STAR Shift Plan Document

July 9, 2001

I. INTRODUCTION

This Shift Plan is designed to meet the requirements of:

A) Continuous running over an extended period (up to 28 weeks depending on funding), with 7 days/per week, 24 hours/day data taking periods.

B) Involvement of the entire collaboration in the STAR experimental program.

C) Providing a set of personnel trained to operate the STAR detector system in a manner fully in accord with the procedures established by the STAR Collaboration, with C-AD safety standards and emergency procedures, and with the BNL Standards Based Management System

II. THE STAR SHIFT PLAN COMMAND STRUCTURE

A) Operations Coordinator:

The individual holding this position has responsibility for coordinating technical effort (as opposed to scientific data taking), and coordinating with the managements of STAR and C-AD in order to insure effective implementation of the experimental program agreed upon by the STAR Collaboration and BNL Management. He/she is the lead person coordinating technical staff and detector experts through each commissioning period, as well as during normal running periods when serious technical problems (as opposed to physics issues) arise, and interrupt the normal flow of data taking. During periods of commissioning he/she will be responsible for calling/leading meetings required for technical coordination, and will take leadership in determining the hour to hour, day to day strategy to commission the STAR detectors and bring them online for physics data taking. Once this phase is complete, responsibility for coordination of “regular” STAR shift staff (as opposed to “detector experts”) in pursuing the STAR physics program is assumed by the STAR Period Coordinators and Shift Leaders (see below).

The Operations Coordinator consults with STAR Collaboration management on the most effective technical strategies to achieve a desired STAR physics goal, but does not decide the course of the STAR scientific program or physics priorities within the scope of the STAR scientific program. He/she represents STAR to C-AD Management and RHIC Operations in matters where the technical operation of STAR and STAR running are concerned. He/she will be particularly concerned with all technical issues dealing with the STAR running which have long range aspects (> weeks). The Operations Coordinator does not necessarily participate in daily shift work, but he/she oversees the coordination of all technical aspects of STAR running. The

Operations Coordinator is a BNL employee, appointed by the STAR Group Leader, who is acceptable to the Management of STAR and the Chairman of the Department of Physics at BNL. During the full term of a given running period, he/she is resident at BNL, except for normal vacation periods when the responsibilities of the Operations Coordinator are covered by other BNL staff. Under "normal" circumstances he/she follows a work schedule approximating that of five days per week. The Operations Coordinator must satisfy a full "menu" of training requirements dealing with procedures involved in the safe operation of the STAR system, proper methods in work planning, and proper procedures to be followed in emergencies.

B) Period Coordinator:

The individual holding this position has responsibility for oversight and continuity of the STAR experimental scientific program on a day-to-day, week to week basis during a two week "tour of duty". Once the STAR detector has been commissioned and brought into "routine" operation for data taking, the Period Coordinator will be responsible for calling and leading meetings required for the coordination of regular shift crew in carrying out the near term scientific program. Should a serious technical problem arise, which cannot be fixed simply by members of the shift crew in consultation with Detector Experts, the STAR Operations Coordinator will assume responsibility for coordinating the effort by Detector Experts to bring the detector back into normal operation. Once normal operation is restored, the Period Coordinator will resume responsibility for oversight and coordination of Shift Leaders and Shift crew to take STAR data.

The Period Coordinator is not on shift during the two weeks of their tour, but he/she will be available, on 24-hour call, for consultation with the STAR Shift Leaders concerning ongoing data taking priorities and pursuit of the STAR scientific program. The Period Coordinator is from a member institution of the STAR Collaboration; and indeed, one of the purposes of this position is to directly involve the Collaboration as a whole in the responsibilities for, and excitement of STAR running. A Period Coordinator will usually serve two-week "tours of duty" during a given period of STAR-RHIC running. The training requirements for Period Coordinator are listed in Appendix A. The Period Coordinator must have a good knowledge of the near term goals of the STAR scientific program, as well as a working understanding of the configuration and operation of STAR detectors systems (in particular the impact of various trigger configurations) in order to consult effectively on near term strategies for effective pursuit of STAR's scientific goals. Period Coordinators are appointed by, and report to, the STAR Spokesperson. They consult the Spokesperson on issues regarding the physics program of STAR and its implementation with regard to STAR data taking.

