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**APPENDIX E
ENVIRONMENTAL ALARA REPORT**

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ACRONYMS

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ALARA	as low as reasonably achievable
ARAR	applicable, relevant and appropriate requirements
AWWT	Advanced Wastewater Treatment
DOE	U.S. Department of Energy
FCP	Fernald Closure Project
HEPA	high-efficiency particulate air
HVAC	heating, ventilating and air conditioning
N/A	not applicable
NEPA	National Environmental Policy Act of 1969
PEAPR	project evaluation for air/water permit/notification request
PHAR	Preliminary Hazard Analysis Report
PPE	personal protective equipment
RCS	Radon Control System
RCT	Radiological Control Technician
RM	Requirements Manual
TBD	to be determined

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ENVIRONMENTAL ALARA REVIEW/EVALUATION - REPORT AND CHECK LIST

ENVIRONMENTAL ALARA Log No: 03-003

Preliminary/Final Report:

ALARA PHILOSOPHY

The ALARA philosophy adopted by the FCP requires that any exposure to ionizing radiation to general employees, the public, or the environment shall be minimized to the extent that social, technical, economic, practical, and public policy considerations allow.

PART I. ENVIRONMENTAL ALARA REVIEW AND EVALUATION INFORMATION

1. Name/title of individual reviewing activity:
2. Date review request to Environmental Compliance and review trigger (request for NEPA Services, PEAPR, etc.)(NOTE: If other significant documents will assist in this process, please note them and attach.)
.....
3. Ongoing or planned activity? Planned activity:
4. Activity ID No, if any: Contract No. 01 PC 000197
5. Activity name: Silo 3 Project

PART II. DESCRIPTION OF ACTIVITY

1. Date of activity commencement: November 1, 2003
2. Location of the potential release (building, area, etc.): Operable Unit 4 (OU4) Silo 3, Silo 3 stack
3. Date of identification of potential release: During Operation, beginning November 2003
4. Personnel initiating assessment: Jacobs Engineering Group Inc. Silo 3 Project staff
5. Description of activity. Define the objective and scope of the issue to be analyzed: Construction and operation of a structure on top of Silo 3 to hold and manipulate an arm within the silo guiding a vacuum retrieval component; an access port through the side of the silo to accommodate equipment for physical retrieval of silo material; and a treatment facility connected to Silo 3 to receive, treat, and package treated Silo 3 material. Material packaged in 3 cubic yard soft-sided packages will be stored near the treatment facility for subsequent transport to a representative permitted commercial disposal facility or Nevada Test Site for final disposition. All project activities will be conducted in accordance with the Environmental Control Plan for Silo 3 (Document 40430-PL-0005).
6. Does the activity have potential for a routine or non-routine release of radionuclides (e.g. stack emissions, spills, etc. Include potential releases during construction)? Yes, the activities involved in constructing and operating of the Silo 3 material retrieval/waste treatment and storage systems have the potential for both routine and nonroutine releases of radiological material. Accidental spills have a potential to occur from the process equipment. Liquids will be added to the dry waste for stabilization. Water will also be used during silo wall cutting and during excavator decontamination.

NOTE : If the answer to Item 6 is "NO," then no further evaluation is required. Sign and date the check list, send the Original to Environmental Compliance, and place a copy in the Project File.

DATE : _____ SIGNATURE : _____

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7. Where is the material released or to be released for a future activity (e.g. air, water, soil, waste)?

Indoors Yes Environment Yes

Potential airborne and liquid releases indoors may occur from tanks, piping, or sampling activities in the future treatment facility. Airborne releases to the environment could occur from the system stack or other conduits associated with this system. Any controlled liquid releases will be transferred to the Advanced Wastewater Treatment System. Potential liquid releases to the on-site environment may occur from accidents within treatment/storage facility.

