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Radon Control System (RCS)
Valve Assembly Installation Overview

AUTHORIZED BY: _____ 9/25/02
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Approval Signature Page

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Radon Control System (RCS) Valve Assembly Installation Overview

1.0 Introduction

This summary work plan describes the construction activity required to install the interface between the Radon Control System (RCS) and the headspaces of Silos 1 & 2 for Phase I operation of the RCS. This document identifies the overall framework within which this limited construction activity will be implemented.

This summary work plan provides:

1) A brief description of the activity.
2) The measures in place or to be taken to assure worker protection.
3) The measures in place or to be taken to protect the environment.
4) The contingencies availed to the project to mitigate the impacts of unforeseen upset conditions and/or barrier failures.

This work plan does not substitute for specific work instructions to be implemented in the field.

2.0 General Steps for Valve Installation

The purposes of the construction activity are:

1) To install 2 sets (per silo) of pressure control valves at locations A & B of each silo. (See Attachment 1). These valves serve as the outlet for radon from the Silo dome headspace and the inlet for treated air returning from the RCS.

2) To install an isolation valve to the existing 2" riser. This valve isolates the 3" suction bypass line to the RCS. The suction bypass line functions to support pressure control for the K-65 Silos.

After installation of the inlet and outlet pressure control assemblies, a 6" diameter flex hose will be connected to the valve assemblies and will serve as the conveyance for the contaminated air to the RCS treatment and return of the treated air to the Silo headspace.

Attachment 2(20 FMD146) shows a detail of:

a) The pressure control valve assemblies, and,
b) The flex duct to pipe interface

Attachment 3 (20 FMD102) shows the post-installation arrangement of the valve assemblies and the RCS ducting. Installation of these valves to the silos provides the interface from the Silos to the RCS for Phase 1 operations. The valve assemblies will provide isolation to isolate the radon in the headspace of the K-65 silos until the initiation of RCS Phase I.

The installation of the valves will be preceded by a mock-up activity. The mock-up activity will be the practice phase for the construction activity and afford practice in the use of the glovebags, removal of the manways, and installation of the valves. This mockup will verify the adequacy of the work procedures and will identify any necessary improvements to the procedures, tool selection, etc. It will provide the opportunity for participation from the actual workers and supervision responsible for the installation in the development of the final work plan. The final work plan is called a construction traveler.

The finalized construction traveler will incorporate additional details as the work process is finalized, thus, the content of the actual work plan is subject to change based upon lessons learned from mock-up and feedback from workers and supervision.

The installation of the valves will be done according to work instructions incorporated into a Construction Traveler Package provided to the construction subcontractor.

To assist in the understanding of the process of actual installation, Attachment 4 is provided. Attachment 4 is a summary of the specific installation instructions as they now are presented in the Construction Traveler Package.

The major activities detailed in Attachment 4 are:

- Installation of Pressure/Vacuum Valve Assemblies to the Silos Manways
- Installation of Isolation Valve to Existing 2" Risers

These major activities are detailed in Attachment 4.

Finally, before the initiation of the work, and after the incorporation of the lessons learned from the mock-up have been incorporated into the Traveler Package and other plans (eg. Radiological Work Permit and FEMP Work Permit), a detailed, independent surveillance will carried out by Fluor's Quality Assurance Team. The actual installation of the valves will not proceed until any deficiencies have resolved.

It is anticipated that two, 10 hour days will be required for the installation of the valve assemblies; one day for each silo. The project has been planned to assure compliance with load bearing requirements applicable to work on the silo domes consistent with the Safety Basis Documentation.

3.0 Worker Protection

The highest priority of this task and all tasks at the FEMP is to perform work safely. Therefore, extensive measures will be in place to protect the worker and to minimize releases to the environment to levels that are ALARA. The industrial safety issues will be addressed in a specific work plan (Construction Traveler Package), a FEMP Work Permit, and a Construction Health and Safety Plan for the Silos Project.

