PLUTONIUM DISPOSITION PROJECT (U)

Project M09A

SCOPE OF WORK

J-SOW-K-00003 Revision ~~0~~ 1 04/09/07

for

Health and Safety Monitoring System (U)

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DC/RO: EC Zeff III 3/29/07

Revision Page

Revision	Revision Date	Affected Section	Description of Change
0	4/2/07	N/A	Initial Revision
1	4/9/07	N/A	Added Original Attachments (pg.s 15 – 21) to DCR

Table of Contents

1.0 SCOPE

1.1 General Description

This Scope of Work (SOW) covers the Health and Safety Monitoring System for the Plutonium Disposition Project. Health and Safety Monitoring contains the Radiological Control Subsystem, Occupational Safety Subsystem, Industrial Hygiene Subsystem and the Nuclear Incident Monitoring Subsystem.

1.2 Background

The Office of Environmental Management has approximately 13 metric tons (MT) of plutonium in approximately 21 MT bulk materials without any defined disposition path. The Plutonium Disposition (PUD) Project is critical to meet the Department of Energy's strategic goal of providing a responsible resolution to the permanent disposal of the nation's excess high-level radioactive materials and waste; and to enable the cleanup of Environmental Management sites.

The Plutonium Disposition Facility (PDF) will be located at the K-Area Complex (KAC) to disposition up to approximately 13 Metric Tons (MT) of Environmental Management (EM) owned surplus plutonium. The facility will utilize a vitrification process to vitrify plutonium into a lanthanide borosilicate (LaBS) glass matrix. This glass will be packaged into bagless transfer cans and placed inside a Defense Waste Processing Facility (DWPF) type canister. The canister will be transported to DWPF and filled with High Level Waste (HLW) glass. The DWPF canisters will be stored in the Glass Waste Storage Buildings and later transported to the geologic repository at Yucca Mountain.

This Scope of Work (SOW) has been developed for the purpose of facilitating **construction** cost and schedule estimates for the Conceptual Design Report (CDR) on the PUD project. The input to this SOW was the approved technical baseline consisting of a Facility Design Description (FDD) and associated System Design Descriptions (SDD). Every intent has been made to assure alignment and consistency between this SOW and the appropriate sections of the technical baseline, in order to provide accurate estimates. This SOW is not a PUD technical baseline document. A more detailed description of the system can be found in the associated SDD listed in the reference section.

A HOLD is placed to identify information that is preliminary in nature, results from a design uncertainty, originates from insufficient documentation, needs verification, or identifies a discrepancy. A **TBD** is placed to identify places in the text where numeric values or descriptive information is not available at the time that the current revision of the SOW is released.

2.0 ACRONYMS/ABBREVIATIONS

AMS	Air Migration Study
ARM	Area Radiation Monitor
CAM	Continuous Air Monitor
CDR	Conceptual Design Report
DCS	Distributed Control System
EMT	Electrical Metallic Conduit
FARMS	Facility Area Radiation Monitoring System
FDD	Facility Design Description

GS	General Services
HVAC	Heating, Ventilation and Air Conditioning
IAW	In Accordance With
ICS	Integrated Control System
IMC	Intermediate Metal Conduit
KAC	K-Area Complex
KIS	K-Area Interim Surveillance
NIM	Nuclear Incident Monitor
PC	Performance Category
PCM	Personnel Contamination Monitor
Pu	Plutonium
PUD	Plutonium Disposition
PDF	Plutonium Disposition Facility
RAS	Retrospective Air Sampler
RGS	Rigid Galvanized Steel
RME	Radiation Monitoring Equipment
SC	Safety Class
SCFM	Standard Cubic Feet per Minute
SDD	System Design Description
SOW	Scope Of Work
SRS	Savannah River Site
SS	Safety Significant
SSC	Structure, System, Component
TBD	To Be Determined
TRU	Transuranic Waste
UPS	Uninterruptible Power Supply
VAC	Volt(s) Alternating Current
WSRC	Washington Savannah River Company

3.0 DESCRIPTION OF PHYSICAL WORK

3.1 Performance Category and Safety Classification (SC, SS, PS, GS)

3.1.1 Performance Category

3.1.1.1 The Health and Safety Monitoring System is Performance Category PC-2. **HOLD** (Reference G-FDD-K-00001)

3.1.2 Functional Classification

3.1.2.1 The NIM equipment and associated wiring are safety related and shall be procured, installed and tested IAW project quality assurance program requirements.

A. Nuclear Incident Monitor

1. Functional Classification – Safety Significant (SS)

B. Continuous Air Monitor

1. Functional Classification – Production Support (PS)

C. Area Radiation Monitor

1. Functional Classification – Production Support (PS)

D. Retrospective Air Sampler

1. Functional Classification – General Services (GS)

E. Personnel Contamination Monitor

1. Functional Classification – General Services (GS)

NOTE: The Isokinetic Stack Particulate Monitor is a subsystem of the HVAC System, thus its components are not included within work scope boundaries of this SOW. (It is described in the HVAC Scope of Work M-SOW-K-00020).

