UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 12, 2000

Mr. J. William Lessig
Plant Manager
Honeywell International Inc.
P.O. Box 430
Metropolis, IL 62960

SUBJECT: HONEYWELL REQUEST TO SEND CALCIUM FLUORIDE WASTE CONTAINING LESS THAN 0.05 PERCENT BY WEIGHT SOURCE MATERIAL TO WASTE CONTROL SPECIALISTS (TAC NO. L31352)

Dear Mr. Lessig:

I am responding to your letter dated June 5, 2000, informing the US Nuclear Regulatory Commission (NRC) of your plan to transfer approximately 215,212 cubic feet of calcium fluoride waste, under 10 CFR 40.13, "Unimportant Quantities of Source Material," to Waste Control Specialists Inc. (WCS), in Texas. We have completed a technical review of the information you submitted by letters dated June 5, and July 26, 2000. 10 CFR 40.13 (a) states that, "Any person is exempt from the regulations in this part and from requirements for a license set forth in section 62 of the Act to the extent that such person receives, possesses, uses, transfers or delivers source material in any chemical mixture, compound, or alloy in which the source material is by weight less than one-twentieth of one percent (0.05 percent) of the mixture, compound, solution, or alloy." The calculated dose to any individual likely to result from transfer of the material is bounded by requirements set forth in "Staff Requirements - SECY 99 - 259 - Exemption in 10 CFR Part 40 for Materials less than 0.05 percent Source Material - Options and Other Issues Concerning the Control of Source Material," dated March 9, 2000, in which the Commission instructed the NRC staff to consider the calculated dose associated with the transfer of unimportant quantities of source material, when reviewing requests such as yours. Based on that directive, therefore, the NRC staff will allow transfers containing less than 0.05 percent by weight source material for permanent disposal if the expected dose does not exceed 100 mrem/yr and notify the Commission when the expected dose exceeds 25 mrem/yr.

The Metropolis Works laboratory indicates that the calcium fluoride waste has an average concentration of 430 ppm (291.1 pCi/gm) of natural uranium and consists of 80% calcium fluoride and 20% calcium hydroxide. An independent analysis was performed by NRC regional staff which revealed even lower concentrations of natural uranium in the range of 303 ppm (205 pCi/gm). This provides the data necessary to confirm that the waste contains source material that is less than 0.05 percent by weight (500 ppm). According to the calculations provided, the external dose was calculated by performing a direct radiation survey of the material. Airborne measurements were not taken because the moisture content of the material is between 30% to 44%. However, for purposes of this request, assumptions were made to include a conservative dust loading of 1 mg/m^3 with radiation workers wearing no respirator protection. NRC staff agrees with the data provided and the assumptions made to calculate the dose. The analysis resulted in an estimated external dose of 5 mrem/yr and an internal dose of 0.5 mrem/yr with a total effective dose equivalent unlikely to exceed 6 mrem/yr.

The public dose will be considerably less than 6 mrem/yr since there is no direct contact with the material.

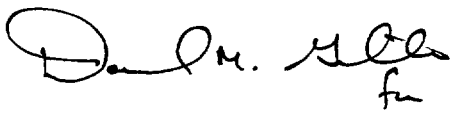
The NRC staff has performed a dose calculation using the RESRAD computer model to ensure that disposal of this material at the WCS facility would not result in a dose to the public exceeding 25 mrem/yr. The conservative resident farmer scenario, using hydrogeologic parameters specific to the WCS facility, was analyzed. The maximum resulting dose, calculated out to 1000 years, was significantly less than 25 mrem/yr.

Since the calcium fluoride waste contains source material under 0.05 percent by weight as specified in 10 CFR 40.13(a), and the disposal of the material would not result in a dose to the public exceeding 25 mrem/yr no additional NRC action is required for the transfer of this material for disposal at WCS. It is noted, however, that the other requirements, such as those imposed by the Texas Natural Resource Conservation Commission and the Texas Department of Health, may apply to the transfer and disposal of the material. Therefore, we suggest you contact the Texas officials on this matter.

