Type "B" material shall pass a 1/2-inch Tyler Standard Screen.

3. PACKAGING

Material shall be supplied in bulk.

4. INSPECTION

Material shall be subject to inspection and analysis by the purchaser or its designee.

Baddeleyite Ore

1. Combine all three piles into one.
2. Obtain grab sample for analysis from all three piles. DNI will provide instructions for obtaining samples.
3. Obtain moisture samples as follows (assuming 10 ton trucks):
Jeffersonville - Truck #1 and #50
Columbus - Truck #1, #100, #200, #300, #400, #500, #600
4. Send moisture sample to laboratory for moisture determination. Samples to be dried at 105C for 12 hours. Moisture results to two decimal places.
5. Send grab samples to laboratory for chemical analysis. Analyze for ZrO_2 and SiO_2 . Report in percent by weight on dry basis to two decimal places.

Prepared by DNI
5-14-86

June 27, 1986

Having) This is not authorization to proceed. Only a plan to implement if and when the project gets a go ahead approval. Further discussion with DNI will be necessary prior to the startup of a project including precautions when taking samples and radiological monitoring.

Charlie F.

U.S. GENERAL SERVICES ADMINISTRATION
 OFFICE OF DEFENSE
 18TH & F STREET N.W.
 WASHINGTON D.C. 20405

EMERGENCY CONTACT
 KEVIN REILLY
 (202) 535-7145

NOTE:

SUBSTANCE IDENTIFICATION

DOES NOT ADEQUATELY ADDRESS RADIATION HAZARD AND GAMMA
 SUBSTANCE: THORIUM NITRATE CAS-NUMBER 13823-29-5
 RADIATION CONSIDERATIONS, FILM BADGES
 TRADE NAMES/SYNONYMS: SAFE DISTANCE FROM MATERIAL AND
 THORIUM(IV) NITRATE TETRAHYDRATE; THORIUM(4+) NITRATE; INSTRUMENT
 NITRIC ACID, THORIUM(4+) SALT (801,901); THORIUM TETRANITRATE; NA 9171;
 GSA23470 MONITORING
 AND RADIATION
 SICKNESS AND
 PREVENTION.

CHEMICAL FAMILY:
 INORGANIC SALT

MOLECULAR FORMULA: N4-O12-TH.4H2O MOL WT: 552.12

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3
 NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: THORIUM NITRATE

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
 THORIUM NITRATE:
 NONE ESTABLISHED

PHYSICAL DATA

DESCRIPTION: WHITE CRYSTALLINE MASS. MELTING POINT: 932 F (500 C) DECOMP
 SPECIFIC GRAVITY: >1 SOLUBILITY IN WATER: SOLUBLE
 SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL, ACIDS

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
 SLIGHT FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NON-FLAMMABLE

FIREFIGHTING MEDIA:
 DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
 (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:

MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE (1984 EMERGENCY RESPONSE GUIDEBOOK DOT P 5800.3, GUIDE PAGE 64).

→ FLOOD WITH WATER. CONTACT LOCAL, STATE, OR DEPARTMENT OF ENERGY RADIOLOGICAL RESPONSE TEAM. COOL CONTAINERS WITH FLOODING QUANTITIES OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING DUSTS AND FUMES, KEEP UPWIND. KEEP PEOPLE OUT OF AREA UNTIL AREA DECLARED SAFE BY PROPER AUTHORITIES. EVACUATE TO A RADIUS OF 2500 FEET FOR UNCONTROLLABLE FIRES (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
RADIOACTIVE MATERIAL

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.402:
RADIOACTIVE AND OXIDIZER

TOXICITY

THORIUM NITRATE:

48 MG/KG INTRAVENOUS-RAT LD50; 45 MG/KG INTRAVENOUS-MOUSE LD50; 8400 UG/KG INTRAVENOUS-DOG LDLO; 500 MG/KG INTRAPERITONEAL-RABBIT LDLO; 57 MG/KG INTRAVENOUS-RABBIT LDLO; REPRODUCTIVE EFFECTS DATA (PTEC); CARCINOGEN STATUS: NONE.

THORIUM NITRATE IS A RADIOACTIVE MATERIAL. IT IS HIGHLY TOXIC VIA INTRAVENOUS AND INTRAPERITONEAL ROUTES. AVOID ANY DIRECT CONTACT WITH THIS SUBSTANCE.

HEALTH EFFECTS AND FIRST AID

INHALATION:

THORIUM NITRATE:

IRRITANT.

ACUTE EXPOSURE- MAY CAUSE COUGHING, RESPIRATORY TRACT IRRITATION, DYSPNEA, AND PULMONARY EDEMA.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE MUCOUS MEMBRANE IRRITATION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

THORIUM NITRATE:

IRRITANT.

ACUTE EXPOSURE- MAY CAUSE IRRITATION AND PAIN.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED

EYE CONTACT:
THORIUM NITRATE:
IRRITANT.

ACUTE EXPOSURE- CONTACT MAY CAUSE REDNESS, PAIN, AND IRRITATION.
CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
THORIUM NITRATE:

ACUTE EXPOSURE- MAY CAUSE NAUSEA, VOMITING, DIARRHEA, ABDOMINAL CRAMPS, WEAKNESS, AND CONVULSIONS. MAY ALSO CAUSE LIVER, KIDNEY, AND BONE MARROW DAMAGE.
CHRONIC EXPOSURE- NONE KNOWN IN HUMANS.

FIRST AID- WHEN THIS CHEMICAL HAS BEEN SWALLOWED AND PERSON IS CONSCIOUS, IMMEDIATELY GIVE PERSON LARGE AMOUNTS OF WATER. AFTER WATER HAS BEEN SWALLOWED, TRY TO GET THE VICTIM TO VOMIT BY HAVING HIM TO TOUCH THE BACK OF HIS THROAT WITH HIS FINGER. DO NOT MAKE AN UNCONSCIOUS PERSON VOMIT. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

THORIUM NITRATE:

REDUCING AGENTS: MAY IGNITE WITH VIOLENT COMBUSTION OR EXPLOSION.
HEATING IN OXYGEN OR AIR BELOW RED HEAT: METAL MAY IGNITE.