3.2 Mechanical/Nuclear/Process

3.2.1 None.

3.3 Instrumentation and Controls

3.3.1 Nuclear Incident Monitor

3.3.1.1 NIM instruments will be installed adjacent to potential incident locations in these areas: Green Fuel Disassembly; Feed Preparation; Oxidation; and Milling & Mixing (refer to layout diagram J-J8-K-00021 and location sketches SK-DE-BOP-0006 & SK-DE-VIT-0010) IAW SRSESM 13096. The NIM Detectors are remotely located in these areas. The NIM Instrument Cabinets are located in Electrical Equipment Room #1 (refer to location sketch SK-DE-BOP-0011). The components of the NIM system are:

A. 24 (total, purchased by Engineering) Mod IV NIM instruments configured as triplets. Each of the above listed areas will have two triplet pairs. NIM instruments installed in triplets require two-out-of-three votes to initiate system alarms.

1. Each NIM Instrument Cabinet will be installed inside a (see-thru) tamper proof enclosure. All 24 NIM Instrument Cabinets (and the NIM Isolation Cabinet) may be installed inside a common enclosure to conserve space, the bounding maximum size to be 96" W x 72" H x 36" D, constructed of expanded metal, or equivalent material, designed to seismic II/I specifications.

B. NIM Isolation Cabinet (1) (refer to location sketch SK-DE-BOP-0011).

C. Remote alarm bells (24) and strobe lights (24) as required to adequately cover the KAC.

D. NIM Interconnections

1. All interconnecting cabling between NIM Detectors, distribution panels, Instrument Cabinets and the Isolation Cabinet are to be

installed in dedicated RGS or IMC conduit. Other radiation monitoring systems may not share NIM system conduit.

2. For cable and raceway quantities refer to Attachment 1.

3.3.1.2 The NIM Isolation Cabinet will provide an isolated discrete output to the ICS as well as provide functionality for system audible and visual alarms.

3.3.2 Continuous Air Monitor

3.3.2.1 CAM Sampling Heads (purchased by Engineering) will be installed in areas occupied by personnel where work is performed that creates or has the potential to create airborne radioactivity during normal operations (refer to layout diagram J-J8-K-00022, Sh. 1 and location sketches SK-DE-BOP-0004, -0005, -0006, -0012 & SK-DE-VIT-0009). The head locations are:

A. TRU Loading (1)

B. Failed Equipment Storage (1)

C. Green Fuel Disassembly (1)

D. Feed Preparation (2 – 1 operations side & 1 maintenance side)

E. Oxidation (2 – 1 operations side & 1 maintenance side)

3.3.2.2 CAM Sampling Heads (purchased by Engineering) will be installed at the boundaries of areas where a power failure or other disruption of engineering controls could result in the release of airborne radioactivity. CAM heads will monitor the HVAC exhaust ducts of these areas. Additionally, for enhanced personnel protection and notification of contamination prior to entry into these areas, CAM heads will be installed to monitor the airlocks of these areas, wherein each CAM head will be installed outside its respective airlock and a sample tube will penetrate the exterior wall in order to sample the area inside the airlock (refer to layout diagram J-J8-K-00022, Sh. 1 and location sketches SK-DE-BOP-0004, -0005, -0006, -0012 & SK-DE-VIT-0009). The head locations are:

A. Green Fuel Disassembly (2 – 1 airlock & 1 duct)

B. Feed Preparation (2 – 1 airlock & 1 duct)

C. Oxidation (2 – 1 airlock & 1 duct)

D. Mixing & Milling (2 – 1 airlock & 1 duct)

E. Vitrification (6 – 4 airlocks & 2 ducts)

Each of the CAM heads listed above will have an In-Line Adapter that allows direct connection to the airlock sample line or HVAC duct.

3.3.2.3 CAM Controllers (purchased by Engineering) provide the operator interface for a network of up to eight Sampling Heads per Controller, thus there will be three networks (to connect 21 Sampling Heads) using a RS-485 communications protocol. The controller locations are:

A. Rad Con Support Space (3) (refer to location sketch SK-DE-BOP-0016).

B. RCO Office (3).

1. The Rad Con Support Space CAM controllers are mirrored by the RCO Office controllers via a RS-232 communications link.

2. The Rad Con Support Space CAM controllers output to the ICS via a RS-232 communications link.

3.3.2.4 Each of the CAM heads requires a Network Tee Box which provides in-line RS-485 and CAM head connections (21 total).

