From: clayton.shedrow[redacted]
Sent: Friday, February 22, 2008 1:18 PM
To: Dimarzio, John A.
Cc: greg.burbage[redacted] ralph.cansler[redacted]; betsy.westover[redacted]; bob.bayer[redacted]; perjetta.hightower[redacted]
Subject: Fw: Updated PuD Immobilization Data Call Response:

Attachments: SAIC Assessment of Immob Response-021208.doc

John

Attached are additional data in response to the PuD Immobilization data call. As you can see from the attached email, Greg believes that we will probably be able to complete this component of the SEIS data call by Monday of next week. As always,

[redacted]

If your technical lead has any questions, I recommend that he contact Gred Burbage directly [redacted]

Thanks.

C. Barry Shedrow
[redacted]

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----- Forwarded by Clayton Shedrow[redacted] on 02/22/2008 01:06 PM -----

Greg Burbage[redacted]

02/22/2008 01:04 PM

To Clayton Shedrow[redacted]

cc Ralph Cansler[redacted], Betsy Westover[redacted] Bob Bayer[redacted], Perjetta Hightower/[redacted]

Subject Updated PuD Immobilization Data Call Response:

Barry,

Attached is the updated PuD Immobilization data call response. You may wish to provide this information to SAIC, or wait until Monday, at which time I believe our response will be complete. If you have any questions, please give me a call. Thanks.

Immobilization Facility Information Request

(please provide numerical data in commonly reported units)

Information Requested	Response
Immobilization Facility	**Modification of K-Reactor Building for immobilization of up to 13 metric tons surplus plutonium using the glass can-in-canister approach**
General	
Schedule - Design - Construction or Modification - Operation - Deactivation and decommissioning	**Source: Data Call Response – 10/4/07** Design complete – 2009 ***(satisfied in original data call response information)*** Construction complete – 2013 ***(satisfied in original data call response information)*** Operations – 6 years ending in 2019 ***(satisfied in original data call response information)*** Deactivation and Decommissioning – Begins 2019 ***(satisfied in original data call response information)***
Description of facility including: - Building number - Latitude and Longitude - Elevation above NGVD (units) - Area (units) - Plot plan - Floorplan with equipment arrangement - Features that prevent unauthorized entry (unclassified description) - Features that ensure safeguards against malevolent acts or material diversion by internal and external entities (unclassified description) - Fire protection systems - Features that control releases of airborne contaminants (include diagram of treatment train) - Features that control releases of waterborne contaminants (include diagram of treatment train) - Features/procedures that prevent criticality - Description of liquid and non-liquid waste processing	Old K-Reactor Building ***NOTE: OUO per DOE-SR OPSEC Guide.*** 1) Vernon O'Steen – can you provide a lat & longitude generally in front of KAC***? Info. available. Can provide if absolutely necessary.*** 2) Vernon O'Steen – do you have elevation capability? ***Approximately 280 msl.*** 3) Vernon O'Steen – do you have acreage/hectares assessment capability? ***Approximately 385,010 square feet.*** 4) Not applicable ***NOTE: Floor Plans for Sensitive Facilities are UCNI.*** Data Call Response – 10/25/07, file "Vitrification System" and "Oxidation System" ***(satisfied in original data call response information)*** 5) Bruce Hewett – is there a document/plan/description that we can provide SAIC? ***DOE Orders along with SRS 7Q Security Manual Procedures identify the Facility Security Requirements. Security & Safeguard Features, to include DBT Upgrades, are controlled information.*** Data Call Response – 10/25/07, file "ICS and MCA" ***(satisfied in original data call response information)*** Data Call Response – 10/25/07, file "Fire Protection" ***(satisfied in original data call response information)*** Data Call Response – 10/25/07, file "Vitrification System" and "HVAC" ***(satisfied in original data call response information)*** 6) Greg Burbage – description to describe building sumps/pumps (Randy Sears). ***Water/liquid is removed from the reactor building through a system of sumps and associated pumps. These sumps may be purged to various holding vessels/tanks for treatment at other onsite wastewater treatment facilities, or if "uncontaminated",be released to the environment. No treatment of waterborne contaminates takes place within the KAC, beyond that for sanitary wastewater.*** 7) Bob Bayer – please provide document/information that prevents KAC criticality. Data Call Response – 10/25/07, file "Waste Management" and "Waste Study" (SK-DA-WM-0001)
Construction/modification	
Land disturbed for laydown (acres or hectares)	2 acres **Source: Data Call Response – 10/25/07, file "Site Work"** ***(satisfied in original data call response information)***