If you have any further questions, please contact Leslie Fields of my staff at 301-415-6267.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,



Philip Ting, Chief
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

Docket 40-3392
License SUB-526

Enclosures:
1. Ltr requesting transfer of calcium fluoride
   dtd 6/5/00
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Docket 40-3392 ADAMS Reading File Folder Region III DWiedeman, RIII FCLB r/f RKrsek, RIII

OFC	FCLB		FCLB		FCLB		FCLB		STP		OGC	
NAME	LFields*		PShea*		MLamastra*		JOlivier*		Plohaus*via email		STreby*	
DATE	08/23/00		08/24/00		08/24/00		08/29/00		09/08/00		08/29 /00	

OFC	IMNS		DWM		FCLB		FCLB	
NAME	DCool*		LCamper*		LRoché*		PTing	
DATE	09/05/00		09/01/00		09/11/00		09/ 12/00	

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OFC	FCLB		FCLB		FCLB		FCLB		STP		OGC	
NAME	LFields*		PShea*		MLamastra*		JOlivier*		Plohaus*via email		STreby*	
DATE	08/23/00		08/24/00		08/24/00		08/29/00		09/08/00		08/29 /00	

OFC	IMNS		DWM		FCLB		FCLB	
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Docket 40-3392 ADAMS Reading File Folder Region III DWiedeman, RIII FCLB r/f RKrsek, RIII

OFC	FCLB		FCLB		FCLB		FCLB		OPA		OGC	
NAME	LFields		PShea		MLamastra		JOlivier		PLohaus		STreby	
DATE	08/23/00		08/24/00		08/24/00		08/ /00		08/ /00		08/ /00	

OFC	IMNS		DWM		FCLB		FCLB	
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OFC	FCLB	E	FCLB	DE	FCLB		FCLB	E	OPA		OGC	
NAME	LFields	LCF	PShea	PWS	MLamastra		JOlivier	JWM	PLohaus		STreby	
DATE	08/23/00		08/24/00		08/24/00		08/23/00		08/ /00		08/ /00	

OFC	IMNS		DWM		FCLB		FCLB	
NAME	DCool		LCamper		LRoché		PTing	
DATE	08/ /00		08/ /00		08/ /00		08/ /00	

From: Kevin Hsueh
To: Leslie Fields
Date: Fri, Sep 8, 2000 11:10 AM
Subject: Honeywell's Request to Send CaF2 to WCS

STP has concurred on the package with attached comments.

CC: Frederick Combs, Kathaleen Kerr

MEMORANDUM TO : Leslie Fields, NMSS/FCSS

FROM: Frederick C. Combs, Deputy Director
Office of State and Tribal Programs

DATE: 8/30/2000

SUBJECT: Honeywell's Request to Send CaF_2 to WCS

We have reviewed the response letter to Honeywell International Inc. and offer the following suggestion for your consideration:

Since the Honeywell facility is located in Illinois, for courtesy purpose we suggest that you send a cc copy of the letter to the Illinois Agreement State program director listed below:

Thomas W. Ortciger, Director
Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

We appreciate the opportunity you have provided to review the letter at this time. If you have any questions, please contact me at 301-415-2792 or Kevin Hsueh at 301-415-2598.

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Docket 40-3392 ADAMS Reading File Folder Region III DWiedeman, RIII FCLB r/f RKrsek, RIII no legal objection SHO

OFC	FCLB	E	FCLB	DE	FCLB		FCLB		OPA		OGC subject to changes noted
NAME	LFields	LF	PShea	PS	MLamastra		JOlivier		PLohaus		STreby
DATE	08/23/00		08/24/00		08/24/00		08/ /00		08/ /00		08/29/00

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OFC	FCLB	FCLB	FCLB	FCLB	OPA	OGC
NAME	LFields	PShea	MLamastra	JOlivier	PLohaus	STreby
DATE	08/23/00	08/24/00	08/24/00	08/ /00	08/ /00	08/ /00

OFC	IMNS	DWM	FCLB	FCLB
NAME	DCool (memo)	LCamper	LRoché	PTing
DATE	08/ 5 /00	08/ /00	08/ /00	08/ /00

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NAME	LFields	PShea	MLamastra	JOlivier	PLohaus	STreby
DATE	08/13/00	08/24/00	08/24/00	08/ /00	08/ /00	08/ /00