3.3.2.5 Each of the 3 networks requires a Network Terminator (3 total).

3.3.2.6 For cable and raceway quantities refer to Attachment 2.

3.3.2.7 A single vacuum pump will provide the required external airflow (~2 scfm/each) for all 21 CAM heads. The vacuum pump discharge will be connected to the PUD HVAC Main Exhaust Duct (refer to layout diagram J-J8-K-00022, Sh. 2 for P&ID). Additional components required to install the vacuum supply distribution system are:

A. Rotameter (21)

B. Valves:

1. ½" needle (21)
2. ½" ball (1)
3. ½" check (1)

C. Tubing ½" stainless – PS206A (1000')

3.3.3 Area Radiation Monitor

3.3.3.1 Area radiation monitors (purchased by Engineering) will be installed in occupied locations with the potential for an unexpected increase in dose rates and in locations where there is a need for local indication of dose rate prior to personnel entering remote locations. The ARMs will be configured as either high-range or low-range monitors. Configuration details of the 35 ARMs are detailed in layout diagram J-J8-K-00023 (refer to location sketches SK-DE-BOP-0004, -0005, -0006, -0011, -0012, -0014, -0015, SK-DE-VIT-0009 & -0010). The detectors to be used are:

A. High-range detector (4)

B. Low-range detector (31)

3.3.3.2 The ARMs are interconnected to a laptop computer located in the RCO Office which forms a serial network using a RS-232 communications protocol.

3.3.3.3 The ARM laptop computer outputs to the ICS via a RS-232 communications link.

3.3.3.4 Auxiliary audible and visual alarms are located to prevent uninformed entry into zones in alarm condition. Panels with relay internals activate the alarms with logic provided by the ICS. The quantities are:

A. Panels with relay internals (10) (purchased by Engineering) (refer to location sketches SK-DE-BOP-0005, -0006, -0012, -0014, -0016, SK-DE-VIT-0009 & -0010).

B. Auxiliary alarm, combination audible & visual (41).

3.3.3.5 For cable and raceway quantities refer to Attachment 3.

3.3.4 Retrospective Air Sampler

3.3.4.1 Portable RASs (purchased by Engineering) will located in hallways or other areas where the potential for airborne is low or non-existent as determined by the AMS as part of FARMS. Additionally, portable samplers will be employed during maintenance involving breaches of the gloveboxes. Ten (10) portable samplers will be provided to cover the KAC.

3.3.5 Personnel Contamination Monitor

3.3.5.1 Whole body personnel contamination monitors (16) (purchased by Engineering) will be located at the exits from all Contamination and Radiological Buffer Areas where potential for contamination exists to prevent the spread of contamination. (refer to location sketches SK-DE-BOP-0004, -0013, -0014, SK-DE-VIT-0010, P-PG-K-02142 & -02143).

3.3.5.2 The PCMs require 25 cc/min of P-10 gas (10% methane + 90% argon mixture). The components needed to install the P-10 gas distribution system are:

A. Gas cylinder cabinet (16)

B. P-10 gas cylinder, size 1A (32 = 350 day supply)

C. Valves:

1. 1" pressure relief (16)
2. ½" ball (16)

D. Tubing ½" stainless – PS206A (2320') (see Assumption 4.2.1.2).

All purchased by Construction

3.3.6 Rad Con Radiological Instruments

3.3.6.1 The quantities of portable Rad Con instruments and equipment required to support facility operations and maintenance is listed in Attachment 4.

3.3.7 Industrial Hygiene Monitoring Instruments

3.3.7.1 The portable industrial hygiene monitoring instruments and equipment required to support facility operations and maintenance are (Ref. G-FDD-K-00001):

A. Chemical agent (such as glovebox fire suppression agent, possibly FM-200 or Inergen) monitor (TBD)

B. Physical agent monitor (TBD)

C. Flammable gas concentration monitor (TBD)

D. Oxygen deficiency monitor (TBD)

E. Carbon monoxide concentration monitor (TBD)

F. Sound level monitor to support the hearing conservation program (TBD)

3.3.7.2 The cost of the portable industrial hygiene monitoring instruments and equipment is estimated to be $50,000.

3.4 Electrical

3.4.1 Refer to Attachments 1, 2 and 3 for cable and raceway bulk material summary reports (see Assumption 4.2.3.3).

3.4.2 Work Scope includes installation of new grounding pigtails (approx. 10 ft. long with bolted connections) between new permanent electrical equipment and/or skids to the existing ground grid system. Small movable equipment shall be grounded in accordance with code and or industry practices.

3.4.3 NIMs

3.4.3.1 120 VAC power for the NIM Instruments and the NIM Isolation Cabinet is to be installed in dedicated IMC or RGS conduit from the cabinets to the power distribution panel. Power is to be supplied from a dedicated branch of the (UPS) power bus. The NIM circuit is to be clearly marked: "NIM Circuit Power – Notify Custodian and Area Emergency Coordinator before De-energizing".

3.4.4 CAMs

3.4.4.1 Each of the 21 CAM heads requires local 120 VAC (UPS) power.

3.4.4.2 Each of the 6 CAM controllers requires local 120 VAC (UPS) power.

3.4.4.3 The vacuum pump requires local 208 VAC (UPS) power (see assumption 4.2.3.1).

3.4.5 ARMs

3.4.5.1 Each of the 35 ARMs requires local 120 VAC (UPS) power.

3.4.6 PCMs

3.4.6.1 Each of the 16 PCMs requires local 120 VAC power.

3.5 Plant Design

3.5.1 Piping quantities for the CAMs vacuum supply distribution system have been estimated in section 3.3.2.7.

3.5.2 Piping quantities for the PCMs P-10 gas distribution system have been estimated in section 3.3.5.2.

3.6 Civil/Structural/Architectural

3.6.1 Core drills will be required for routing electrical conduit through existing walls or floors. (Note: Installation of new core drills is covered in C-SOW-K-00009).