Information Requested	Response
Description of activities conducted (e.g., decontamination/removal/disposal of existing facilities/equipment, land clearing, onsite concrete plant) and modifications needed (e.g., floors, walls, support beams, roof, waste management, ventilation, new roads)	Data Call Response – 10/4/07 & Data Call Response – 10/25/07, file "Waste Study" (SK-DA-WM-0001) ***(satisfied in original data call response information)***
Describe type and quantity of air pollutant emitting equipment and frequency and duration of use.	Data Call Response – 10/25/07, file "Construction Equipment" ***(satisfied in original data call response information)***
Describe type and quantity of noise producing equipment and frequency and duration of use.	Data Call Response – 10/25/07, file "Construction Equipment" ***(satisfied in original data call response information)***
Emission release parameters – For any stack releases - release location (latitude & longitude), stack height, stack diameter, stack exhaust velocity or flow rate, exhaust air temperature – For fugitive releases - release location and dimensions of source area	8) Linda Nass – describe, if applicable/quantifiable, emissions released during CX/mod. phase of project? ***A stack location or height has not been determined. A final determination has not been made. Emissions could go out the existing 105-K Reactor Main Stack or a new stack could be built or separate buildings could be built (each with their own stack/vent) outside of the 105-K Reactor Building. The operating 105-K Main Stack currently has a maximum airflow of 107,000 CFM. Stack height is 130 ft from ground level (75 ft above the structure) / Diameter of this stack is 16 ft / and exhaust air temperature is 78°F, exit velocity is 15 ft/sec. (The exit temperature could change with the introduction of the PuVit process depending upon which stack would be used. Air would need to be cooled prior to exiting the gloveboxes/Hepa filters.)*** 9) Linda Nass – describe, if applicable/quantifiable, fugitive emissions during CX/mod. phase of project? ***Fugitive emissions during the CX/mod phase of the project would be minimal. If seen, these would exit out the 105-K Reactor Main Stack (info provided above).***
Air emissions (point source and fugitive): - Criteria Pollutants (metric tons/yr) - HAPs (kilograms/yr) - Radioisotopes (curies/yr)	10) Linda Nass – are there any point source or fugitive source releases for criteria pollutants, HAPs, or radioisotopes during CX/mod. phase of the project? ***None. If any, they would be in the noise range. Work on HX removal, Bingham pump removal, etc would be done in a containment hut so potential emissions would be minimal. At the most an increase of 10% over current stack emissions may be seen; current emissions from the 105-K Reactor Main Stack were 4.92E-04 mrem/yr for CY07 (or 3.51E-02 Ci) seen mostly as tritium.***
Liquid effluents - Location(s) of discharge(s) and copies of permit(s) - Rate(s) of discharge(s) (units/day) - Concentrations of contaminants (picocuries/liter or micrograms/liter)	11) Greg Burbage – describe liquid emissions (locations, permits, rates, concentrations, contaminants) created during CX/mod. phase of the project? ***Liquid emission from KAC are storm water, which are permitted per SCDHEC Permit #SCR000000, and process water which are permitted per SCDHEC Permit #SC0000175. The process wastewater outfall is designated as NPDES Outfall K-18, and is limited for pH, total suspended solid, and flow. Tritium, typically at or below background levels, is discharged from K-18. Typical flow rate is 200-400 gallons/minute. The PuD Project construction is not expected to effect KAC liquid emissions.***