The major occupational radiological safety issues for the workers installing the valve assemblies are exposures from radon and external whole-body penetrating gamma radiation. To protect the worker from inhalation of radon gas, the Silos Project will use a combination of engineering controls, administrative control, and PPE. Exposures to external radiation exposures will be maintained using ALARA principles and implementation of detailed planning. Below is a summary of the major mitigators/actions to minimize radiological exposures during the activity.

3.1 Engineering Controls and Personnel Protective Equipment (PPE)

The first layer of defense for the worker and release to the environment will be the use of a glove bag for containment. A sealed glovebag will help to minimize the escape of radon for the brief period of time when the flange is removed and the new valve/valve assemblies are bolted in place. The second layer of defense for the workers for protection from radon is the use of air supplied suits. The "bubble suits" will have supplied air from an external air trailer that will provide fresh clean air for the workers to breath. Other PPE will be available and prescribed based upon radiological conditions as dictated by the work permit.

3.2 Planning (Mockup/Training/Briefings)

Worker involvement is key to the success of any project. Therefore, the workers and supervisors are being involved in the planning process through meetings, briefings and a mockup of the activity. The steps of the draft work plan will be evaluated by the workers to see if the plan is safe, functional, and efficient. Feedback will be solicited from involved personnel and lessons learned will incorporated in the plans and permits requirements.

Detailed planning and practicing will dramatically minimize the time spent on the silos dome where radiation levels are elevated. Attachment 5 is a radiological survey to give an overview of the radiation levels on the K-65 silo domes. The following items are being performed to ensure adequate planning and implementation:

- Dry runs
  Dry runs are walk throughs with workers and management in order to ensure personnel fully understand the activity and to obtain feedback for incorporation into the work plan. The dry runs will be performed prior to conducting the mock-ups.

- Mock-ups
  Activity will be practiced using some of the same tools and equipment where feasible. Lessons learned by the mockup and other sources will be incorporated into the work plan.

- Briefings
  Briefing will be performed for the involved prior to the activity and daily during the activity. This is a vital process to get worker involvement and feedback.

3.3 Work Plans/Work Permits

The activity will be performed in accordance with approved work plans and work permits. These plans and permits will be briefed to the workers and become the administrative tool to execute the task.

3.4 Detectors/Monitors

- Site Radon Monitors

The environmental radon monitors located on the K-65 exclusion area perimeter and those located in the Silos Project area will assure that any effect on the surrounding area due to any releases of radon is identified and quantified. The next section will provide more information regarding the sites continuous radon monitoring system.

- Occupational Radon Monitoring

One of the most useful indicators of radon release will be the use of portable radiological monitoring instrumentation being used by Radiological Control who will provide full coverage and perform continuous monitoring. Other working level monitors will be used in the area to determine ambient radon working levels.

Although radon levels inside the worker air suits are not likely to become elevated, personnel radon monitors will be used to assess radon levels inside the workers air suit thus breathing zone.

3.5 Minimizing Time in the Work Area

During dry runs and mock-up, input will continue to be solicited to determine if there are any activities that can be performed off and away from the silo domes.
Example: The four pressure/vacuum relief assemblies will be pre-assembled away from the immediate area of the silos. The valve assembly will then be placed within a glove bag and its frame. The entire unit will then be hoisted to the silo manway where the only activity required to make up the final connection will be to seal the glovebag to the riser and remove the existing blind flange from the riser.

3.6 Oversight

As mentioned previously, Radiological Control will be providing full coverage using radiological control technicians and a Radiological Engineer. Quality oversight will also be present for independent assessment. In addition, construction management personnel will be directly involved in the planning and implementing process.

3.7 Notifications

Site notification will be made to the Emergency Duty Officer and the Assistant Emergency Duty Officer prior to commencement of the activity. Although release of radon to the environment is expected to be minimal, the potential for an increase in ambient radon levels in and around the immediate area of the silos is recognized in the planning of the project. Therefore, the Communication Center will also be notified so they are aware of the possibility of increased radon concentrations around the Silos Exclusion Area.

4.0 Protection of the Offsite Environment

The mitigators listed above for the control of exposure to the occupational worker also apply to minimizing releases to the environment. If the radon release is minimized at the source to protect the worker, then any release to environment will be ALARA.