3.6.2 For electrical conduits and equipment supports, use cookbook No. C-CI-G-0039. For routing and supports for NPS 2" and smaller piping, use cookbook No. C-CH-G-00004.

3.6.3 Provide metal shelving and security cage for NIM electronics units and cabinet. Concept for shelving is 3 tiers, 12" deep, and 14' long. Shelf framework and supports shall be angle iron or tubular steel, anchor bolted to wall. Floor of shelves shall be 12 gauge sheet metal. Front of each shelf shall have a 4" high ledger angle of 1/8" steel plate. Concept for cage is a front section 20' long, 8' high with end walls 2' deep. No top is required. Back and floor will be existing concrete. Cage shall be fabricated from 12 gauge expanded metal with angle iron or tubular steel framework anchored to concrete. Provide (5 each) swinging, lockable doors, 30" wide and 7' tall. All material shall be galvanized or coated.

4.0 ASSUMPTIONS

4.1 General Assumptions

4.1.1 The Construction Agency will be the SRS Construction Group. DS will provide engineering documentation for the installation of this equipment and will rely on the use of SRS Guides and Standards.

4.1.2 SRS Construction Group will procure all bulk materials.

4.1.3 SRS Construction Group will procure all off-the-shelf components and equipment identified on engineering data sheets that do not require testing or quality documentation.

4.1.4 The installer is responsible for providing all equipment/components detailed within this document unless noted otherwise (i.e. purchased by Engineering).

4.2 Specific Assumptions

4.2.1 Mechanical

4.2.1.1 All piping will be per ASME B31.3.

4.2.1.2 Due to limited available total gas cylinder volume a P-10 gas line break will not cause an asphyxiation hazard and thus room oxygen deficiency monitors are not required.

4.2.2 Instrumentation and Controls

4.2.2.1 It is assumed that the placement of the CAM Sampling Head Vacuum Pump, valves, rotameters, quantity and routing of tubing, will be similar to that for the KIS Project.

4.2.2.2 It is assumed that the placement of the PCM P-10 gas distribution system cylinder cabinets, valves, quantity and routing of tubing, will be similar to that for CLWR-TEF. The quantity of ½" stainless tubing is based upon the assumption that the P-10 gas cylinder cabinets are centrally located against the outside facility wall on the 0' level next to the cylinder storage racks.

4.2.2.3 Air monitoring equipment types and locations based upon M&O-PUD-2006-00112.

4.2.2.4 It is assumed that all Pu Vit Facility Occupational Safety and Industrial Hygiene monitoring will be performed using only portable equipment similar to that for present KAC operations.

4.2.2.5 Portable Rad Con instruments and equipment detailed in Attachment 4 and portable industrial hygiene monitoring instruments and equipment will be purchased by Engineering and provided to Operations (i.e. no construction installation scope).

4.2.3 Electrical

4.2.3.1 The CAM Sampling Head Vacuum Pump motor power rating is less than 1 hp.

4.2.3.2 All permanently installed cabling will be routed in protected conduit/tray.

4.2.3.3 Quantities of conduit reported in Attachment 2, Bulk Materials List: CAMs and Attachment 3, Bulk Materials List: ARMs have not been economized for conduit or raceway sharing.

4.2.3.4 Existing grounding grid is intact and adequate for grounding of new equipment.

4.2.4 Plant Design

4.2.4.1 No specific assumptions have been made in this group.

4.2.5 Civil/Structural/Architectural

4.2.5.1 All anchor bolts used for equipment and commodity supports will be A36 Drillco Maxi bolts. Alternatively, cast-in-place anchors with grout sleeves or Hilti Kwik Bolt-TZ are acceptable for anchoring items.

4.2.5.2 Functional Classification for drilling holes in concrete surface is SC.

4.3 HBDER Scope

4.3.1 The addition of a redundant ARMs RS-232 serial network would allow continued operation of the system in the event of primary network failure. It is estimated 4130' additional 1PR #22 TWSH cable is required to accommodate this HBDER Scope item.

4.3.2 The addition of a second (parallel) CAMs vacuum pump would allow continued operation of the system in the event of primary vacuum pump failure or maintenance.

5.0 REFERENCES

5.1 Drawing List

5.1.1 PUD Project Drawings & Sketches

5.1.1.1 J-J8-K-00021 – Nuclear Incident Monitoring System (NIMS) Layout
5.1.1.2 J-J8-K-00022 – Constant Air Monitoring System (CAMS) Layout
5.1.1.3 J-J8-K-00023 – Area Radiation Monitoring System (ARMS) Layout
5.1.1.4 SK-DE-BOP-0004 – Plan View Electrical/Instrumentation Commodities Equipment Location Sketch Elevation -40
5.1.1.5 SK-DE-BOP-0005 – Plan View Electrical/Instrumentation Commodities Equipment Location Sketch Elevation -40