OFC	IMNS	DWM	FCLB	FCLB
NAME	DCool	LCamper	LRoché	PTing
DATE	08/ /00	08/31/00	08/ /00	08/ /00

9/1/00

Honeywell

Specialty Chemicals
Honeywell
Route 45 North
P.O. Box 430
Metropolis, IL 62960
618 524-2111
618 524-6239 Fax

June 5, 2000

Certified Mail:
7080-7103

U. S. Nuclear Regulatory Commission
Attention: Ms. Leslie Fields
Division of Fuel Cycle Safety &
Safeguards, NMSS
Washington, DC 20555-0001

Subject: Radioactive Waste Burial
Calcium Fluoride (CaF_2)
Less than 0.05% Source Material, 10 CFR Part 40.13

Dear Ms. Fields:

Currently, Honeywell is working with the Illinois Environmental Protection Agency (IEPA) to resolve a Notice of Violation (NOV) received for Pond "A" calcium fluoride surface impoundment. The calcium fluoride stored within this surface impoundment contains source material at an average concentration of 430 PPM (291.1 pCi/gm).

In an effort to resolve the NOV, Honeywell is proposing to clean close "A" Pond. One of the options that will be presented to IEPA to achieve clean closure is to bury this material at Waste Control Specialist in Texas. This material has been analyzed for T.C.L.P., paint filter test, and natural uranium. It is our opinion, based on the applicable agency guidance and the analytical results, the material stored in "A" Pond is a non-hazardous waste with the exception of the source material contamination.

We would like to ship this material (approximately 167,000 ft^3) for burial at Waste Control Specialist under 10 CFR Part 40.13, "Unimportant Quantities of Source Material".

We would appreciate a timely review and approval for this request.

If you need any additional information, please contact Mr. Hugh Roberts at 618-524-6349 or Mr. Marshall Shepherd at 618-524-6238.

Sincerely,

J. William Lessig
Plant Manager

JWL/sm

Enclosure 1

cc: M. Shepherd
H. Roberts
C. Bibb

Chief, Fuel Cycle Branch
NRC Region III
801 Warrenville Road
Lisle, IL 60532-4351

Specialty Chemicals
Honeywell
Route 45 North
P.O. Box 430
Metropolis, IL 62960

618 524-2111
618 524-6239 Fax

July 26, 2000

Certified Mail
7080-7394

U.S. Nuclear Regulatory Commission
Attention: Ms. Leslie Fields, Project Manager
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety & Safeguards, NMSS
Office of Nuclear Material Safety & Safeguards
Washington, DC 20555-0001

Subject: Calcium Fluoride less than 0.05%
By Weight Source Material
Docket No. 40-3392, Lic. No. SUB-526
TAC No. L31352

Dear Ms. Fields:

This letter refers to your letter dated June 14, 2000 requesting additional information, and the conference telephone call between your staff and my staff on July 25, 2000 for disposal of calcium fluoride at Waste Control Specialists in Texas.

NRC Question:

What are the chemical compositions of the waste? Is the waste classified as mixed waste? In what physical forms (solid, powder, dry, or wet) is the waste?

Honeywell Answer:

The material is a non-hazardous waste that has a chemical composition of calcium fluoride (CaF_2) and 20% hydrated lime. It will not be classified as a mixed waste. The material will be shipped as a solid with a moisture range between 30 and 44%. Refer to the attached Waste Profile Sheet for WCS (Attachment No. 1) and the TCLP report (Attachment No. 2) for additional information.

NRC Question:

Identify the radionuclides that are present in the waste material and their concentrations. Present your answers in weight percent.