Environmental monitoring for the project is performed in conformance with Silos Project Environmental Monitoring Plan. The following is a synopsis of the monitoring that will be done for environmental purposes during the valve installation. No environmental monitoring beyond that required in the Silos Project Environmental Monitoring Plan is planned for this activity.

4.1 Detectors/Monitors

Continuously operating environmental radon monitors are located throughout the site and at many offsite locations. The real-time data from the monitors are available to the Fernald Workforce, OEPA, USEPA, the public, and other stakeholders.

Many of these monitors are located in the immediate area of the silos and the Silos Project. The Silos Exclusion Area monitors are continually monitored by the site Communications Center for immediate detection in case of a silo dome failure. Refer to Attachment 6 to see the location of the various radon monitors located within the Silos Project Area.

Other radon monitors will be used for detection of radon leakage. See section 3.4

5.0 Contingencies

5.1 Elevated radon levels in the immediate area of the silos

The specific issues involve potential leakage through the glovebag due to causes such as a failed seal or a cut or rip in the glovebag.

Contingency/Controls

- Workers on the dome and directly next to the dome are protected by the use of bubble suits.
- Respiratory protection will be available in the immediate area of the exclusion area such as for control point personnel where bubble suits will be doffed.
- The source of the leak can easily and quickly be detected by radiological control using field instrumentation. A Radiological Control Technician will be on the dome or directly adjacent to the activity at all times.
- Leaks can be repaired quickly using tape and other suitable materials.
- A secondary boundary beyond the exclusion area will be established to minimize the number of personnel in the silos project area.

5.2 Silos Exclusion Area Radon Monitors Alarms

The Silos Exclusion Area perimeter radon monitors are continuously being monitored in the Site Communication Center. There are associated alarms to alert the site if radon levels become elevated. Site procedure, EM-0030, "Silos Area Emergency Response" details the required response to these alarms.

Contingency/Controls:

- The Exclusion Area monitors will be monitored by silos project personnel when the during breaching activities.
- The Assistant Emergency Duty Officer and Communication Center supervisor will be briefed on the activity ahead of time so they are aware of the activity.
- Any repairs will be performed as discussed above.
- If radon levels become excessive, the activity will be shutdown and silos will be put in a safe configuration. The levels will be monitored continuously. Additionally, the Communications Center and Project Radiological Engineer will be in communication with one another.

5.3 Failed Relief Valve Post Valve Assembly Installation

Once the valve assemblies are installed, the system will be evaluated to ensure that there is no leakage.

Contingency/Controls:

- Risers and pressure/vacuum reliefs are tested and inspected prior to installation.
- After the valve assemblies are installed, Radiological Control will perform monitoring to determine if there is any leakage of the newly installed components.
- If leakage is detected, actions will be implemented to stop the release of radon. Examples of action if a leak is detected include torque checking connections or component replacement.

5.4 Dome Collapse

Structural Engineers have determined that if a failure were to occur, the failure would likely be localized buckling of the dome. This accident has been evaluated for consequences to the workers, public, and the environment. The analyses determined that for an unmitigated accident, there would be no significant effect on the public or environment. However, there would be significant localized consequences. Therefore, the project has controls in place to reduce the probability of the accident from occurring and emergency procedures and plans exist if the accident were to occur.

Contingency/Controls

- Procedure D22-03-001 is followed in order to access the K-65 Silos. D22-03-001 require that a Silo Dome Access Permit be written prior to personnel access or placement of equipment on the K-65 Silo domes.
- Emergency procedure EM-0030 provides the steps to follow in the event of a silo dome collapse.

Attachment 4 - General Steps for Installation of Valves/Aseemblies on the K-65 Silos

Installation of Pressure/Vacuum Valve Assembly to Silo Manways

1. Perform a pre-job briefing.

2. Donn protective clothing in accordance with the work permits

3. Access silo man-way and receive valve assembly.
   The valve assembly will be assembled and rigged along with the glovebag and its frame then be hoisted via a crane to the manway where the valve assembly will be connected . This activity will be performed on the ground where radiation levels are negligible.