POWDERED METAL: MAY IGNITE WHEN RUBBED OR CRUSHED.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF NITROGEN.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR.

CONDITIONS TO AVOID

MAY IGNITE COMBUSTIBLES (WOOD, PAPER, OIL, ETC.).

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
STOP LEAK IF YOU CAN, DO IT WITHOUT RISK. MOVE UNDAMAGED PACKAGES FROM SPILL AREA. DO NOT TOUCH DAMAGED CONTAINERS OR SPILLED MATERIAL. DAMAGE TO OUTER CONTAINER MAY NOT AFFECT PRIMARY INNER CONTAINER. FOR SMALL LIQUID SPILLS, TAKE UP WITH SAND, EARTH OR OTHER ABSORBENT MATERIAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY. DELAY CLEANUP UNTIL ARRIVAL OF INSTRUCTION OR QUALIFIED RADIATION AUTHORITY. DO NOT TOUCH DAMAGED CONTAINERS OF SPILLED MATERIAL

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION SYSTEM.

RESPIRATOR:

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON THE CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION. THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON THE DATA FOUND IN THE PHYSICAL DATA, HEALTH EFFECTS AND TOXICITY SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION:

CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE(S) WITH A FULL FACEPIECE AND A DUST FILTER.

GAS MASK WITH ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER) WITH A FULL FACEPIECE AND A PARTICULATE FILTER.

TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN CONTINUOUS-FLOW MODE.

SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY

SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A
FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO
THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE
IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY U.S. GENERAL SERVICES ADMINISTRATION
CREATION DATE: 06/19/86 REVISION DATE: 06/19/86



energy fuels exploration company

one labor center • suite 2500
1200 seventeenth street • denver, colorado 80202

(303) 623-8317
twx 910-931-2561
fax 303-595-0930

May 4, 1994

DEFENSE NATIONAL STOCKPILE CENTER
1745 Jefferson Davis Highway
Crystal Square 4, Suite 100
Arlington, VA 22202-3402

Attn: Mr. David Brown

Gentlemen:

Energy Fuels is interested in the possibility of recovering both uranium and zirconium oxide from the baddeleyite ore currently controlled by the DLA.

In order to pursue the various potential recovery routes at our NRC-licensed facility in Blanding, Utah, we need a sample of sufficient size for a series of grinding and leaching tests. While the precise quantity needed for the tests cannot be determined in advance, we believe that a 55-gallon drum of material should provide an adequate amount.

We are prepared to make the necessary arrangements for acquiring a suitable drum, obtaining a representative sample of ore, and shoveling that sample into the drum. We will also arrange for transportation from the stockpile center to our processing facility. Your assistance in providing a shovel and a fork lift to load the drum into a truck would be greatly appreciated.

We understand that you also have a small stockpile baddeleyite ore that is contaminated with soil. A small sample, 25 pounds, of that stockpile would be sufficient to test our ability to separate the soil from the ore.

We anticipate that our representative could be at the stockpile center during the week of May 16-20, if the necessary authorization can be obtained by then.

Your cooperation and prompt responses to our inquiries is greatly appreciated.

Sincerely,

ENERGY FUELS EXPLORATION

Thomas C. Pool

cc: Mr. Wallace M. Mays
Mr. Harold R. Roberts
Mr. Peter R. Wood

Facility Name: White Mesa Mill
Type: Conventional Uranium Mill

Code Number: UT-N-C-05

Location -

Site Name: White Mesa Mill
Ownership -
Owner: Energy Fuels Nuclear, Inc.

City: Blanding State: UT County: San Juan

Address: Suite 900, Three Park Central
1515 Arapáhoe, Denver, CO 80202

Mill Contact: Harold Roberts
Title: Senior Project Engineer
Telephone: (303) 623-8317

Regulatory Authority: NRC

LICENSING DATA

License Number: SUA 1358
Current Status of Operation: Active
Days of Operation/Year: 340
Project Life (years, est): 2003
Years for Complete Reclamation: 4

First Issued: 1979/08
Last Renewed in Entirety: NR
Last Amended: 1983/05
Expires: 1984/08
Surety Type: Under review
Surety Amount: NA
Surety Holder: NA

Name of Mine: NR
Type: NR
Ore Grade (%): 0.13
Metals in Ore Recovered: V
Extraction Efficiency (%): 94
Throughput (tons/day): 1995

PROCESSING OF URANIUM

Grinding Method: SAG
Leach Method: Acid
Clarification: CCD
Concentration: SX
Precipitation: NH₃
Calcining Temp: Low Fired

U₃O₈ Production
(tons/year): 799

U₃O₈ Purity (%): 90

EFFLUENT AND TAILINGS CHARACTERISTICS

Total Weight, Tailings (tons): 0.6x10⁶ Total Pond Area (acres): 333
Total Area, Tailings (acres): 333 Number Evaporation Ponds: 2 cells
Method of Tailings Disposal: Below Ground pH: 1.4-1.8
Liner Types: Synthetic Dam Height (feet, AGL): 20-37
Cover Material: Silt-sand overburden, rock, & topsoil Freeboard Height (feet): 3-5
Thickness: 9' soil, 2-4' rock Construction Method of Dam: Homogeneous compacted earthfill embankment

% Water Recycled: None
Mill Water Consumption (gpm): 300
Seepage Rate (gpm): NR

Rn Flux (pCi/m²/s): NR

Underlying Strata: Sandy silt, sandstone

RADIOLOGICAL PARAMETERS

Radionuclides Evaluated: U-Nat, Th-230, Pb-210, Ra-226, Rn-222
Method of Concentration Determination: Environmental data, MILDOS
Dose to Nearest Offsite Individual: 1.6 mrem/year (bone)
Location of Nearest Offsite Individual: 3.2 mi SSE
Dose at Site Boundary (nearest downwind): NR
Dose at Site Boundary (closest to source): NR

Text Description (page): 2-37

Date Compiled: 1982/01

Date Data Revised: 1983/10

GS-00-DS-(S)-43102

BADDELEYITE - (ZIRCONIUM DIOXIDE)