Honeywell Answer:

The major radionuclides analyzed on a dry basis from RSA Laboratories, Inc. are as follows:

Radionuclide	pCi/gm	µg/g	Dry Basis %
U-238	129.6	385.1	0.038
U-234	135.3	0.022	2.2^{E-6}
U-235	5.6	2.60	2.6^{E-4}
Th-234	108.1	4.67^{E-9}	4.67^{E-13}
Pa-234m	157.9	2.27^{E-13}	2.27^{E-15}
Ra-226	<2.3	$<2.32^{E-6}$	$<2.32^{E-10}$
Pb-214	0.1	3.05^{E-15}	3.05^{E-19}
Bi-214	0.5	1.13^{E-14}	1.13^{E-18}
Pb-212	0.1	7.20^{E-14}	7.2^{E-18}

NRC Question:

What is the projected dose of the source material from the point it leaves the site boundary to the burial facility which should include dose to persons transporting the waste material and burying the waste material? What is the leachability of the waste? Please provide the name of computer models, assumptions used to determine the dose, and a hard copy of the computer model solution. Present your answers in mrem/yr. for both the internal and external dose.

Honeywell Answer:

The internal dose calculations are based on the laboratory results from RSA Laboratories. The RSA laboratory report is Attachment No. 3. We also provided Mr. Darrel Wiedeman, NRC Region III senior inspector with a dried composite sample for radionuclide analysis. The NRC data indicated 205 pCi/gm or 303 PPM U(nat.). The Metropolis Works Laboratory results indicate 291 pCi/gm or 430 PPM U(nat.).

It is estimated the operators and laborers could receive a calculated internal dose of 0.45 mrem/yr. plus 5.0 mrem/yr. external for a total of 5.5 mrem/yr. EDE. Because the calculated dose is low we did not calculate a dose for individuals transporting the material either by rail or highway in closed steel roll off boxes. We also have not calculated any dose to the general public. WCS employees may receive approximately the same dose of 5.5 mrem/yr. for unloading the material. Attachment No. 4 contains the modeling data.

The occupational external deep dose for operators working in the EPF/CaF_2 facility for a two year period indicates zero exposure, and this confirms our calculations. The TLD vendor does not report any exposure less than 10 mrem.

The external dose was calculated using the surface reading from a calibrated Ludlum Model 3 survey meter. The surface reading of the material was 40 uR/hr. and the area background reading was 30 uR/hr. The reading for the track-hoe operator was also 30 uR/hr. Shielding and distance was not used in the external dose calculations, only time. This external dose calculated is a very conservative dose because the track-hoe operator is not located next to the material . The dose assigned is 10 uR/hr. or 5.0 mrem/yr.

One other item requires clarification the original request letter, dated June 14, 2000 indicated a total volume of material for burial at 167,000 Ft^3. This volume should be changed to 215,212 Ft^3.

If you need any additional information, please contact Mr. Hugh Roberts at 618-524-6349.

Sincerely,

J. William Lessig by B.M. Vandermeulen

J. William Lessig
Plant Manager

JWL/sm

Cc: M. Shepherd
H. Roberts
C. Bibb
R. Perry

Chief, Fuel Cycle Branch
NRC Region III
801 Warrenville Road
Lisle, IL 60532-4351

Attachment No. 1

Bill Dornsife
Sales Representative
Mailing Address:
1710 W. Broadway
Andrews, TX 79714

Waste Profile Sheet

Exhibit "B"

WCS **Waste Control Specialists L.L.C.**

Profile Number
FedEx/UPS Address:
9998 W Hwy 176
Eunice, NM 88231

WCS EPA ID # TXD988088464
WCS State ID # 50358

Corporate Office/Sales: Phone # (888) 492-7552
Fax # (281) 260-0141

Site: Phone # (888) 789-2783
Fax # (505) 394-3427

List any unacceptable treatment types:

Section 1: Generator Information

Company Name: Honeywell, Inc.
Address: P.O. Box 430
City, State, Zip: Metropolis, Illinois 62960
Contact Name: Rhonda S. Perry – RCRA or Hugh Roberts – RAD
Title: Environmental Supervisor / Health Physics Supervisor
24 Hour: 618-524-6201

US EPA ID #: ILD006278170
State ID #: 1278540002
Phone #: 618-524-6211
Fax #: 618-524-6358

Certificate of Disposal: ■ Yes ☐ No Technical Contact: Same as Contact Name

Status: ■ Industrial ☐ Non-Industrial ☐ CESQG ☐ Municipal ☐ Oilfield ☐ Oilfield Non-Exempt

Section 2: Billing Information (☐ Same as above)

Company Name: Honeywell, Inc.
Address: P.O. Box 3133
City, State, Zip: Baton Rouge, LA 70821