5.1.1.6 SK-DE-BOP-0006 – Plan View Electrical/Instrumentation Commodities Equipment Location Sketch Elevation -40
5.1.1.7 SK-DE-BOP-0011 – Plan View Electrical/I&C Commodities Location Sketch Elevation -20
5.1.1.8 SK-DE-BOP-0012 – Plan View Electrical/I&C Commodities Location Sketch Elevation -20
5.1.1.9 SK-DE-BOP-0013 – Plan View Electrical/I&C Commodities Location Sketch Elevation -20
5.1.1.10 SK-DE-BOP-0014 – Plan View Electrical/I&C Commodities Location Sketch Elevation -20
5.1.1.11 SK-DE-BOP-0015 – Plan View Electrical/I&C Commodities Location Sketch Elevation -20
5.1.1.12 SK-DE-BOP-0016 – Plan View Electrical/I&C Commodities Location Sketch Elevation -20
5.1.1.13 SK-DE-VIT-0009 – Plan View Electrical/Instrumentation Commodities Equipment Location Sketch Elevation -40
5.1.1.14 SK-DE-VIT-0010 – Plan View Electrical/I&C Commodities Location Sketch Elevation -20
5.1.1.15 P-PG-K-02142 – General Arrangement Plan at Level -20
5.1.1.16 P-PG-K-02143 – General Arrangement Plan at Level -40

5.1.2 Existing Savannah River Site (SRS) Drawings

5.1.2.1 None

5.2 Design Input Documents

The following Facility Design Description and System Design Descriptions are the baseline documents used to develop this SOW.

5.2.1 Facility Design Description

5.2.1.1 G-FDD-K-00001, Rev B "PUV Facility Design Description"
5.2.1.2 Health and Safety Monitoring System, FDD Input Draft B, Aug. 24, 2006

5.2.2 System Design Description

5.2.2.1 None.

5.3 Applicable SRS & Industry Codes, Guides and Standards

5.3.1 Industry Codes and Standards

5.3.1.1 ASME B31.3, 2006 - Chemical Plant and Petroleum Refinery Piping
5.3.1.2 NFPA-70 - National Electrical Code, 2005 Edition

5.3.2 SRS Guides & Standards

5.3.2.1 WSRC-TM-95-1, Standard No. 13096, Rev. 5, "Field Installation of Nuclear Incident Monitor (NIM) (U)"
5.3.2.2 WSRC-TM-95-1, Standard No. 03010, Rev. 1, "Coring, Chipping, and Drilling in Concrete"
5.3.2.3 WSRC-IM-95-58, Guide No. 03252-G, Rev. 1, "Installation and Testing of Concrete Anchors"
5.3.2.4 WSRC-IM-95-58, Guide No. 15060-G, Rev. 5, "Application of ASME B31.3"

5.3.2.5 WSRC-IM-95-58, Guide No. 15980-G, Rev. 3, "Installation and Calibration of Instruments"
5.3.2.6 WSRC-IM-95-58, Guide No. 16051-G, Rev. 2, "Installation of Electrical Raceway Systems and Cable Trays"
5.3.2.7 WSRC-IM-95-58, Guide No. 16052-G, Rev. 3, "Installation of Electrical Wires, Cables and Terminations"
5.3.2.8 WSRC-IM-95-58, Guide No. 16053-G, Rev. 2, "Installation of Electrical Equipment"
5.3.2.9 WSRC-IM-95-58, Guide No. 16056-G, Rev. 2, "Installation of Grounding Systems"

5.4 Related Scopes of Work (SOW)

5.4.1 M-SOW-K-00017, Electrical System- The power distribution panels and UPS equipment installation is described in this related SOW.

5.4.2 M-SOW-K-00020, HVAC System- The CAMs sample the process room HVAC exhaust ducts as described in Section 3.3.2.2. (additionally the Isokinetic Stack Particulate Monitor is described in this related SOW).

5.4.3 J-SOW-K-00002, Integrated Control System- Alarms for these systems will be connected to the ICS as described in this related SOW.

5.5 Miscellaneous

5.5.1 M&O-NMM-2006-00011, K Area Complex Annual Review of Monitoring System (FARMS).
5.5.2 M&O-NMM-2006-00089, Preliminary Radiological Design Summary Report – Plutonium Vitrification Project (U).
5.5.3 M&O-PUD-2006-00004, Pu Disposition Project - Preliminary Discussion of Functional Classification of Pu Vit Facility Systems.
5.5.4 M&O-PUD-2006-00044, Project M09A, Pu Disposition Air Monitoring Kickoff.
5.5.5 M&O-PUD-2006-00093, Pu Disposition Project - Air Monitoring System Assumptions & Design Input for Continuous Air Monitors.
5.5.6 M&O-PUD-2006-00112, Pu Disposition Project – Meeting Minutes for Rad Con Review of Plutonium Vitrification Facility (-20' and -40' levels).