EXHIBIT A
Page 7
%

Item No.	Storage Location	File No.	Short Tons	% ZrO ₂	% SiO ₂	% U ₃ O ₈	Hf O ₂
1	GSA-FSS Jeffersonville Depot Jeffersonville, Indiana	1	1,054	65.80	22.03	0.32	0.70
2	GSA-FSS Casad Depot New Haven, Indiana	III	7,821	67.63	18.39	0.38	0.81
3	Defense Construction Supply Center Columbus, Ohio	3,6,7, and 8	<u>7,124</u>	67.63	18.39	0.40	0.71
			15,999				

ZIRCONIUM METAL POWDER (In Metal Cans)

5	GSA-FSS Casad Depot New Haven, Indiana	<u>Pounds</u> 2,000
---	---	------------------------

Typical Analysis

89% Zr (Metallic)	%
Maximum Acid Sol. Calcine	.05
" Fe	.30
" Al	.10
" H	.20
" Cl	.03
" Si	.10
" Sn	.75

NOTE: The analytical data for each item were obtained by the Government at the time of acquisition and are believed to be correct but no guarantee or warranty is made thereof

copy
faxed and
mailed
8/28/87

attn: *Henry Szczeperanski*

8/28/87 DNI



DEFENSE LOGISTICS AGENCY
DEFENSE NATIONAL STOCKPILE CENTER
1745 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VIRGINIA 22202



IN REPLY
REFER TO

DNSC-PD

04 AUG 1993

Mr. Paul R. Walker
Director of Engineering
VISION Inc.
5200 Cherry Avenue
Hudsonville, MI 49426

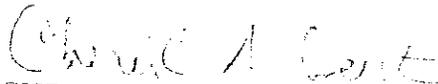
Dear Mr. Walker:

Reference is made to your interest to purchase baddeleyite ore from the National Defense Stockpile. In your letter of 14 July 1993, you requested that discussions pertaining to the sales arrangements be initiated with your contracting consultant, Mr. Arvind Vora.

I have attempted on numerous occasions to contact Mr. Vora but find this effort to be unsuccessful. Since we are interested in pursuing dialogue regarding the potential sales transactions, I request that either you or Mr. Vora forward to me your proposal to purchase the 15,999 tons of baddeleyite ore located at our New Haven, IN depot. Please be advised that transportation charges will remain your responsibility. The Government is willing however to provide the necessary outloading services. Your firm must have a current/active Nuclear Regulatory Commission (NRC) license to possess and use this source material. The ore can be shipped as LSA material documented on shipping papers - no placards are necessary.

Please forward your proposal to me by fax on (703) 607-3114. I will be out of the office for the week of August 16, 1993. Upon my return to the office on August 23, 1993, I hope to be able to begin our negotiations. Thank you for your assistance. If you subsequently need to contact me, please phone (703)607-3176.

Sincerely,


CHERYL A. DEISTER
Contracting Officer

Callie
Kewins

BADDELEYITE ORE SALE

1. MUST HAVE CURRENT/ACTIVE NUCLEAR REGULATORY COMMISSION (NRC) LICENSE TO POSSESS AND USE SOURCE MATERIAL.
2. MATERIAL CAN BE SHIPPED AS LSA MATERIAL DOCUMENTED ON SHIPPING PAPERS - NO PLACARDS NECESSARY.
3. WOULD LIKE TO ALSO REMOVE 1051 TONS OF "CONTAMINATED SOIL" (ORE & SOIL) ALONG WITH INVENTORY OF ORE AS PART OF SALES AGREEMENT. ^{clean up requirement} FOR THIS WE SHOULD REDUCE THEIR OFFER FOR THE ORE BY A RELATIVE PERCENTAGE

4. THE DEAL

- ✓ ALL THE ORE (PRICE/TON) ^{15,999 Tons of ore} fob ore site
- ✓ THE ORE/SOIL (1051 TONS)
- ✓ THEY PAY TRANSPORTATION
- ✓ WE WILL UNLOAD MATERIAL ONTO THEIR CONVEYANCE

Disposal Cost of 1051 Tons of soil & ore

TRANSPORTATION

.05¢ / TON / MILE ESTIMATE OF 1500 MILES

$$.05 \times 1051 \times 1500 = \$78,825.00$$

Disposal @ 25.00 / cu foot 14 cu ft / ton

$$\frac{14 \text{ CU FT}}{\text{TON}} \times 1051 \text{ TONS} = 14,714 \text{ cu feet} \times \frac{25.00}{\text{CU FT}}$$

$$\$367,850.00$$

TRANSPORTATION & DISPOSAL OF 1051 TONS OF SOIL/ORE
AT APPROVED UTAH SITE

$$\underline{\underline{\$446,675.00}}$$

* 1992 PRICES

444
6.5.95

Code- 586

NOTIFICATION OF STOCKPILE INSPECTION *CJ*

3448

1. NAME AND LOCATION OF DEPOT OR FACILITY
 DLA/DNSZ
 New Haven Depot New Haven, IN

2. NAME AND TYPE OF COMMODITY
 Zirconium - Ore
 Baddlelite Material

3. SERIAL NO.
 43

4. REGION
 HMQ

D A. LAST 03-Nov-94
 A B. THIS
 T
 E 01-Jun-95

8. TYPE OF STORAGE AND SPECIFIC DEPOT AREA
 Open Storage Area 7-A Pile # 111 and 111A
 Type "C" Storage Pad

7. NAME AND TITLE OF PERSON RESPONSIBLE FOR MATERIAL
 FREDERIC W. BROOKS, DEPOT MANAGER

7A. TEL. NO. OR CODE
 219-749-9544

7B. EXTENSION

INSPECTION DATA (Check and complete. Explain negative responses.)