8. Radionuclides potentially released:

a. Radioactive material names, isotopes: Primary releases will be potential releases include Rn-222 and Rn-220, Ac-227, Ac-228, Bi-210, Bi-211, Bi-212, Bi-214, Fr-223, Pa-231, Pa-234, Pa-234m, Pb-210, Pb-211, Pb-212, Pb-214, Po-210, Po-211, Po-212, Po-214, Po-215, Po-216, Po-218, Ra-223, Ra-224, Ra-226, Ra-228, Rbn-219, Th-227, Th-228, Th-230, Th-3231, Th-232, Th-234, Ti-207, Ti-208, U-234, U-235/236, U-238

b. Physical state (gas, solid, liquid): Primary release is particulates, and to a lesser extent gaseous radon isotopes. There is also the potential release of liquids with some solid particulate material

c. Drum/container markings (include FCP Lot Markings): Drum and container markings will be in accordance with procedural and regulatory requirements.

d. Material Source/Origin: Calcined raffinate obtained from the extraction of uranium ore.

9. Amount released (lbs., gallons, curies, etc.) and source:

a. To air: Refer to performance calculations 40430-CA-0003, Rev. 2, Radioactive Particulate and Radon-222 Stack Release Considerations for the Silo 3 Remedial Action Project. Amount released: < 0.1 Ci/year particulate, < 10 Ci/year radon-222.

b. To water: None planned. Water will be used to add fixative to the final waste form.

c. To Soil: None

d. To Waste: Primary waste is 3646 tons of Silo 3 material. Secondary waste consists of filters, and personal protective equipment (PPE) (Ref.40430-RP-0012)

e. To controlled and/or free release of material: Materials and equipment released will meet 10 CFR 835, Appendix D (or new ANSI N13,12) release standards

10. How was amount determined (estimated, weighed or otherwise measured?): Estimated on the basis of

Silo 3 retrieval/treatment/storage performance calculations (Ref. 40430-CA-0003).

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11.	Off-site release? (Storm water, air release, other) <u>Primarily controlled airborne release of radon via the Silo 3 Project stack and permitted discharges from the AWWT.</u>
12.	Is a hazardous/mixed waste involved? List any special factors as a result: <u>No mixed wastes are involved in Silo 3 retrieval/treatment/storage project. The waste is 11(e)(2) byproduct material. The material contains RCRA toxic metals (arsenic, cadmium, chromium, selenium) which exceed TCLP limits. Due to the 11(e)(2) byproduct exemption, it is not regulated as RCRA hazardous waste, but must meet applicable or relevant and appropriate requirements. Approximately 4,500 gal of ferrous sulfate solution will be used for material treatment.</u>
PART III. CONTROL OF RADIOACTIVE MATERIAL RELEASES	
1.	Describe or reference any protection options considered. Describe air emissions and water discharge control equipment, fugitive dust suppression, material lockdown, handling of waste, secondary containments, spill control equipment, controls on release of material, clean-up of spill material, administrative controls, etc.: <u>The Silo 3 Project will use the best available technology. The air emissions will be prefiltered and HEPA filtered before discharge from the project stack. The effluent from the stack will be monitored in real-time for radon concentrations. In addition, the stack will be sampled and monitored for particulate airborne releases. The waste water will be sampled, analyzed and treated as necessary to meet the AWWT waste acceptance criteria (WAC) before discharge to the AWWT. Any spills will be cleaned up to meet Fluor Fernald radiological control requirements.</u>
2.	How will waste be packaged/labeled/stored(location)/handled? What procedure will be used? <u>Material will be treated and packaged for off-site dispositioning at an off-site disposal facility. Applicable Fluor Fernald procedures (or equivalent Jacobs Engineering Group Procedures) will be used to package, label, store, and handle Silo 3 Project wastes. Actual Procedures used will be cited in the revised Environmental ALARA Report that will be submitted with the Final Design package.</u>
3.	Release of materials and equipment - surface contamination levels. Prior to being released, will property be surveyed to determine whether both removable and total surface contamination (including contamination present on and under any coating) are in compliance with the levels given in Figure IV-1 of DOE 5400.5 and that the contamination has been subjected to the ALARA process. Describe or reference documentation of the ALARA process. <u>Before release from the controlled area, all material and equipment will be surveyed by Fluor Fernald Radiological Control Technicians (RCTs) using Fluor Fernald Procedure RP-0009 to ensure compliance with requirements set forth in Figure IV-1 of DOE Order 5400.5 release criteria and/or corresponding 10CFR 835 specifications. The ALARA Process is further discussed in the ALARA Analysis appended to the Silo 3 NHASP.</u>
PART IV. ENVIRONMENTAL ALARA EVALUATION	
1.	Estimated performance of the control options. How much material will be controlled/removed (% , pounds, etc)? Identify advantages/disadvantages of each factor and control option. (Note: Use quantitative and qualitative methods when each is appropriate) The air control system was designed using best available technology. <u>The ULPA/HEPA filter will remove more than 99.97% of particulates with aerodynamic mean</u>