4. Install tools and attach the glove-bag to man-way while suspending the valve assembly above the manway.
   Caution: Cribbing will be used between workers finger and load to mitigate the pinch hazard.

5. Radiological Control perform the glove-bag inspection.

6. With approval from Radiological Control start removing fasteners from flange.

7. Slide flange to the side when all the fasteners are removed.
   Caution: Take care to not damage glovebag with the manway cover. The man-way cover weight is approximately 20 lbs.

8. Clean the man-way flange

9. Ensure the new valve assembly has a gasket in place

10. Lower the valve assembly into place. Watch for proper orientation of fasteners.

11. Tighten fastener as required by the work plan.

12. QA/QC check that the fasteners meet torque specification.

13. Remove sling from crane hook

14. Remove glove-bag **frame** and secure glovebag to manway to prevent damage from excessive wind.
   The glovebag will be left on the assembly in order to allow for decay of radon and to check for leakage.

15. Leave glove-bag installed to allow for decay as determined by Radiological Control.

16. When Radiological Engineering approves, Radiological Control will remove the glove-bag and its contents.

Attachment 4 (-continued-) General Steps for Installation of Valves/Assemblies on the K-65 Silos

Installation of Isolation Valve to Existing 2" Risers

1. Perform a pre-job briefing.
2. Donn protective clothing in accordance with the Work Permits
3. Attach the glove-bag to dome surface.
4. Radiological Control perform a glove-bag inspection
5. With approval from Radiological Control, remove blind flange.
6. Clean the man-way flange
7. Ensure the new valve assembly has a gasket in place.
8. Place the valve assembly into place and tighten nuts and bolts per torque specification.
9. Perform QA/QC check that fastners meet the torque specification.
10. Remove glove-bag **frame** and secure glovebag to manway to prevent damage from excessive wind.

    The glovebag will be left on the assembly in order to allow for decay of radon and to check for leakage.

11. Leave glove-bag installed to allow for decay as determined by Radiological Control
12. When Radiological Engineering approves, Radiological Control will remove the glove-bag and its contents and package as radioactive waste.

FEMP COVER SHEET		SURVEY NUMBER 2002-09-12-0086
DATE 9/17/2002	RCT PRINT [redacted] 4598	PAGE 1 of 3
TIME 1330	SIGNATURE [redacted]	BADGE # 7715
RWP NUMBER	REVIEWER PRINT [redacted]	DATE 9/17/02
2002-0104	SIGNATURE [redacted]	BADGE # 7502

LOCATION: SLO's 182

REASON FOR SURVEY: DOSE RATE SURVEY OF MANWAYS & PORTS WHERE GLOVE BAGS ARE TO BE INSTALLED FOR MODIFICATION FOR THE NEW RAS SYSTEM

SUMMARY:

COPY

-4617
. 2: 04/01/99, RP-0023

ATTACHMENT 5

FEMP / RADIOLOGICAL SURVEY REPORT

4598

SURVEY NUMBER: 2002-09-12-0066

DATE:	RCT PRINT:		BADGE #:
9/17/2002	[redacted]	[redacted]	7715
DATE REVIEWED:	[redacted]	[redacted] SIGNATURE):	BADGE #:
9/17/02			7502

MODEL	SERIAL NUMBER	TYPE (α, β, γ)	CALIBRATION DUE DATE	BKGD (cpm)	EFF./CF	COUNT TIME (min)	MDA (dpm) =	INSP./ PERFORMANCE TEST SAT? YES	NO
TELETECTOR	37337	BX	9/2003	NA	NA	NA	NA	✓	
				NA					

ITEM NUMBER	LOCATION AND/OR DESCRIPTION	DPM/100cm² ALPHA REMOVABLE (1)	DPM/100cm² ALPHA FIXED PLUS REMOVABLE	DPM/100cm² BETA-GAMMA REMOVABLE (1)	DPM/100cm² BETA-GAMMA FIXED PLUS REMOVABLE	CORRECTED DOSE RATE (MREM/HR) γ CONTACT	β CONTACT	γ AT__FT	β AT__FT
1	SEE PAGE 3 FOR DOSE RATE LOCATIONS								
				NA					
		NA							

COPY

Note (1): Values identified by an asterisk (*) indicate results are less than the calculated MDA.