8. STORAGE	A. Storage Facilities Are of the Type Prescribed in the Storage Manual	YES	NO
	B. Storage Facilities Are Maintained In Good Order.	X	
9. MATERIAL	A. Material is Stored in the Manner Prescribed in the Storage Manual.	X	
	B. Material is Free of Deterioration, Infestation, Contamination, Commingling, Migration and Erosion.	X	
10. RECORDS	A. Depot Manager Confirmed that all entries have been Posted.	X	
	B. Depot Postings indicate Last RR No. 19349 Dated 7-Sep-88	X	
	Last OSR No. 18296 Dated 29-Oct-92	X	
11. UNITS	Quantity indicated in Item 14. reflects Depot Postings and agrees with actual and/or computed count.	X	
12. SECURITY AND FIRE PROTECTION	Security and Fire Protection are being provided in accordance with Quality Assurance and Materials Inspection Handbook and Storage Manual Requirements.	X	
13. CONTAINERS, PILES OR OTHER UNITS	A. Material is Stored in Proper Containers (Check only if applicable)	X	
	B. All containers, Piles and/or Units Are Marked as Prescribed in the Storage Manual.	X	
	C. Condition of Containers (Give exact number in Class III under remarks)	X	
	(1) CLASS I %	(2) CLASS II %	(3) CLASS III %

14. DESCRIPTION OF CONTAINERS, PILES, OR OTHER UNITS

PRO-GRAM	TYPE (Pile, case, ingot, bale, etc.)	WIDTH	LENGTH	HEIGHT	DIAM-ETER	g. WEIGHT OF UNIT		TOTAL NUMBER OF UNITS	LBS	
						(1) GROSS	(2) NET		I. TOTAL WEIGHT	NET
NDS	Pile # 111			285'	25'			Bulk	31,981,402	
NDS	Pile 111-A			100'	20'	Contaminated Material	*****	Bulk	2,783,706	
						Total =			34,765,108	

15. REMARKS (Review all other appropriate questions contained in "guide for the inspection of stockpiled materials and storage facilities," and, if deficiencies are found, give the appropriate guide numbers and complete details in this block)

 Pile # 111-A This Pile is contaminated with base material, Mostly stone and dirt . Pile location is adjacent to Pile # 111. Weight taken from depot 46 record card. Material is accessible by truck and/or Rail service. Signs for "Radioactive Material" are posted. "Radioactive" survey report is attached.

16. RECOMMENDATIONS (Not to be construed by storage depot or facility as authorization to proceed with remedial measures beyond the scope of usual authority)

None

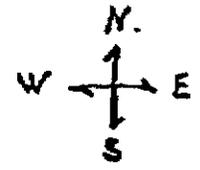
RECEIVED
 1995 MAY 30 AM 7:57
 DLA/M
 11/11/95

17. DISTRIBUTION
 Q.A. DIVISION
 ORIGINATING DEPOT
 FINANCE
 Q. A. ZONE BRANCH
 STOCKPILE OP. DIVISION
 CONTRACTOR
 SUPERVISORY Q.A.
 CONTRACTING OFFICER
 Other, HMQB, DNSCO

18. NAME OF INSPECTOR (Type or print)
 Clarence McDaniel, QAS

18A. SIGNATURE
Clarence McDaniel

18. DATE OF SIGNATURE
 01-Jun-95



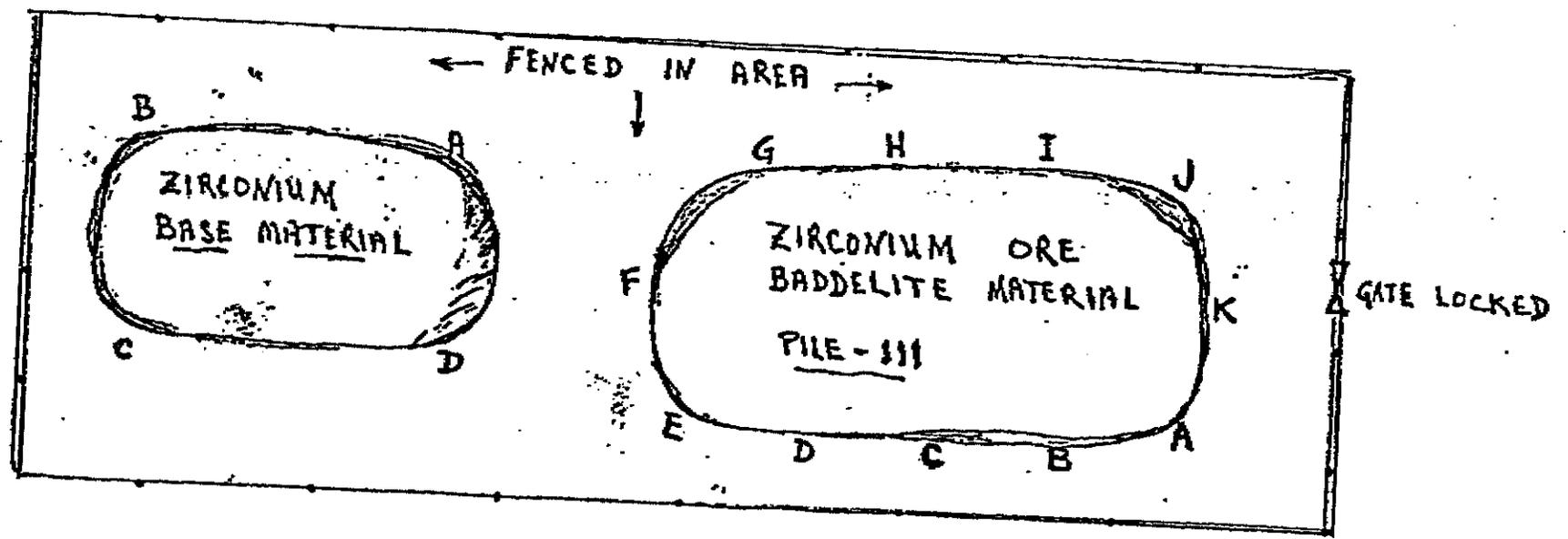
Note: Readings are in mr/hr
Date: 1 Jun 95