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	<u>diameter greater than 0.3 micrometers from the stack effluent.</u>
2.	Identify cost information for control options (as relevant to the decision):
3.	Applicable dose limits and Derived Concentration Guidelines (DCGs) from DOE 5400.5. Dose Impacts, if determined (e.g. Dose to the maximally exposed individual, population dose, etc). Are dose limits or DCGs exceeded? <u>Refer to Silo 3 performance calculations (Ref. 40430-CA-0003)</u>
4.	Analytical Solution. Present the results of quantitative analysis, if one is performed. (Note: Per DOE 5400.5, qualitative analyses are acceptable, in most instances, for ALARA judgments, especially where potential doses are well below the dose limit.): <u>Refer to Silo 3 performance calculations (Ref. 40430-CA-0003)</u>
5.	What are the preferred control options and what is the basis for their selection. Present results of optimization, as appropriate. (e.g. weighting of factors, environmental impacts, associated risks, costs and changes in cost, sensitivity analysis, changes in societal impact (doses), etc for options.) (Note: Per RM-0015, the primary methods used to control exposure shall be physical design features, such as filtration, confinement, etc,. Administrative controls and procedural requirements shall be employed only as supplemental methods to control radiation exposure, unless physical design features are demonstrated to be impractical. For control of airborne radioactive material, the design objective shall be, under normal conditions, to avoid releases to the workplace atmosphere, the surrounding environment, and in any situation, to control the inhalation of such material by workers to levels that are ALARA; confinement and ventilation shall normally be used. Modifications to existing facilities and designs of new facilities shall meet the Environmental ALARA design criteria specified in DOE Orders 6430.1 and 5400.5.) <u>Refer to Silo 3 performance calculations. (Ref. 40430-CA-0003)</u>
6.	Environmental ALARA Decision. State the controls that constitute Environmental ALARA for the activity: <u>Refer to Environmental Control Plan (Ref. 40430-PL-0005) Fugitive dust is controlled in accordance with RM-0047. Stormwater runoff is controlled in accordance with PL-3083. Processing activities are conducted under cover.</u>
7.	Implementation and monitoring. Describe the methods to be used to monitor achieved performance against desired targets (e.g. ambient air monitoring, stack monitoring, water sampling, surveillance, reporting, etc.): <u>Continuous monitoring of radon as it exits the stack will be used to ensure compliance with radon emission limits. Wastewater will be sampled and analyzed to ensure it meets the AWWT acceptance criteria.</u>
8.	Recommended actions (advise consideration of additional factors, control options, develop additional information, etc.): <u>Monitoring Program will be implemented as described in the Environmental Control Plan (Ref. 40430-PL-0005).</u>
9.	Justification for recommendations: <u>Monitoring is consistent with ARARs</u>
PART V. FOLLOW-UP ACTIONS	
1.	Reporting requirements, requests for temporary dose limits. [Note: DOE Operations Office shall notify, the relevant Program Offices(s) and the Deputy Assistant Secretary for Environment (EH-20) of actual or



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potential exposures of members of the public exceeding certain limits].	
<u>None</u>	
2.	Remaining issues/actions required: <u>None</u>
3.	Attachment List (attach modeling output, reports, data, etc used as a basis for the ENVIRONMENTAL ALARA review/assessment: <u>CAP88-PC stack release calculation 40430-CA-0003</u> <u>Environmental Control Plan, 40430-PL-0005</u> <u>Silo 3 Process Description, 40430-RP-0003</u>
Report By: <u>Scott J. B.</u>	Report Date: <u>8/1/03</u>
Reviewed By: <u>S. M. Burkner</u>	Review Date: <u>8/13/03</u>



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Follow-Up Action Required: _____

Action Item No.:

Responsible Individual:

Distribute To:

S. Waligora - ALARA Coordinator

F. Johnston - Environmental ALARA Committee Representative

Original-ENVIRONMENTAL ALARA Files

Distribution via E-mail completed:

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