C) Shift Leader:

A STAR Shift Leader directs the running of the STAR experiment during a shift of approximately 8 hours, once a day, for a minimum period of seven days. He/she is the only person recognized by the Collider-Accelerator

Department as being part of the C-AD Conduct of Operations. He/she is responsible to the Chairman of C-AD, through the C-AD Operations Coordinator, for insuring safe operation of the STAR Detector during normal data taking activities, fully within the operational envelope established by C-AD and the BNL Standards Based Management System.

The Shift Leader guides the Shift Crew, maintains liaison with the RHIC Main Control Room and contacts the subsystem experts if problems arise in the course of STAR operations. The goal of his/her leadership and direction is to achieve the near term scientific goals of the STAR program during an 8 hour period. A Shift Leader has final authority on the minute to minute conduct of STAR data taking activities in the STAR Control room, with one exception. With regard to the issue of "turning on" or energizing STAR detector components, the Shift Leader and the Detector Operator both play a role. The decision to turn on a detector requires the agreement of both the Detector Operator and the Shift Leader. Either person can decide to turn a detector system off, if they feel continued operation would result in an unsafe condition for the detector subsystem.

A Shift Leader comes from a member institution of the STAR Collaboration and usually serves a minimum of two seven-day shift periods during a given STAR-RHIC running period. The training requirements for Shift Crew Leader are listed in Appendix A. Shift Leader candidates are identified and trained according to STAR procedures, and are recommended to the Star Spokesperson for certification by the STAR Shift Leader Selection Quality Assurance Board. Certification of STAR Shift Leaders is made by the Chairman of the Collider-Accelerator Department, upon recommendation by the STAR Spokesperson.

D) Detector Operator:

A STAR Detector Operator is responsible for insuring all STAR detectors are operated in accordance with their safe operational envelope. He/she is responsible for monitoring slow controls information regarding detector performance, and for taking appropriate action to turn detectors on and off when called for by the condition of the accelerator or of the beams during the course of an 8 hour shift. He/she is responsible for having a detailed knowledge of the safe operational envelope of all STAR detectors, and is recognized as a resource and an authority in this area. With regard to the issue of "turning on" or energizing STAR detector components, the Shift Leader and the Detector Operator both play a role. The decision to turn on a detector requires the agreement of both the Detector Operator and the Shift Leader. If either person believes the detector should remain off for the safety of the subsystem, the detector system will continue to remain in a state in which it is not energized. Either person can decide to turn a detector system off if they feel continued operation would result in an unsafe condition for the detector subsystem.

A Detector Operator comes from a member institution of the STAR Collaboration and usually serves a minimum of two seven-day shift periods during a given STAR-RHIC running period. The training requirements for

Detector Operator are listed in Appendix A. Detector Operators are identified by STAR Management with input from the Collaboration, trained according to STAR procedures, and reviewed and recommended for certification by the STAR Shift Leader Selection Quality Assurance Board. Certification of STAR Detector Operators is by the STAR Spokesperson, upon recommendation by the STAR Shift Leader Selection Quality Assurance Board.

E) Shift Crew:

This is a group of three individuals who, under the direction of the Shift Leader, run the STAR experiment for a shift of 8 hours, once a day, for a period of at least seven days, with one additional day to overlap with the shift crew who will serve next. Two of these three individuals have specific, differentiated duties in the areas:

1) Run-Time: shift crew member carries out run-time (trigger/DAQ/online) procedures and manipulates various aspects of the data acquisition system. This person also reviews “low-level” data (i.e. data that does not require a great deal of analysis or manipulation) contained in the “Panitkin Plots” which are accumulated online from incoming data to assess the quality of the ongoing data acquisition.

2) Fast Offline Quality Assurance: shift crew member reviews and assesses the data set being acquired for quality assurance through fast offline reconstruction available in the STAR Control Room. The purpose of this role is to provide for feedback on the time scale of a few hours regarding quality assurance of data that is being recorded.