6.0 ATTACHMENTS

6.1 Attachment 1, Bulk Material List: NIMs
6.2 Attachment 2, Bulk Material List: CAMs
6.3 Attachment 3, Bulk Material List: ARMs
6.4 Attachment 4, List of Rad Con Portable Radiological Instruments

J-SOW-K-00003 Rev. 1
ATTACHMENT No. _1__
(Bulk Material Summary)

Scope Set: Health & Safety Monitoring: NIMs **Date:** 3/21/2007

Prepared By: Bart Betz **Reviewed By:** R. King

Exterior Glovebox Cables

Sum of Qty XGB (ft)	
Ext. Cable Size/Type	Total
9/C #20	4,200
2/C #18	40
3/C #14	360
2/C #14	2,400
Grand Total	7,000

All Raceway Types

Sum of Qty Rcwy (ft)	
RCWY	Total
3/4" IMC	2,670
1-1/2" IMC	600
Grand Total	3,270

Description: Health and Safety Monitoring for NIMs Bulk Materials, Cable and Conduit
Reference: J-J8-K-00021

Item #	From Equipment	To Equipment	Cable Estimates (Exterior GB)			GB Pentr	(Interior. GB)	Shared Rcwy/Tray	Raceway Estimates				
			Length (A) (ft)	Qty (A)	Cable size/type	Conn. (Qty)	Length (B) (ft)	Length (C) (ft)	Length (D) (ft)	Qty (D)	Size/Desc. (D)	Red	Notes/Comments
1	NIMs in Electrical Room 1	HM-DET-001, -002, -003, -004, -005, -006	290	6	9/C #20				280	1	1-1/2" IMC		Belden 83609
2	NIMs in Electrical Room 1	HM-DET-007, -008, -009, -010, -011, -012	120	6	9/C #20				110	1	1-1/2" IMC		Belden 83609
3	NIMs in Electrical Room 1	HM-DET-013, -014, -015, -016, -017, -018	120	6	9/C #20				110	1	1-1/2" IMC		Belden 83609
4	NIMs in Electrical Room 1	HM-DET-019, -020, -021, -022, -023, -024	110	6	9/C #20				100	1	1-1/2" IMC		Belden 83609
5	NIMs	HM-CAB-001	15	24	9/C #20				10	24	3/4" IMC		Belden 83609
6	lighting panel	NIMs	15	24	3/C #14				10	24	3/4" IMC		
7	HM-CAB-001	remote bells/lights	100	24	2/C #14				90	24	3/4" IMC		
8	HM-CAB-001	ICS-CAB-050	40	1	2/C #18				30	1	3/4" IMC		

J-SOW-K-00003 Rev. 1
ATTACHMENT No. _2__
(Bulk Material Summary)

Scope Set: Health & Safety Monitoring: CAMs **Date:** 3/21/2007

Prepared By: Bart Betz **Reviewed By:** R. King

Exterior Glovebox Cables

Sum of Qty XGB (ft)	
Ext. Cable Size/Type	Total
1PR #22 TWSH	3,650
1/C #12 THWN	2,730
Grand Total	6,380

All Raceway Types

Sum of Qty Rcwy (ft)	
RCWY	Total
3/4" IMC	3,170
Grand Total	3,170

Description: Health and Safety Monitoring for CAMs Bulk Materials, Cable and Conduit
Reference: J-J8-K-00022