Contact: Glynna Duplessis
Phone #: 225-376-3812
Fax #: 225-376-3848

Section 3: General Description of the Waste

Waste Name: Calcium Fluoride Sludge

Detailed Description of Process Generating Waste: Wastewater Treatment

Physical State at Room Temperature: 0 % Liquid 0 % Solid 100 %Sludge 0 % Debris

Number of distinct layers/phases: ■ 1 ☐ 2 ☐ ___ Color (s): White/Light Grey

For LIQUIDS only:
Turbidity: ☐ Transparent (clear) ☐ Translucent (cloudy) ☐ Opaque ☐ Other: ___
Viscosity: ☐ Light (water-like) ☐ Medium (syrup-like) ☐ Heavy (warm tar-like)

Analytical data provided by the Generator (attached):
☐ Volatiles ☐ Semi-Volatiles ☐ PCB's ■ Metals ■ Other: Paint Filter

Container Type and Size: Steel roll-off box Frequency: TBD per TBD

Total Waste Quantity or Rate of Generation: 5,000 Tons (215, 212 ft^3)

Attachment No. 1

Section 4: Regulatory Information

Profile

Is this waste TSCA regulated? ☐ Yes ■ No ☐ Wastewater ☐ Non-wastewater

Proper US DOT Shipping Name Not DOT Regulated

Class _____ UN/NA _____ PG _____ RQ _____ Poison Inhalation Hazard? ☐ Y ☐ N

TX Waste Code # _____

Waste Classification: ☐ **Hazardous** ■ **Non-Hazardous** (Skip to Section 5)

List all applicable EPA Waste Code numbers _____

Is this waste a debris, subject to the alternate treatment standards listed in 40 CFR 268.45? ☐ Y ☐ N

Will this waste be treated to achieve a treatment standard before it is received at WCS? ☐ Y ☐ N

If yes, please explain _____

Is this waste subject to the national emissions standards for benzene waste operations as per 40 CFR 61.330? ☐ Y ☐ N

List all Underlying Hazardous Constituents* (☐ Check if not applicable) _____

*For characteristic Wastes, it must be determined if underlying hazardous constituents are present.

TCLP CERTIFICATION (mg/L, TCLP) (☐ **Check if not applicable**)

CODE	COMPONENT	REGULATORY LIMIT	Check If ≥ Limit	CODE	COMPONENT	REGULATORY LIMIT	Check If ≥ Limit
D004	arsenic	5.0	☐	D024	*m-cresol	200.0	☐
D005	barium	100.0	☐	D025	*p-cresol	200.0	☐
D006	cadmium (except NiCads)	1.0	☐	D026	*mixed cresols	200.0	☐
D007	chromium	5.0	☐	D027	*p-dichlorobenzene	7.5	☐
D008	lead (except lead batteries)	5.0	☐	D028	*1,2-dichloroethane	0.5	☐
D009	mercury (for low merc)	0.2	☐	D029	*1,1-dichloroethylene	0.7	☐
D010	selenium	1.0	☐	D030	*2,4-dinitrotoluene	0.13	☐
D011	silver	5.0	☐	D031	*heptachlor and epoxides	0.008	☐
D012	*endrin	0.02	☐	D032	*hexachlorobenzene	0.13	☐
D013	*lindane	0.4	☐	D033	*hexachlorobutadiene	0.5	☐
D014	*methoxychlor	10.0	☐	D034	*hexachloroethane	3.0	☐
D015	*toxaphene	0.5	☐	D035	*methyl ethyl ketone	200.0	☐
D016	*2,4-D	10.0	☐	D036	*nitrobenzene	2.0	☐
D017	*silvex (2,4,5-TP)	1.0	☐	D037	*pentachlorophenol	100.0	☐
D018	*benzene	0.5	☐	D038	*pyridine	5.0	☐
D019	*carbon tetrachloride	0.5	☐	D039	*tetrachloroethylene	0.7	☐
D020	*chlordane	0.03	☐	D040	*trichloroethylene	0.5	☐
D021	*chlorobenzene	100.0	☐	D041	*2,4,5-trichlorophenol	400.0	☐
D022	*chloroform	6.0	☐	D042	*2,4,6-trichlorophenol	2.0	☐
D023	*o-cresol	200.0	☐	D043	*vinyl chloride	0.2	☐