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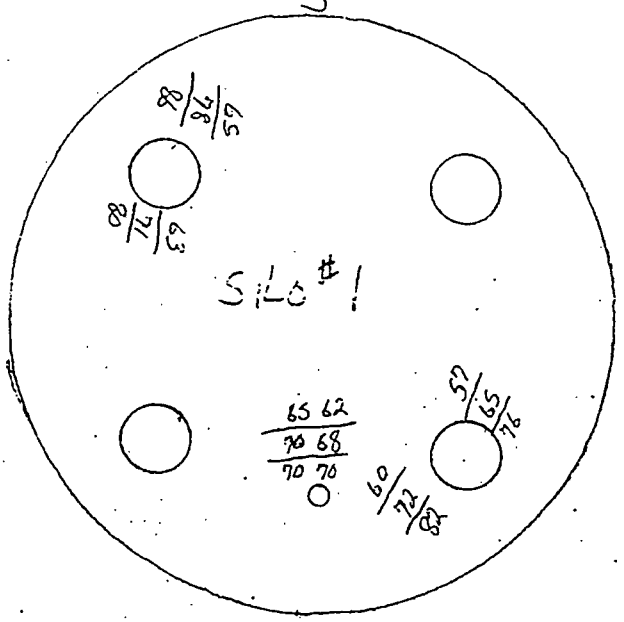
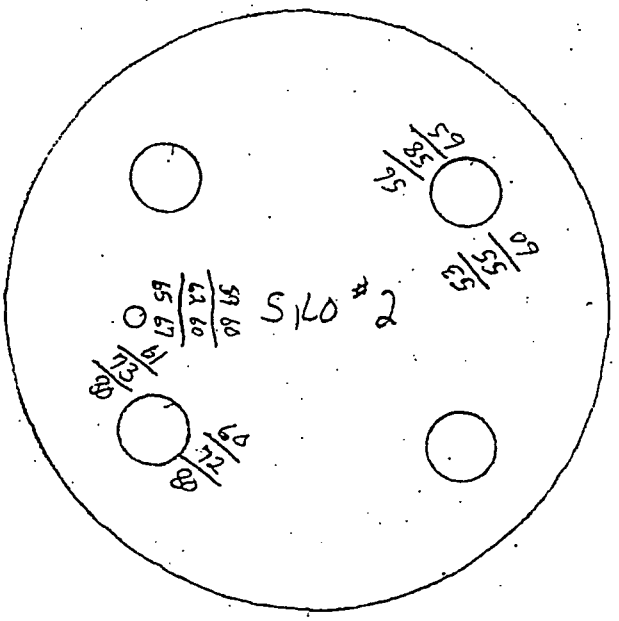
SUMMARY AND/OR SPECIAL REPORT FORM

LOCATION: SILO'S 1 & 2	DATE: 9/17/2002
DOCUMENT TITLE: ~~DOE~~ DOSE RATE SURVEY	DOCUMENT # 2002-09-12-0066

S



W



N

SE RATES ARE IN MR/HR

NTACT, 1 FOOT, & 3 FOOT READINGS

ENTERED BY:	REVIEWED BY:
NAME: (PRINT) [redacted]	NAME: (PRINT) [redacted]
SIGNATURE/DATE [redacted] 9/17/2002	SIGNATURE/DAT [redacted] 9/17/02