RADIOLOGICAL MONITOR SURVEY
Zirconium Ore Pile - 111 & Base Material

Pile # 111		A	B	C	D	E	F	G	H	I	J	K
Contact Reading		2.25	2.00	2.30	3.10	2.20	2.35	2.10	2.75	2.60	2.40	2.80
1 Foot "		1.00	1.20	1.25	1.50	1.60	1.20	1.50	1.25	1.25	1.30	1.60
6 Foot "		.60	.60	.50	1.00	1.00	.60	.50	.70	.70	.60	.60
9 Foot "		.40	.30	.40	.70	.50	.30	.30	.50	.60	.50	.50
At Fence "		.20	.22	.22	.25	.21	.25	.25	.30	.25	.30	.20

Base Pile		A	B	C	D
Contact Reading		0.05	0.15	0.30	0.09
1 Foot "		.04	.15	.10	.05
6 Foot "		.04	.05	.06	.05
9 Foot "		.03	.04	.04	.05
At Fence "		.03	.03	.04	.04

File # 111
(ON CONTACT) Base Material (more stone than ore)
MAX: 3.10 mr/hr MAX: 0.15
MIN: 2.00 mr/hr MIN: 0.04



MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WHSE LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
Open Area 7-A Pile # 111 and 111-a	Zirconium Ore Baddelite Material	Portable FH 40F6 AND Eberline E-120	Contact	X1	3.10
			1 ft.	X1	1.50
			6 ft.	X1	.75
			12 ft.	X1	.35

MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WHSE LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
215-2 Bays 41&42 46, 52-54 And 62	Rare Earth Sodium Sulphate	Portable FH 40F6 AND Eberline E-120	Contact	X1	0.3 - 0.6
			1 ft.	X1	0.3
			6 ft.	X1	0.3
			12 ft.	X1	0.2

(a) The first survey involves the radon selection of (16) locations along the perimeter fence. At each location three (3) readings were taken with the exception of O which was not selected. All readings were recorded on a chart of perimeter fence. The average background readings were well within the depot background level of detection of 0.02 - 0.03. mr/hr (See attached chart)

(b) The second portion of this survey involves recorded reading at each entrance door of warehouse 214 and 215 which licensable commodities are stored, by bay and section, See exhibit attached for location and list of four (4) readings at each location.

(c) The third portion of this survey involved the recording of reading at two (2) Zirconium (Badelite) Ore piles one being the base material which is mostly stone, from previously stored locations. Five (5) reading were taken at eleven (11) locations. This material is completely fenced with a gate and pad lock. All radioactive signs are in place. Readings for pile 111 Max 3.10 mr/hr and Min 2.00 mr/hr. The contaminated pile 111-A was Max 0.15 mr/hr and Min 0.04 mr/hr.

(d) The fourth portion of the survey involves recording readings on the warehouse stored commodities, Four (4) separate reading were taken. (See attached exhibit for data information.

Conclusion:

The perimeter fence line readings indicates that concentration of radiation released (does not exceed) background for any of selected locations surveyed at random. Which is 0.02 - 0.03 mr/hr.

Background Radiation reading established during survey from (30 to 50 feet) to nearest building, using the Dosimeter FH40F6 and the E-120 Geiger Counter, were 0.02 - 0.03 mr/hr, which is background at this depot.

The overall storage of these licensable commodities is satisfactory and in compliance with DLA/DNSZ directives and NRC revised 10CFR part 20 Sub part F.

4. Equipment Instructions:

Instrument	Model/Type	Serial No.	Calibration Date
Eberline - Geiger Counter	E-120	10122	31Oct94
Eberline - Geiger Counter	E-520	3135	Out of servic
FAG 40F6 Dosimeter		5-0002	05Aug94

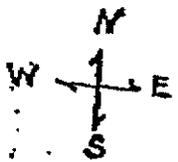
Above listed instrument are on an annual recalibration. With exception of the E-520 which is on as needed basis.

(b) Personnel Monitoring Equipment

Instrument	Model/Type	Serial No.
Charger Dosimeter	FEMA-750	A-004264
Minometer II	687-0	357
Transistorized Charger (Reader Victoreen) V-750	362 357	
	6 V-138 Dosimeter	39403/50793