Item #	From Equipment	To Equipment	Cable Estimates (Exterior GB)			GB Pentr	(Interior. GB)	Shared Rcwy/Tray	Raceway Estimates				
			Length (A) (ft)	Qty (A)	Cable size/type	Conn. (Qty)	Length (B) (ft)	Length (C) (ft)	Length (D) (ft)	Qty (D)	Size/Desc. (D)	Red	Notes/Comments
1	HM-MON-003A	HM-CAM-001	340	1	1PR #22 TWSH				330	1	3/4" IMC		
2	HM-CAM-001	HM-CAM-002	100	1	1PR #22 TWSH				90	1	3/4" IMC		
3	HM-CAM-002	HM-CAM-007	130	1	1PR #22 TWSH				120	1	3/4" IMC		
4	HM-CAM-007	HM-CAM-008	15	1	1PR #22 TWSH				5	1	3/4" IMC		
5	HM-CAM-008	HM-CAM-009	80	1	1PR #22 TWSH				70	1	3/4" IMC		
6	HM-CAM-009	HM-CAM-010	55	1	1PR #22 TWSH				45	1	3/4" IMC		
7	HM-MON-002A	HM-CAM-003	140	1	1PR #22 TWSH				130	1	3/4" IMC		
8	HM-CAM-003	HM-CAM-004	15	1	1PR #22 TWSH				5	1	3/4" IMC		
9	HM-CAM-004	HM-CAM-005	100	1	1PR #22 TWSH				90	1	3/4" IMC		
10	HM-CAM-005	HM-CAM-006	55	1	1PR #22 TWSH				45	1	3/4" IMC		
11	HM-CAM-006	HM-CAM-013	280	1	1PR #22 TWSH				270	1	3/4" IMC		
12	HM-CAM-013	HM-CAM-014	15	1	1PR #22 TWSH				5	1	3/4" IMC		
13	HM-CAM-014	HM-CAM-015	90	1	1PR #22 TWSH				80	1	3/4" IMC		
14	HM-MON-001A	HM-CAM-011	190	1	1PR #22 TWSH				180	1	3/4" IMC		
15	HM-CAM-011	HM-CAM-012	15	1	1PR #22 TWSH				5	1	3/4" IMC		
16	HM-CAM-012	HM-CAM-016	85	1	1PR #22 TWSH				75	1	3/4" IMC		
17	HM-CAM-016	HM-CAM-017	110	1	1PR #22 TWSH				100	1	3/4" IMC		
18	HM-CAM-017	HM-CAM-018	175	1	1PR #22 TWSH				165	1	3/4" IMC		
19	HM-CAM-018	HM-CAM-019	160	1	1PR #22 TWSH				150	1	3/4" IMC		
20	HM-CAM-019	HM-CAM-020	15	1	1PR #22 TWSH				5	1	3/4" IMC		
21	HM-CAM-020	HM-CAM-021	15	1	1PR #22 TWSH				5	1	3/4" IMC		
22	HM-MON-001A, -002A, -003A	HM-MON-001B, -002B, -003B	350	3	1PR #22 TWSH				340	1	3/4" IMC		
23	HM-MON-001A, -002A, -003A	ICS-CAB-050	140	3	1PR #22 TWSH				130	1	3/4" IMC		
24	lighting panel	HM-P-001	60	3	1/C #12 THWN				50	1	3/4" IMC		
25	lighting panel	HM-MON-001A, -002A, -003A	50	3	1/C #12 THWN				40	1	3/4" IMC		
26	lighting panel	HM-CAM-001	50	3	1/C #12 THWN				40	1	3/4" IMC		
27	lighting panel	HM-CAM-002	50	3	1/C #12 THWN				40	1	3/4" IMC		
28	lighting panel	HM-CAM-003, -004	50	3	1/C #12 THWN				40	1	3/4" IMC		
29	lighting panel	HM-CAM-005	50	3	1/C #12 THWN				40	1	3/4" IMC		
30	lighting panel	HM-CAM-006	50	3	1/C #12 THWN				40	1	3/4" IMC		
31	lighting panel	HM-CAM-007, -008	50	3	1/C #12 THWN				40	1	3/4" IMC		
32	lighting panel	HM-CAM-009	50	3	1/C #12 THWN				40	1	3/4" IMC		
33	lighting panel	HM-CAM-010	50	3	1/C #12 THWN				40	1	3/4" IMC		
34	lighting panel	HM-CAM-011, -012	50	3	1/C #12 THWN				40	1	3/4" IMC		
35	lighting panel	HM-CAM-013, -014	50	3	1/C #12 THWN				40	1	3/4" IMC		
36	lighting panel	HM-CAM-015	50	3	1/C #12 THWN				40	1	3/4" IMC		
37	lighting panel	HM-CAM-016	50	3	1/C #12 THWN				40	1	3/4" IMC		
38	lighting panel	HM-CAM-017	50	3	1/C #12 THWN				40	1	3/4" IMC		
39	lighting panel	HM-CAM-018, -020	50	3	1/C #12 THWN				40	1	3/4" IMC		
40	lighting panel	HM-CAM-019, -021	50	3	1/C #12 THWN				40	1	3/4" IMC		
41	lighting panel	HM-MON-001B, -002B, -003B	50	3	1/C #12 THWN				40	1	3/4" IMC		

J-SOW-K-00003 Rev. 1
ATTACHMENT No. _3__
(Bulk Material Summary)

Scope Set: Health & Safety Monitoring: ARMs **Date:** 3/21/2007

Prepared By: Bart Betz **Reviewed By:** R. King

Exterior Glovebox Cables

Sum of Qty XGB (ft)	
Ext. Cable Size/Type	Total
1PR #22 TWSH	4,130
1/C #12 THWN	4,650
Grand Total	8,780

All Raceway Types

Sum of Qty Rcwy (ft)	
RCWY	Total
3/4" IMC	4,990
Grand Total	4,990

Description: Health and Safety Monitoring for ARMs Bulk Materials, Cable and Conduit
Reference: J-J8-K-00023