FS-S-4365
REV. 1: 04/20/98, RP-0023

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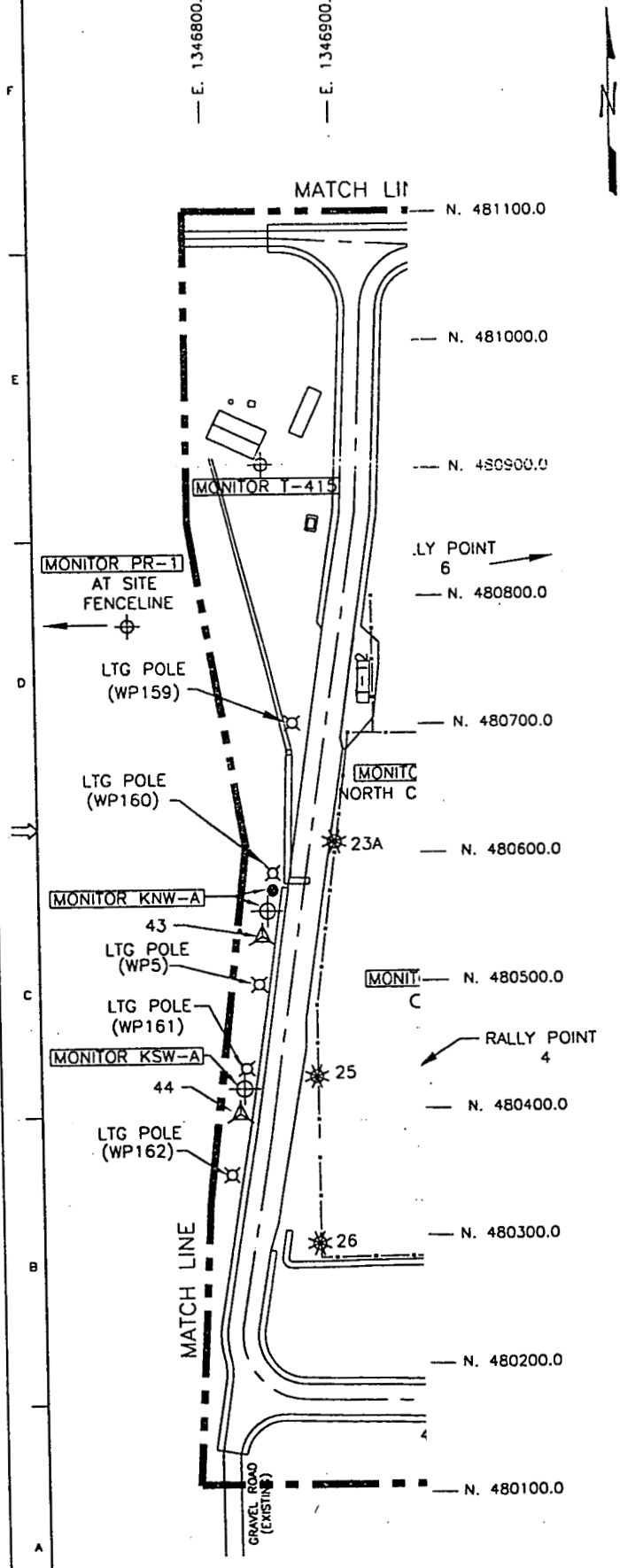
14

ATTACHMENT 6

4598



LEGEND OF SYMBOLS

- = RADON MONITOR LOCATION
- = RALLY POINT LOCATION
- = BADGE IN STATION LOCATION
- = EXISTING TLD LOCATION
- = NEW TLD LOCATION
- = HIGH VOLUME PARTICULATE MONITOR LOCATION

0 25 50 100 150 200 250

GRAPHIC SCALE
1" = 50'

DWG FILE	RADMON.DWG	CHECKER	

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR DANIEL FERNALD
SILOS PROJECT
CINCINNATI, OHIO

DRAWING TITLE
RADON MONITOR LOCATION
SILOS AREA LOCATION PLAN
OU 4 SILOS PROJECT

15

DRAWN BY	J. THOMPSON	DATE	1/10/00	DESIGNED, CHECKED BY	DATE
CHECKED BY	DATE	PLANT/BLDG. NO.	OU4	AUDIT	SCALE 1"=50'
CLASS	SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	OPERATING CONTRACTOR	DATE	
A-E PROJECT NO.	40710	OPER. CONTR. PROJ. NO.	—	DRAWING NO.	94X-5500-SK-5527
SHEET NO.	1	REV. NO.	C		

DISTRIBUTION CODE: 1001 ACAD INITIALS: JBT DATE: 08/22/02