<table>
<tr><th>Information Requested</th><th>Response</th></tr>
<tr><td>Employment for each year (FTEs)</td><td>12) John Hammond – do you have employment numbers for the CX/mod. phase of the project? Maximum FTE's (Year/FTE): FY09/99, FY10/151., FY11/119, FY12/0, FY13/0, FY14/182, FY15/330, FY16/307, FY17/340., FY18/210, FY19/241, FY20/169, FY21/179 & FY22/76 Average FTE's (Year/FTE): FY09/83, FY10/99., FY11/75, FY12/0, FY13/0, FY14/90, FY15/263, FY16/281, FY17/231., FY18/161, FY19/169, FY20/132, FY21/128 & FY22/47</td></tr>
<tr><td>Shifts</td><td>13) John Hammond – do you have shifts information for the CX/mod. phase of the project? Day and night shifts will be required to achieve schedule completion dates.</td></tr>
<tr><td>Worker radiological exposure - total dose (person-rem)</td><td>14) Ben Morgan – is radiological exposure information during CX phase of the project available? I spoke with John Hammond and got the hours expected for the D&R phase. According to Wayne Farrell the external dose rates in the parts of K-area that will be involved are low. Using a near background dose rate of 0.05 mrem/h and the hours required gives a rough estimate of 59760 h * 0.05 mrem/h = 2988 mrem for FY09 and 71280 h * 0.05 mrem/h = 3564 mrem for FY10. Accounting for the reporting threshold of the dosimeters the actual recorded dose will be about 300 mrem per year.</td></tr>
<tr><td>Number of exposed workers</td><td>15) John Hammond – can you estimate a number of workers exposed for the CX/mod. phase of the project? Average FTE's: FY09/83, FY10/99 (Note: The D&R was scheduled during FY09 & FY10. It is assumed that after D&R is completed that the sources will be removed and the work areas will be rolled back. Therefore, no radiological exposure is expected after the D&R phase is completed.</td></tr>
<tr><td>Utilities needed
- Potable water (units/yr)
- Non-potable water (units/yr)
- Electricity (units)
- Gasoline (units/yr)
- Diesel Fuel (units/yr)</td><td>16) John Hammond – can you estimate in annual usage for the CX/mod. phase of the project of potable water, non-potable water, electricity, gasoline, and diesel fuel? (As provided by Rick Spaulding, CX Mngr).
<table>
<tr><th></th><th>FY09</th><th>FY10</th><th>FY11</th><th>FY12/13</th><th>FY14</th><th>FY15</th><th>FY16</th><th>FY17</th><th>FY18</th><th>FY19</th><th>FY20</th><th>FY21</th><th>FY22</th></tr>
<tr><td>Pot Water (gal)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>500</td><td>500</td><td>500</td><td>500</td><td>500</td><td>500</td><td>500</td><td>500</td><td>500</td></tr>
<tr><td>Non-Pot (gal)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1000</td><td>1000</td><td>1000</td><td>1000</td><td>1000</td><td>1000</td><td>1000</td><td>1000</td><td>1000</td></tr>
<tr><td>Gas (gal)</td><td>200</td><td>200</td><td>200</td><td>0</td><td>200</td><td>1000</td><td>1000</td><td>1000</td><td>500</td><td>500</td><td>500</td><td>300</td><td>200</td></tr>
<tr><td>Diesel (gal)</td><td>400</td><td>400</td><td>400</td><td>0</td><td>400</td><td>5000</td><td>5000</td><td>5000</td><td>3000</td><td>2000</td><td>1000</td><td>1000</td><td>400</td></tr>
</table>
NOTE: Minimal to no impact on existing electrical utilities during construction phase</td></tr>
</table>

<table>
<tr><th>Information Requested</th><th>Response</th></tr>
<tr><td>Resources needed
- Concrete (units)