Attachment No. 1

Section 5: Physical and Chemical Data

Profile

COMPONENTS TABLE The whole waste consists of the following materials (total=100%)	Concentration Ranges are acceptable	Units (%, ppm)
Calcium Fluoride	0 – 80	%
Calcium Hydroxide	0 – 20	%
Water	0 – 40	%

Boiling Point N/A degrees F Asbestos % N/A Fuel value, BTU/lbs N/A

Flash Point N/A degrees F pH N/A Density 112 Unit lb/ft^3

Describe the odor None

Reactive Sulfide Concentration N/A Reactive Cyanide Concentration N/A

Oxidizer as per 49 CFR	☐	Liquid Organic Peroxide	☐
*VOC's	☐	Infectious or Etiological	☐
Pyrophoric	☐	Putrescible	☐
Radioactive	■	Autopolymerizable	☐
Explosive	☐	**None of the above**	☐

*Please include specific VOC's , if any, in the components table above.

Section 6: Radioactive Characteristics ☐ **Mixed*** ■ **Radioactive**

(If neither Mixed nor Radioactive, go to Section 7)

***Basis for identifying as Mixed Waste (circle): (1) Ignitable (2) Reactive (3) Corrosive (4) EP Toxicity or TCLP (5) Listed Waste**

Chemical Form Calcium Fluoride

Is material waste (check one): ■ Yes ☐ No	Is material exempt (check one): ■ Yes ☐ No (WAC section 3.2.1)
If Waste-What is Waste Class (check one): ■ A ☐ B ☐ C or ☐ >C (see Title 10 CFR 61.55 and TRCR 21, Appendix E)	
Is material NORM (check one): ☐ Yes ■ No	Does Material contain technologically enhanced Radium (check one): ☐ Yes ■ No
Is material Source Material (check one): ■ Yes ☐ No	If yes, Radon emanation rate is: ____ pCi/m^2/sec

Grams of Special Nuclear Material (Total for Profile): Pu None U-233 None U-235 None

Highest Dose Rate in mR/hr: On Contact < 0.04 At 1 ft.

Is the material overpacked? ☐ Yes ■ No

Describe the packaging: Steel roll-off box.

Attachment No. 1

Section 6: Radioactive Characteristics Continued

Profile Number

Radioactive Constituents:

(List all radionuclides present in the waste, the concentration in pCi/gm and the total activity in milli Curies.)

[Attach additional sheets if necessary- please list the information below in table format]

Nuclide	Concentration Range (pCi/gm)			Total Activity (mCi)
	Min	Max	Avg	
U-238	114.03	145.13	129.58	587.8
U-234	119.09	151.55	135.32	613.8
U-235	4.71	6.53	5.62	25.5
Th-234	105.1	111.0	108.05	490.1
Pa-234m	152.34	163.5	157.92	716.3
Ra-226	< 2.33	< 2.33	< 2.33	< 10.6
Pb-214	0.47	0.57	0.52	2.4
Bi-214	0.43	0.55	0.49	2.2
Pb-212	0.07	0.11	0.09	0.4

Section 7: Safety Related Data

If the handling of this waste requires the use of special protective equipment, please explain
Personal protective equipment should consists of the following: chemical protective gloves; sleeved work clothes; safety glasses; NIOSH- approved dust respirator only if dusting occurs.

Section 8: Attached Supporting Documents (Analytical should be noted in Section 3)

Please list all documents, notes, or other data that are being attached to this form as part of the waste approval package. Lab Reports: TCLP; Paint Filter; RAD (Methodology Used for RAD Analysis)

Attachment No. 2

HONEYWELL

Client Sample ID: A POND COMPOSITE

TCLP Metals

Lot-Sample #...: F0E120214-007 Matrix.....: SOLID
Date Sampled...: 04/10/00 Date Received..: 05/11/00
Leach Date.....: 05/15/00 Leach Batch #..: P013705