Item #	From Equipment	To Equipment	Cable Estimates (Exterior GB)			GB Pentr	(Interior. GB)	Shared Rcwy/Tray	Raceway Estimates				Notes/Comments
			Length (A) (ft)	Qty (A)	Cable size/type	Conn. (Qty)	Length (B) (ft)	Length (C) (ft)	Length (D) (ft)	Qty (D)	Size/Desc. (D)	Red	
1	HM-RI-001	HM-RE-001	460	1	1PR #22 TWSH				450	1	3/4" IMC		
2	HM-RE-001	HM-RE-002	60	1	1PR #22 TWSH				50	1	3/4" IMC		
3	HM-RE-002	HM-RE-003	50	1	1PR #22 TWSH				40	1	3/4" IMC		
4	HM-RE-003	HM-RE-004	60	1	1PR #22 TWSH				50	1	3/4" IMC		
5	HM-RE-004	HM-RE-005	290	1	1PR #22 TWSH				280	1	3/4" IMC		
6	HM-RE-005	HM-RE-006	80	1	1PR #22 TWSH				80	1	3/4" IMC		
7	HM-RE-006	HM-RE-007	250	1	1PR #22 TWSH				240	1	3/4" IMC		
8	HM-RE-007	HM-RE-008	310	1	1PR #22 TWSH				300	1	3/4" IMC		
9	HM-RE-008	HM-RE-010	50	1	1PR #22 TWSH				40	1	3/4" IMC		
10	HM-RE-009	HM-RE-011	80	1	1PR #22 TWSH				70	1	3/4" IMC		
11	HM-RE-011	HM-RE-012	100	1	1PR #22 TWSH				90	1	3/4" IMC		
12	HM-RE-012	HM-RE-015	110	1	1PR #22 TWSH				100	1	3/4" IMC		
13	HM-RE-015	HM-RE-013	70	1	1PR #22 TWSH				60	1	3/4" IMC		
14	HM-RE-013	HM-RE-014	70	1	1PR #22 TWSH				6	1	3/4" IMC		
15	HM-RE-014	HM-RE-016	70	1	1PR #22 TWSH				60	1	3/4" IMC		
16	HM-RE-015	HM-RE-016	70	1	1PR #22 TWSH				60	1	3/4" IMC		
17	HM-RE-016	HM-RE-017	70	1	1PR #22 TWSH				60	1	3/4" IMC		
18	HM-RE-017	HM-RE-018	250	1	1PR #22 TWSH				240	1	3/4" IMC		
19	HM-RE-018	HM-RE-019	210	1	1PR #22 TWSH				200	1	3/4" IMC		
20	HM-RE-019	HM-RE-022A	170	1	1PR #22 TWSH				160	1	3/4" IMC		
21	HM-RE-022A	HM-RE-022B	5	1	1PR #22 TWSH				1	1	3/4" IMC		
22	HM-RE-022B	HM-RE-021A	90	1	1PR #22 TWSH				80	1	3/4" IMC		
23	HM-RE-021A	HM-RE-021B	5	1	1PR #22 TWSH				1	1	3/4" IMC		
24	HM-RE-021B	HM-RE-024	90	1	1PR #22 TWSH				80	1	3/4" IMC		
25	HM-RE-024	HM-RE-023A	60	1	1PR #22 TWSH				50	1	3/4" IMC		
26	HM-RE-023A	HM-RE-023B	5	1	1PR #22 TWSH				1	1	3/4" IMC		
27	HM-RE-023B	HM-RE-029	70	1	1PR #22 TWSH				60	1	3/4" IMC		
28	HM-RE-029	HM-RE-030	60	1	1PR #22 TWSH				50	1	3/4" IMC		
29	HM-RE-030	HM-RE-031	60	1	1PR #22 TWSH				50	1	3/4" IMC		
30	HM-RE-031	HM-RE-028	95	1	1PR #22 TWSH				85	1	3/4" IMC		
31	HM-RE-028	HM-RE-027	60	1	1PR #22 TWSH				50	1	3/4" IMC		
32	HM-RE-027	HM-RE-026	90	1	1PR #22 TWSH				80	1	3/4" IMC		
33	HM-RE-026	HM-RE-025	80	1	1PR #22 TWSH				70	1	3/4" IMC		
34	HM-RE-025	HM-RE-020A	185	1	1PR #22 TWSH				175	1	3/4" IMC		
35	HM-RE-020A	HM-RE-020B	5	1	1PR #22 TWSH				1	1	3/4" IMC		
36	HM-RI-001	ICS-CAB-050	290	1	1PR #22 TWSH				280	1	3/4" IMC		
37	lighting panels	individual ARMs	50	93	1/C #12 THWN				40	31	3/4" IMC		

12/18/2006 01:52 PM

To Barton Betz/SUB/Srs
cc Terese Henson/WSRC/Srs@Srs, Charles Warren/WSRC/Srs@Srs
Subject Preliminary PuVit RadCon Equipment List

Based on our 12/01/06 meeting and conversations with NMM RadCon personnel, here is the preliminary radiological equipment list for the PuVit Project:

Air Sampling

Motor Air Pumps - 15
Staplex Impactors - 5
SKC Lapel Pumps (5/pack) - 2

Portable Survey Instruments

Alpha Survey - 6
Beta-gamma Survey - 6

Dose Rate Instruments

RO-20 - 6
Bicron Micro-rem - 4
Teletector - 3
Neutron Rem Ball - 6

Count Room Equipment

HandECounter - 5
Canberra filter paper scanner - 2

Radioactive Sources

for count room instruments - 2
for portable survey instruments - 2

Personnel Monitoring

PCMs - 16
Count Rate Meters - 30

Dosimetry

EPD Model Mk-2 - 20

If these instruments are also for the D&D effort on -20 and -40 levels, then some categories will be higher (I need input from Terese and Rick as to how many RadCon Inspectors it will take for that work, and pro-rate the instrumentation numbers accordingly). The number of PCMs may be reduced (two are currently specifed for each location) if a set of PCMs is within reasonable walking distance from a single PCM station. However, this should give you a starting point, call me if you have any questions.