- Asphalt (units)
- Steel (units)
- Crushed stone (units)
- Sand & Gravel (units)
- Soil (units)
- Lumber (units)
- Chemicals (units)
- Gases (units)
- Other construction materials (units)</td><td>Data Call Response – 10/4/07 (concrete volumes) (satisfied in original data call response information)
Data Call Response – 10/25/07, file “CSA Outside PIDAS” (concrete volumes for fan house, sand filter and stack) (satisfied in original data call response information)

16a) John Hammond (or Rick Spaulding if delegated) – can you provide the construction phase demands for asphalt, steel, crushed stone, sand & gravel, soil, lumber, chemicals, gases, and other, as requested at left?
<table>
<tr><th></th><th>FY09</th><th>FY10</th><th>FY11</th><th>FY12/13</th><th>FY14</th><th>FY15</th><th>FY16</th><th>FY17</th><th>FY18</th><th>FY19</th><th>FY20</th><th>FY21</th><th>FY22</th></tr>
<tr><td>ASPHALT (TONS)</td><td>0</td><td>0</td><td>200</td><td>0</td><td>0</td><td>0</td><td>500</td><td>100</td><td>100</td><td>50</td><td>50</td><td>0</td><td>0</td></tr>
<tr><td>STEEL (TONS)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1000</td><td>1000</td><td>200</td><td>200</td><td>100</td><td>50</td><td>25</td><td>0</td></tr>
<tr><td>CRUSHED STONE (TONS)</td><td>200</td><td>200</td><td>200</td><td>0</td><td>200</td><td>200</td><td>200</td><td>100</td><td>100</td><td>100</td><td>50</td><td>0</td><td>0</td></tr>
<tr><td>SAND&GRAVEL (TONS)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>100</td><td>100</td><td>100</td><td>50</td><td>50</td><td>50</td><td>50</td><td>0</td><td>0</td></tr>
<tr><td>SOIL (CY)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>7000</td><td>7000</td><td>8000</td><td>0</td><td>0</td><td>500</td><td>500</td><td>0</td><td>0</td></tr>
<tr><td>LUMBER (BOARD FEET)</td><td>2000</td><td>2000</td><td>2000</td><td>0</td><td>5000</td><td>5000</td><td>5000</td><td>2000</td><td>1000</td><td>1000</td><td>1000</td><td>500</td><td>0</td></tr>
</table>
NOTE: Minimal to no impact with chemicals, gases and other construction materials.</td></tr>
<tr><td>Waste generated (provide solid and liquid separately) (units/yr):
- TRU
- LLW
- MLLW
- Hazardous
- Non-Hazardous</td><td>Data Call Response – 10/25/07, file “Waste Study” (SK-DA-WM-0001) volumes not provided

16b) Betsy Westover – can you please provide construction phase waste generated for TRU, LLW, MLLW, Hazardous, Non-hazardous?</td></tr>
<tr><td>Operations</td><td></td></tr>
<tr><td>Description of Process including:
- Flowchart
- Throughput (units/yr)
- Number of cans filled per year</td><td>16c) Clayton Holloway – can you provide a Operations process description flowchart to me for SAIC? Provided separately (electronically).
Five 3013 cans per day Source: Data Call Response – 10/25/07, file “Preliminary Assumptions” (satisfied in original data call response information)
16d) Clayton Holloway – can you provide the number of cans filled per year during Operations of PuD? Provided separately (electronically).</td></tr>
<tr><td>Please provide:
- Number of DWPF canisters needed
- Additional DWPF canisters created</td><td>790 CIC units per Pu Disposition Alternatives Analysis (Y-AES-G-00001) (satisfied in original data call response information)
95 additional canisters per Pu Disposition Alternatives Analysis (Y-AES-G-00001) (satisfied in original data call response information)</td></tr>
</table>