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0138421						
Arsenic	7.5 B	750	ug/L	SW846 6010B	05/17-05/18/00	DD537101
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Lead	110 B	250	ug/L	SW846 6010B	05/17-05/18/00	DD537102
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Selenium	4.1 B	625	ug/L	SW846 6010B	05/17-05/18/00	DD537103
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Barium	56.9 B	500	ug/L	SW846 6010B	05/17-05/18/00	DD537104
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Cadmium	2.2 B	12.5	ug/L	SW846 6010B	05/17-05/18/00	DD537105
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Chromium	25.7	25.0	ug/L	SW846 6010B	05/17-05/18/00	DD537106
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Silver	ND	25.0	ug/L	SW846 6010B	05/17-05/18/00	DD537107
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Prep Batch #...: 0139458						
Mercury	0.090 B	1.0	ug/L	SW846 7470A	05/18-05/19/00	DD537108
		Dilution Factor: 5		Analysis Time..: 07:39		
Prep Batch #...: 0201373						
Antimony	11.6 B	25.0	ug/L	SW846 6010B	05/17-05/18/00	DD53710T
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Beryllium	ND	12.5	ug/L	SW846 6010B	05/17-05/18/00	DD53710U
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Nickel	ND	100	ug/L	SW846 6010B	05/17-05/18/00	DD53710V
		Dilution Factor: 2.5		Analysis Time..: 15:48		
Thallium	ND	25.0	ug/L	SW846 6010B	05/17-05/18/00	DD53710W

Attachment No. 2

HONEYWELL

Client Sample ID: A POND COMPOSITE

TCLP Metals

Lot-Sample #...: F0E120214-007 Matrix.....: SOLID

NOTE(S):

Analysis performed in accordance with USEPA Toxicity Characteristic Leaching Procedure Method 1311

B Estimated result. Result is less than RL.

RSA Laboratories Inc.
Radiochemistry Analysis Data Sheet

Attachment No. 3

Final Report

Set No. 10891TH | Customer: **Honeywell**

Customer Samp No. **"A" Pond Composit** | Location: **Highway 45N, Metropolis, IL**

RSA Laboratories Sample No. **10891** | Project: **"A" Pond Disposal**

Date Collected: **Not Indicated** | Samp. Description: **CaF_2 Solids**

Date Received: **06/27/2000** | Matrix: **Dried Solids**

Parameter	Method		Result	MDA	Units	Date
Th-234	DOE RS100		108.05 +/- 2.949	0.85	pCi/g	06/29/00
Pa-234m	DOE RS100		157.92 +/- 5.58	1.98	pCi/g	06/29/00
Ra-226	DOE RS100	<	2.33	2.33	pCi/g	06/29/00
Pb-214	DOE RS100		0.52 +/- 0.05	0.47	pCi/g	06/29/00
Bi-214	DOE RS100		0.49 +/- 0.06	0.05	pCi/g	06/29/00
Pb-210	DOE RS100	<	0.72	0.72	pCi/g	06/29/00
Ra-228	DOE RS100	<	0.08	0.08	pCi/g	06/29/00
Ra-224	DOE RS100	<	0.43	0.43	pCi/g	06/29/00
Pb-212	DOE RS100		0.09 +/- 0.02	0.03	pCi/g	06/29/00
Bi-212	DOE RS100	<	0.21	0.21	pCi/g	06/29/00
Tl-208	DOE RS100	<	0.02	0.02	pCi/g	06/29/00
U-235	DOE RS100		7.64 +/- 0.19	0.22	pCi/g	06/29/00
K-40	DOE RS100		2.23 +/- 0.18	0.11	pCi/g	06/29/00
AM-241	DOE RS100	<	0.07	0.07	pCi/g	06/29/00
Co-60	DOE RS100	<	0.02	0.02	pCi/g	06/29/00
Co-57	DOE RS100	<	0.02	0.02	pCi/g	06/29/00
Th-227	DOE RS100	<	0.13	0.13	pCi/g	06/29/00
U-238	RSAL-432 Mod.		129.58 +/- 15.55	0.30	pCi/g	07/12/00
U-234	RSAL-432 Mod.		135.32 +/- 16.23	0.36	pCi/g	07/12/00
U-235	RSAL-432 Mod.		5.62 +/- 0.91	0.18	pCi/g	07/12/00