Note: Readings are in mr/hr

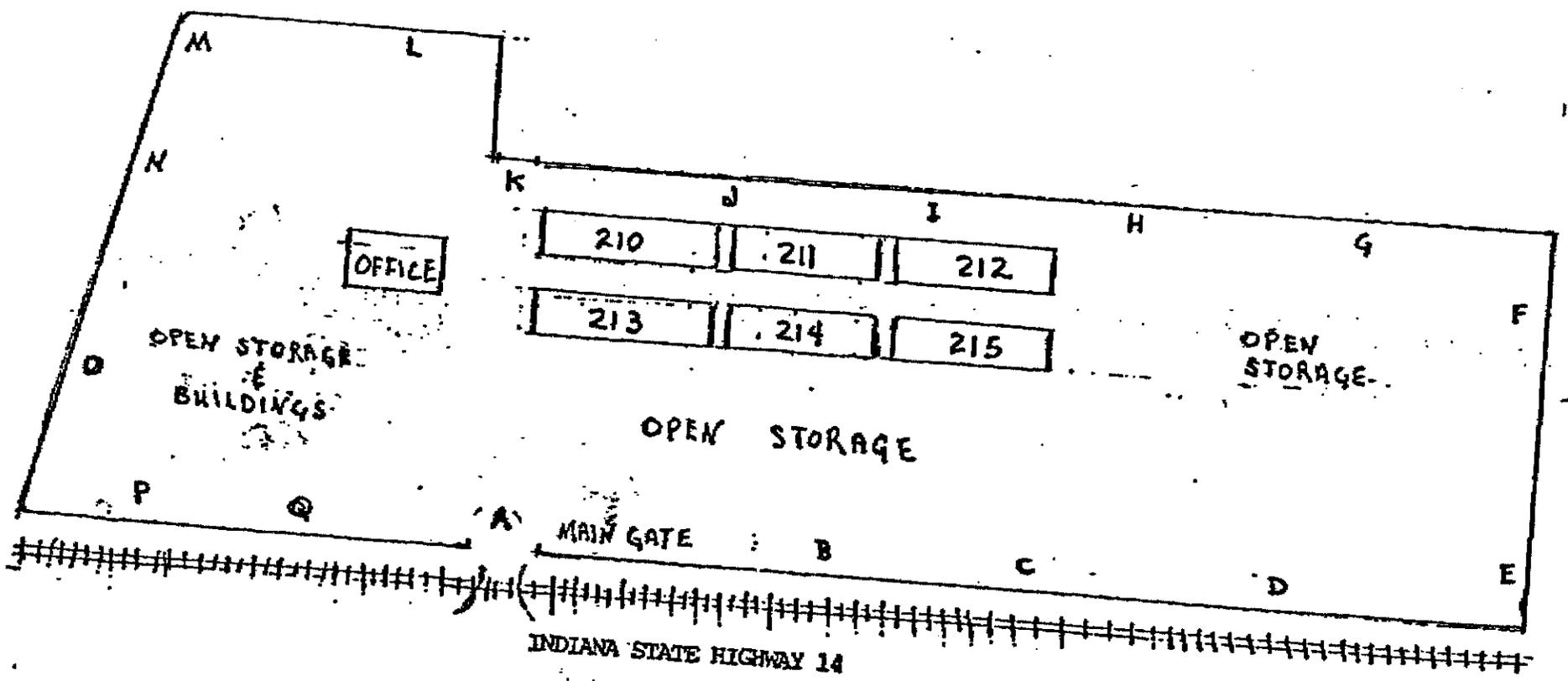
RADIOLOGICAL MONITOR SURVEY
PERIMETER FENCELINE
NEW HAVEN DEPOT



Locations

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q
	.013	.014	.014	.015	.015	.017	.016	.014	.018	.015	.015	.014	.015	.018	.017	.018
	.017	.015	.017	.018	.019	.019	.019	.020	.019	.017	.017	.016	.019	.020	.019	.020
	.020	.018	.022	.020	.020	.020	.021	.022	.020	.021	.020	.018	.020	.021	.022	.021
MIN:	.013	.014	.014	.015	.015	.017	.016	.014	.018	.015	.015	.014	.015	.018	.017	.018
MAX:	.020	.018	.022	.020	.020	.020	.021	.022	.020	.020	.020	.018	.020	.018	.017	.018

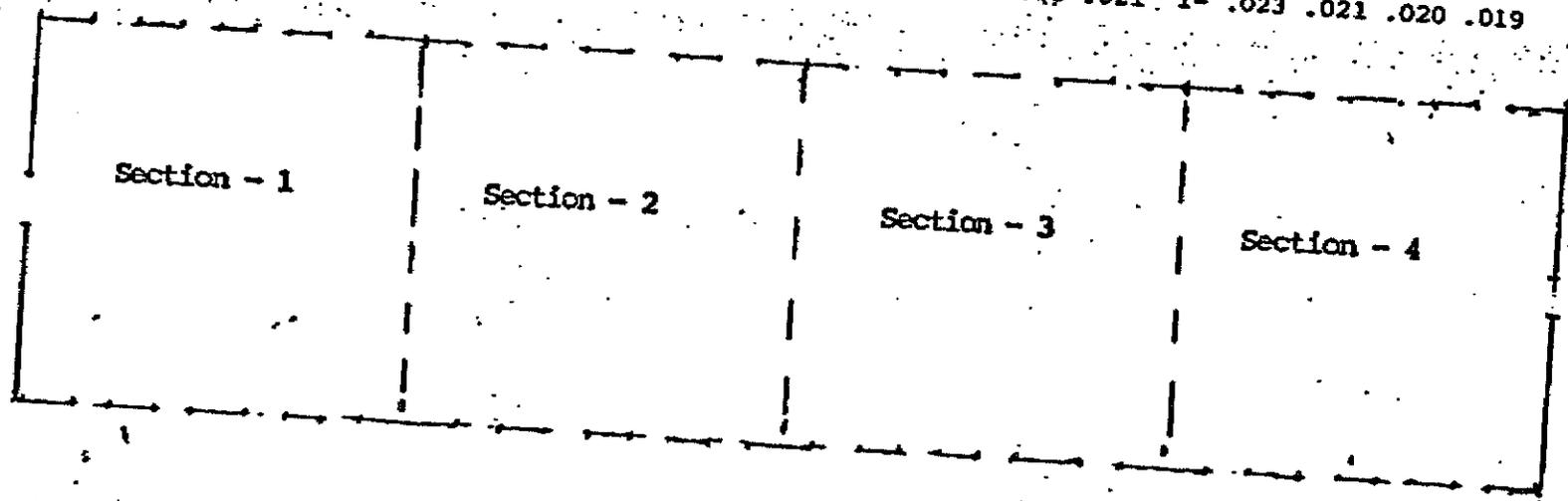
Depot Background Radiation is 0.02 - 0.03



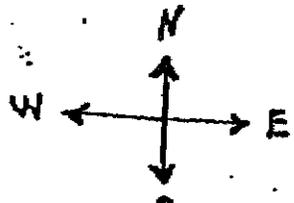
Warehouse # 214, Section 3 & 4
 New Haven Depot, IN
 Each WHSE has (4) sections 180' wide X 240' long
 Radioactive material is located in section
 Date of readings 30 May 95
 All readings are in mr/hr
 High average at door interance is 0.02 - 0.03 mr/hr

- 1. = Door Entrance
- 2. = 1 ft.
- 3. = 3 ft.
- 4. = 6 ft.
- 5. = 9 ft.