3) Shift Crew Member: this person does not have specific differentiated responsibilities. He/she assists other shift crew as needed, and attempts to learn about the operation and data taking activities of STAR generally. The person serving in this capacity may be apprenticed to a Detector Operator, or may serve in fulfillment of the pre-requisite for apprenticing to be a Shift Leader.

Training requirements for the members of a STAR Shift Crew are listed in Appendix A. Shift Crew members will receive any specialized training which may be needed from subsystems experts working under the coordination of STAR Operations Management. Regular Shift Crew members do not require certification. The manpower needed to supply the Shift Crew positions will come from the member institutions making up the STAR Collaboration.

F) Offline Quality Assurance Person

In addition to personnel present at the STAR detector site during data taking, for 2 shifts per day (day and swing shift), an additional person will be on duty to review the output of offline quality assurance production. The purpose of this effort is to provide quality assurance for STAR data analysis and production. This activity is de-coupled from the ongoing data acquisition

activity during running periods, and the quality assurance from this effort will be relevant for data that was (typically) acquired several weeks prior to data being acquired at the moment.

The person on this shift will be responsible for regular completion of a number of web based tasks (the description of tasks for this position is in section III below).

Personnel who take responsibility for offline QA shifts are not required to be present in the counting house, However, they are required to be on site at BNL for their first week of Offline QA shift service. Subsequent offline QA shifts may be done from non-BNL sites provided adequate web access to the Auto QA system can be demonstrated from the remote site.

Presence at the BNL site initially is motivated by the fact that many unforeseen problems with the quality assurance/production effort will very likely arise during these shifts and quick, real time help, which is more likely to be available at BNL, is essential to insure daily shift productivity. Continued participation from one's home institution is motivated by the reality of year round DST production and the very likely need to have at least one QA shift per day in the long run for the life of STAR. An Offline QA Oversight team will be on duty to assist and supervise the shift crew to insure that meaningful QA work is done. Members of the Offline QA Oversight Team will receive 0.25 shift week credit per week of service.

G) Subsystem Experts:

With the total STAR detector and data acquisition system broken down into a set of major subsystems, there will be a group designated as Subsystem Experts. Each Subsystem Expert possesses an extensive knowledge of a given subsystem. During STAR running there will be a Subsystem Expert on 24-hour call for each major STAR subsystem to deal with situations which cannot be handled by the Shift Crew Leader/Shift Crew utilizing the normal operating procedures and instructions. Maintenance of the roster of Subsystem Experts and the determination of their availability to cover the various STAR subsystems will be the responsibility of STAR Operations Management.

III. DESCRIPTION OF DUTIES FOR THE MEMBERS OF THE STAR SHIFT PLAN

A) Operations Coordinator:

1) During a given RHIC running period, has oversight and coordination responsibility for technical effort in support of the implementation of the STAR Experimental Program as decided by the STAR Collaboration in consultation with BNL Management.

2) Is responsible for identifying resource requirements for effective operation of the STAR Detector Support Group.

3) Oversees technical changes/developments in the STAR detector configuration/systems to insure that these changes are implemented in a timely fashion and cause a minimum of interference with the ongoing experimental scientific program. Works with the Leader of the Technical Support Group to operate the STAR detector in an effective manner.

4) Oversees the production of an accurate, concise "history" of the STAR running which will provide relevant information needed to make informed decisions about how the STAR experimental program should evolve over a given running period. As he/she is aware, acquaints the STAR shift crew and data analysis teams with particular conditions or problems concerning the data they are taking/analyzing.

5) Serves as a conduit of information between C-AD, STAR Management, and STAR Operations/Management/Coordination personnel, as well as STAR shift personnel regarding operations matters, technical matters affecting run plan factors/changes, and training requirements.

6) Represents STAR with C-AD Operations Management in matters involving the interface between STAR operations and RHIC operations. Attends and represents STAR at C-AD Operations and Time Meetings.