U-238 ug/g	Calculated from Alpha Spec Data	385.425 +/- 46.252	ug/g
U-234 ug/g		0.022 +/- 0.003	ug/g
U-235 ug/g		2.598 +/- 0.421	ug/g
Total Uranium ug/g		388.045 +/- 46.676	ug/g

Th-228 + Th-232 ug/g	Calculated from Alpha Spec and Gamma Spec Data	8.16E-01 +/- 1.81E-01	ug/g
Th-230 ug/g		6.56E-03 +/- 7.87E-04	ug/g
Th-234 ug/g		5.73E-09 +/- 6.87E-10	ug/g
Th-227 ug/g		< 4.15E-12	ug/g
Total Thorium ug/g		8.22E-01 +/- 1.82E-01	ug/g

Jay R. Dockendorff

Attachment No. 4 Modeling Data

Analytical Results RSA

U238	385.4	µg/g
U234	0.022	µg/g
U235	2.6	µg/g
Total	388.0	µg/g (PPM) dry basis

Dust exposure for the backhoe operator = 1.0 mg/m^3, no respirator. We are assuming this dust load. We were unable to detect any dust load during the trial dig on June 26, 2000. The track-hoe operator was instructed to raise the material as high as possible and drop the material in order to create dust; due to the moisture content this was impossible.

Moisture content is 30%. Material passed the paint filter test in a range of 30% to 44% H_2O. Using a 30% moisture content is the conservative method for calculating the as is uranium concentration.

388.0 µg U/gm dry basis = 271.6 µg U/gm at 30% moisture

271.6 µg U/gm X 1.0^{E-3} gm/m^3 (dust) = 0.272 µg U/m^3

Airborne uranium concentration inhaled by the backhoe operator assuming 1.0 mg/m^3 at 1.0 um particle size.

$$\frac{0.272\ \mu g\ U/m^3 \times 6.77^{E-7}\ \mu Ci}{1^{E-6}\ \frac{ml}{m^3}}\ \mu g = 1.84^{E-13}\ \mu Ci/ml\ U(nat.)$$

Calculations for Internal Dose

	Concentration (µCi/ml)	Isotopic Fraction	Breathing Rate / Hr	Hrs Week	Weeks Year	Solubility Uranium	EDE REM/µCi	Mrem/ rem	Dose EDE
U-238 "D"	1.84E-13	0.48877	1.20E+06	10	50	0.692	2.45	1000	9.16E-02
U-238 "W"	1.84E-13	0.48877	1.20E+06	10	50	0.308	7.03	1000	1.17E-01
U-234 "D"	1.84E-13	0.48877	1.20E+06	10	50	0.692	2.73	1000	1.02E-01
U-234 "W"	1.84E-13	0.48877	1.20E+06	10	50	0.308	7.88	1000	1.31E-01
U-235 "D"	1.84E-13	0.02245	1.20E+06	10	50	0.692	2.53	1000	4.34E-03
U-235 "W"	1.84E-13	0.02245	1.20E+06	10	50	0.308	7.29	1000	5.56E-03
									4.51E-01

Attachment No. 4 Modeling Data

Calculation Notes:

1. U(nat.) Conc. (µCi/ml) X isotopic fraction in U(nat.) X 1.2E6 ml/hr X hr/wk X wk/yr. X sol. Fraction X rem/µCi EDE dose factor X 1000 mrem/rem = **mrem/yr. EDE**.
2. Effective dose equivalent factors(1um particle size) are from Dose Coefficients , Federal Guidance Report No. 11.
3. Breathing rate is for standard adult man, light activity, 20 liters/min. Radiological Health Handbook.
4. Solubility uranium fractions are from lung fluid analysis, Health Physics Lab.

Calculations for External Dose

The actual meter reading at the location of the track-hoe operator was background 30 uR/hr.; the surface reading on the "A" Pond was 40 uR/hr. Calculating an external dose of 10 uR/hr. is a very conservative approach using time, but not distance or shielding.

40uR/hr – 30uR/hr(bkg) = 10uR/hr

0.01 mR/hr x 10 hr/wk x 50 wk/yr. = **5 mR/yr.**