4-	.021	.022	.019	.017	4-	.023	.022	.021	.020
3-	.023	.024	.020	.018	3-	.020	.018	.018	.017
2-	.026	.024	.019	.022	2-	.021	.019	.018	.017
1-	.022	.021	.018	.021	1-	.023	.021	.020	.019



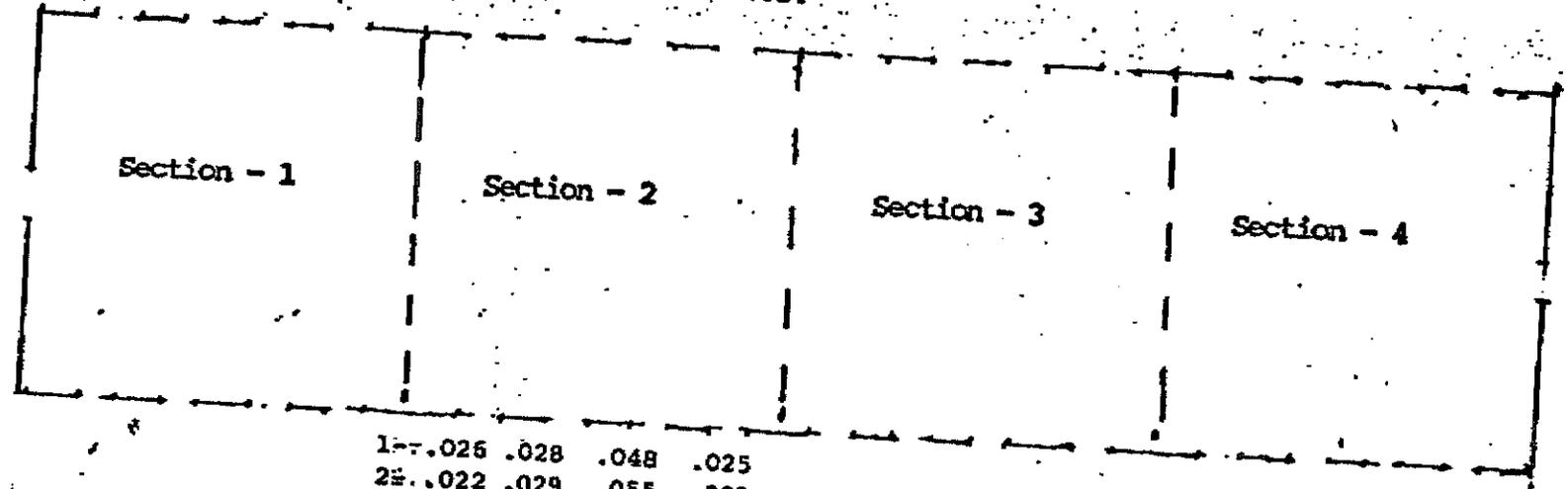
1-	.022	.025	.024	.021	1-	.020	.021	.018	.019
2-	.020	.019	.018	.017	2-	.022	.021	.020	.018
3-	.020	.021	.017	.017	3-	.019	.018	.018	.017
4-	.021	.020	.018	.017	4-	.021	.020	.018	.018



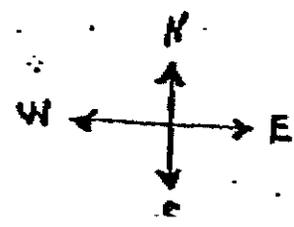
Warehouse # 215, Section 2
 New Haven Depot, IN
 Each WHSE has (4) sections 180' wide X 240' long
 Radioactive material is located in section
 Date of readings 30May95
 All readings are in mr/hr
 High average at door interance is .02 - .03 mr/hr

- 1. = Door Entrance
- 2. = 1 ft.
- 3. = 3 ft.
- 4. = 6 ft.
- 5. = 9 ft.

1-	.023	.025	.025	.025
2-	.023	.024	.024	.026
3-	.024	.025	.026	.022
4-	.022	.023	.024	.025
5-	.022	.024	.021	.024



1-	.026	.028	.048	.025
2-	.022	.029	.055	.023
3-	.022	.023	.050	.021
4-	.018	.023	.042	.024
5-	.017	.020	.028	.022



MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WHS# LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
213-3 Bays 9, 14, 15 & 18	Columbium Tantalum Source Material	Portable FH 40F6			
214-4 Bays 41 & 42 & 45 51/61 & 52/62	Tantalum Natural Mineral	Eberline E-120	Contact	X1	0.3 - 0.6
			1 ft.	X1	0.3
			6 ft.	X1	0.2
			12 ft.	X0.1	0.08

MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WHS# LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
214-3 Bays 9 & 16	Columbium Tantalum Source Material	Portable FH 40F6			
214-4 Bays 42 & 43	Columbium Natural Mineral	AND Eberline E-120	Contact	X1	0.3 - 0.8
			1 ft.	X1	0.3
			6 ft.	X1	0.1
			12 ft.	X0.1	0.06

MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WHSE LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
214-3 Bays 27 & 28	Tantalum Pentoxide Columbium Source Natural Minerals	Portable FH 40F6 And Eberline E-120	Contact	X1	.0.5
			1 ft.	X1	0.3
			6 ft.	X1	0.2
			12 ft.	X1	0.1

MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WHSE LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
214-3 Bay 13	Columbium Tantalum Source Material Tantalite Chemically Processed	Portable FH 40F6 And Eberline E-120	Contact	X1	.06
			1 ft.	X1	.05
			6 ft.	X1	.05
			12 ft.	X1	.05

MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WISE LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
Open Area 7-A Pile # 111 and 111-a	Zirconium Ore Baddelite Material	Portable FH 40F6 AND Eberline E-120	Contact	X1	3.10
			1 ft.	X1	1.50
			6 ft.	X1	.75
			12 ft.	X1	.35

MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WISE LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
215-2 Bays 41&42 46, 52-54 And 62	Rare Earth Sodium Sulphate	Portable FH 40F6 AND Eberline E-120	Contact	X1	0.3 - 0.6
			1 ft.	X1	0.3
			6 ft.	X1	0.3
			12 ft.	X1	0.2

MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WHE LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
214-4 Bay 45	Tantalum Penoxide Columbium Source Mat. Chemically Processed	Portable FH 40F6 And Eberline E-120	Contact	X0.1	.02 - .04
			1 ft.	X0.1	.02
			6 ft.	X0.1	.02
			12 ft.	X0.1	.02

MONITOR RADIATION SURVEY

NOTE: All readings in mr/hr

WHE LOC	LSA COMMODITY	MONITOR USED	DISTANCE	RANGE	DOSE RATE mr/hr
		Portable FH 40F6	Contact	X1	
			1 ft.	X1	
			6 ft.	X1	
			12 ft.	X1	