Information Requested	Response
Emission release parameters - For stack releases - release location (latitude & longitude), stack height, stack diameter, stack exhaust velocity or flow rate, exhaust air temperature - For fugitive releases - release location and dimensions (including height) of vents or louvers from which release would occur - Emissions from emergency generators, boilers, and other ancillary equipment	17) Linda Nass – describe emissions released during operation of PuV for stack, stack height, stack diameter, exhaust velocity, temp, etc.? ***A determination had not been made whether to use the current (105-K Reactor Main) stack, to build one for the entire vitrification process or to have separate stacks associated with various buildings designed/built outside of the 105-R Reactor building. However, in determining the emissions in mrem/yr, the dose release factors which would provide the largest emissions were utilized; these were the factors for zero elevation. Information for the current operating stack is provided below:*** ***<u>Current stack dimensions</u> (note: the stack height was reduced by 70 ft)*** ***Height: 130 ft above ground (75 ft above structure)*** ***Diameter: 16 ft*** ***Exit Temp: 78°F*** ***Exit Velocity: 15 ft/sec*** ***UTM: N – 3,674,754.903; E – 438,113.483*** ***<u>PuV Project:</u>*** ***The furnace exhaust gas flow rate was used in these release calculations; it assumed an exit velocity of 1 CFM (or 28,316.74 cc/min).*** 18) Linda Nass – describe fugitive emissions released during operation of PuV, and dimensions of fugitive sources? ***Opening/emptying , milling/mixing, metal to oxide conversion, and vitrification will be performed inside gloveboxes. There should be no fugitive emissions; if otherwise, emissions would be minimal.*** 19) Linda Nass – describe emissions released during operation for PuV from emergency generators, boilers, else? ***Emissions from emergency equipment should be minimal. At present it is unknown whether there will be or how many and what size diesel generators would available for emergency use.***

<table>
<tr><th>Information Requested</th><th>Response</th></tr>
<tr><td>Air emissions
- Criteria Pollutants (metric tons/yr)
- HAPs (kilograms/yr)
- Radioisotopes (curies/yr)</td><td>19a) Linda Nass – can you provide Operations phase criteria pollutants released in metric tons per year?
Other than PM, there are no 'Criteria' pollutants.
HAPS:
Ni/NiO = 6.337E-05 kg/yr
Radionuclides =
<table>
<tr><th>Nuclides</th><th>Curies</th></tr>
<tr><td>Np^{237}</td><td>8.531E-08</td></tr>
<tr><td>Pu^{238}</td><td>4.749E-06</td></tr>
<tr><td>Pu^{239}</td><td>5.081E-07</td></tr>
<tr><td>Pu^{240}</td><td>5.683E-07</td></tr>
<tr><td>Pu^{241}</td><td>1.427E-05</td></tr>
<tr><td>Pu^{242}</td><td>2.757E-09</td></tr>
<tr><td>Am^{241}</td><td>6.777E-05</td></tr>
<tr><td>Total</td><td>8.795E-05</td></tr>
</table>
PSD pollutants: Be/BeO, Fluorides, and PM/PM-10 (all are well below trigger levels)
SCDHEC Std 8 (Toxic Pollutants): HCl, Be/BeO, Ni/NiO
Data Call Response – 10/25/07, file "Emissions Calculation" (satisfied in original data call response information)
Data Call Response – 10/25/07, file "Emissions Calculation" (satisfied in original data call response information)</td></tr>
<tr><td>Liquid effluents
- Location(s) of outfall(s)
- Rate(s) of discharge(s) (units/day)
- Concentrations of contaminants (picocuries/liter or micrograms/liter)</td><td>20) Greg Burbage – describe liquid releases during PuV ops. (locations, rates, concentration of contaminants)?
Liquid effluents are expected to increase from KAC following PuD Project operations, primarily as cooling tower blowdown, and noncontact cooling water. There are no significant chemical composition changes anticipated beyond cooling tower additives, and flow is expected to be combined with that currently going to NPDES Outfall K-18.</td></tr>
<tr><td>Employment (FTEs)</td><td>34 (24 vit process operators plus 10 waste management) Source: Data Call Response – 10/25/07, file "Preliminary Assumptions" (satisfied in original data call response information)</td></tr>
<tr><td>Shifts</td><td>Operates 24 hrs/day; 7 days/week with 12 hr shifts Source: Data Call Response – 10/25/07, file "Preliminary Assumptions" (satisfied in original data call response information)</td></tr>
<tr><td>Employee radiological exposure - total dose (person-rem)</td><td>21) Ben Morgan – during operations do you know total dose for employee radiological exposure? It is much too early to say what total dose will be required to operate the facility. The radiological design guide requires that individual dose be limited to 1 rem/y. A rough estimate of facility annual dose would be 1 rem/y times the number of "hands on" workers. Some staffing information from the previous planning showed 314 workers. This would equate to 314 person-rem/y. If there are new staffing numbers available they could be used instead.</td></tr>
<tr><td>Number of exposed workers</td><td>22) Ben Morgan – during operations do you know the number of workers exposured? Everyone assigned to the facility will probably be monitored for exposure. The previous staffing information gave a total staff of 434.</td></tr>
</table>