DEFENSE LOGISTICS AGENCY
Inter-Office Memorandum

IN REPLY
REFER TO

JUL 2 1992

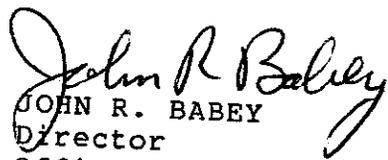
DNSC-R (RSTEVENS/746-7334/lgc)

SUBJECT: Baddeleyite Ore Market Survey

TO: DNSC-O

1. Enclosed as requested is an initial market review for baddeleyite (zirconium oxide) ore prepared by Richard Stevens, Mining Engineer. On the basis of significant industry and Government contacts made during this review the subject material was initially determined to be not commercially marketable. At this time, we have not heard further from two firms who had requested samples or expressed limited interest in the material.
2. If you have any comments or questions at this time let us know.

cc: DNSC-D
DNSC-P


JOHN R. BABEY
Director
Office of Planning
and Market Research

DEFENSE LOGISTICS AGENCY
Inter-Office Memorandum

IN REPLY
REFER TO

DNSC-R (RSTEVENS/746-7334/lgc)

SUBJECT: Market Evaluation of Baddeleyite (Zirconium Dioxide) Ore

TO: Director, DNSC-R

In response to the request of 13 Mar 92 from DNSC-O a preliminary market review was initiated to determine if the subject baddeleyite ore could be disposed of through commercial channels. After extensive contacts with industry and Government representatives (see ATTACHMENT 1) it was initially determined that this material was not commercially marketable. The only way to dispose of/abandon this ore, which contains naturally occurring low-level radioactive material, would be to ship it to an approved radioactive disposal site at a cost of \$6.2 to \$43 million. The cost to ship and bury only the contaminated soil would be \$0.5 million. These estimated costs (see ATTACHMENTS 2 & 3) would cover handling, transportation, and burial at nuclear materials disposal sites in Nevada, Washington, South Carolina, and Utah or in the waste dumps of uranium mine/mill operations in the Four Corners area of Colorado/Utah/New Mexico/Arizona. The data in ATTACHMENT 4 cover the costs of transportation and burial of soil contaminated with low level radiation. To account for unexpected costs which might be encountered a 10 percent contingency fee has been included in these calculations.

Since the site at Barnwell, SC is expected to become unavailable by the end of the year (December 92) the only sites which could be used for burial of this radioactive material are at Clive, UT (80 miles west of Salt Lake City); Hanford, WA; Beatty, NV; and at waste dumps associated with uranium mine/mill facilities.

Two commercial firms which had originally indicated a tentative interest in this material were:

1) Teledyne Wah Chang Albany (TWCA)
Albany, OR

and

2) Magnesium Elektron, Ltd (MEI)
Flemington, NJ

These companies have the required NRC license which allows them to handle low level radioactive materials. But both companies have decided not to attempt to process this material after lengthy discussion and an exchange of information.

In addition, interest has been expressed by three uranium firms, UMETCO of Grand Junction, CO; Uranium Resources of Dallas, TX; and Energy Fuels Corp. of Denver, CO. UMETCO and Uranium Resources have offered to remove the radioactive material and dispose of the remainder for a fee (about \$400/st plus transportation costs). The third uranium processor, Energy Fuels Corp., has expressed an interest in processing the radioactive

material from the baddeleyite and has requested a small sample to evaluate in their processing operations. A ten pound sample has been sent to them for testing.

Recent interest in this material, for use in the manufacture of ZrO₂ refractories, has also been expressed by Zedmark Co., which is currently evaluating the technical possibility of using the baddeleyite. Zedmark's manufacturing plants are located in Slippery Rock, PA and in Dover, OH. Both plants are within about 290-300 miles of the Casad depot at New Haven, IN. Material would be transported to Slippery Rock by truck and to Dover by rail.

To date (10 June 1992) Energy Fuels Corp. and Zedmark appear to be the best (and only) prospective buyers. On the basis of this interest further cost information was estimated (see ATTACHMENT 4) assuming that the ore could be sold but that the contaminated soil would have to be buried at an approved low-level radiation landfill. These calculations indicate that DNSC would have to pay about \$0.5 million to bury this soil. It is assumed that this cost would be more than offset by the monies received from the baddeleyite sales. One option that was considered by R and O was to offer the baddeleyite ore to uranium processors who could remove the radioactive elements and then sell the radiation free residue to zirconium producers. No one has expressed an interest in this option, probably because of the high transportation rates and handling costs which would be associated with this procedure (rail: IN-UT, truck: UT-mill, truck: mill-UT & rail: UT-OR).

RECOMMENDATIONS:

1) DNSC should continue to evaluate methods of selling the subject ore to Energy Fuels Corporation and Zedmark at a nominal fee. The companies buying this material would be responsible for arranging for and paying the transportation charges associated with moving the baddeleyite from the depot at New Haven to the companies processing plant(s). 2) Because many of the people contacted would like to have a sample of the baddeleyite to evaluate in their processing operations it is recommended that P issue an announcement in the Commerce Business Daily (CBD) that anyone interested in obtaining samples should submit an administrative fee of \$X to DNSC-PD and make their own arrangements with a commercial carrier to pick up the material at New Haven, IN, and pay for transportation to their plant site. The CBD notice should include the chemical analysis and radioactivity level "of record." The notice should also indicate that anyone desiring a sample would be required to have an NRC license for handling low-level radioactive materials.

DNSC points of contact (POC) for interested parties desiring further information are:

Market & Technical	- Richard Stevens	- phone: (703) 746-7334
Environmental	- Kevin Reilly	- phone: (703) 746-7338
Contracting	- Cheryl Deister	- phone: (703) 746-7307
and Legal	- Essie Schloss	- phone: (703) 746-7248

3) A "working group" should be convened to review the problems that are associated with the disposal/abandonment of this baddeleyite material and to make recommendations/proposals to the Administrator for removing this radioactive material. Members of this "working group" should represent DNSC-R,-O,-P and -G.



RICHARD F. STEVENS, JR., PE
Mining Engineer
Office of Planning and
Market Research