Information Requested	Response
Utilities needed - Potable water (units/yr) - Non-potable water (units/yr) - Electricity (kw/hr) - Natural gas (units/yr) - Coal (units/yr) - Gasoline (units/yr) - Diesel Fuel (transportation) (units/yr) - Heating fuel oil (units/yr)	23) P.K. Hightower – do you know the POC for utilities? Please ask that they respond for this anticipated usage during operations phase of PuV.
Resources needed - Metals (units/yr) - Frit (units/yr) - Ceramic precursors (units/yr) - Chemicals (units/yr) - Gases (units/yr) - other materials (units/yr)	24) P.K. Hightower – do you know the POC for resources? Please ask that they respond for this anticipated usage during operations phase of PuV.
Waste generated (solid or liquid) (units/yr): - TRU - LLW - MLLW - Hazardous - Non-Hazardous	**Source: Data Call Response – 10/25/07, file "Waste Study" (SK-DA-WM-0001)** ***(satisfied in original data call response information)*** 460 m3/yr 250 m3/yr 80 m3/yr 80 m3/yr 50 m3/yr No liquid waste expected.
Please provide any safety documentation (e.g., safety assessments, safety analysis reports) for these facilities.	25) Bob Bayer – please provide safety doc.s (electronically)requested so that I may forward to SAIC.
List any accident scenarios (in existing safety or NEPA documents) that need to be modified because of changes produced by the proposed action. For any new or modified scenarios provide the information listed below:	26) Bob Bayer – please provide any accident scenarios in existing safety doc.s that must be changed for PuV ops. (please provide per below table criteria).

Information Requested	Response
Radiological accidents - Accident description (include release pathways and mitigating factors) - Accident frequency - Material at risk - Material characteristics - Source term released to environment (curies by isotope) - Release parameters: release fractions, release timing, location, release height, release duration, and heat of release - Filtration (specify efficiency) - Number of involved workers	26) continued, Bob Bayer
Chemical inventory for chemical accident analysis - List chemicals, total facility inventory, and annual usage of the chemical - Size and location of largest tank (storage container) for each chemical. Include floor area or diked area that would contain the spill when applicable. - Concentration of chemical in largest tank (identify if this is the highest concentration of the chemical being stored). If not, also list the other storage locations, size of tank and concentration of chemical being stored.	27) continued, Bob Bayer
Design basis earthquake frequency and intensity	28) continued Bob Bayer
Earthquake frequency that would result in loss of structural integrity	29) continued Bob Bayer
Other natural phenomena that would result in loss of structural integrity and their frequency	30) continued Bob Bayer
Aircraft crash frequency	31) continued Bob Bayer
Deactivation and Decommissioning	
General description of the D&D process and end state achieved after D&D	32) P.K. Hightower – assume that PuV processes will be removed at the end state of project need? Please confirm.