7) Is responsible for being aware of and communicating to STAR personnel the training requirements placed on them by C-AD. He/she maintains liaison with the C-AD Management as to any training requirements placed on STAR shift staff who serve as Period Coordinator, Shift Leader, Detector Operator, or Shift Crew member.

8) Reports to the STAR Council as requested.

B) Period Coordinator:

1) Has responsibility for continuity and coordination of the STAR experimental program on a day-to-day and week to week basis during a "tour of duty" of two weeks. The Period Coordinator will not be on shift during that period, but he/she will be available, on call, to the Shift Crew Leaders on a 24-hour basis. Starting at least one day before the start of the "tour of duty" he/she communicates with both the outgoing Period Coordinator and the Operations Coordinator concerning the ongoing STAR/RHIC experimental situation and the projected STAR experimental program. Makes this information available to the Shift Crew Leaders/Shift Crews.

2) Oversees the accumulation of information for an accurate “history” of the STAR experiment during his/her “tour of duty”.

3) Leads two types of meetings during the two week “tour of duty”. Both meetings have in attendance the Shift Leaders and Shift Crew staff for a given period as well as other STAR collaborators on site at BNL. The first meeting, held every day, goes over what was accomplished during the previous 24 hours and what the plans are for the next 24 hours of running. The current status of all systems, both hardware and software, are presented and problems both in accelerator operation and in the STAR experimental system are discussed in detail. Sometimes there will be a brief presentation on some aspect of the experiment, for example, progress in data analysis. In the second meeting, held once per week, the Period Coordinator presents a detailed report on what had been accomplished and on what problems had been encountered during the past week. Plans for the next week are gone over in detail. On-going progress in data analysis and investigations of the characteristics of the detector hardware are presented at this meeting. For major problems requiring extensive effort and or time by detector experts, authority for coordination of technical effort is passed to the Operations Coordinator until normal operation of the detector is restored.

4) Evaluates the performance of the Shift Leaders/Shift Crews and recommends adjustments to the STAR Spokesperson if necessary.

C) Shift Leader:

1) Supervises the operation of the STAR experimental setup during an eight-hour period and reports to the Period Coordinator with regard to detector operation, data flow, and data quality. Provides direction to the Shift Crew regarding the physics run plan and assesses the effectiveness of the ongoing shift, in part by examining the results of fast offline data Q/A. Provides direction to the Shift Crew regarding the safe operation of the STAR detector.

2) At the beginning of a week’s “tour of duty”:

   i) Is briefed in detail by the Period Coordinator concerning the objectives of the week’s running period and the status of the STAR experimental setup.

   ii) Is informed of the list of Subsystem Experts on call.

3) At the start of each shift, he/she reviews the actions taken by the previous shift and the current status of the STAR experimental setup with the outgoing Shift Leader.

4) Ensures that an accurate written log is maintained during the shift, and that all members of the shift crew record any changes made,

or unusual/unexpected conditions which occur. He/She produces a summary of each shift.

5) Is responsible for changes in trigger conditions, as previously set out by the Period Coordinator, for the starting and stopping of runs, and for the taking of calibration data.

6) Assures that STAR detector specific operating procedures are followed and ensures the safe operations of the detector within the approved C-AD/BNL safety envelope.

7) Acts as Liaison with the Main Control Room (MCR) during an 8 hour shift period

   i) Is the conduit for information between MCR and the STAR experiment.

   ii) Takes action as required by MCR.

   iii) Reports directly to MCR with regard to experimental safety issues.

   iv) Reports any radiological incidents, accidents, or unusual conditions to MCR.

8) Contacts Subsystem Experts in the case of problems with STAR detector operation or data acquisition that cannot be handled by the Shift Leader/Shift Crew. Keeps the Period Coordinator informed with regard to the situation. Ensures that the intervention of the Subsystem Experts is fully documented in the STAR experimental log.

9) **Must have the willing concurrence of the Detector Operator on duty before directing staff to energize a given STAR detector system.** If either the Detector Operator on duty or the Shift Leader feel the detector should not be turned on, or should be turned off from an energized state, the detector in question will remain off, or will be de-energized.

D) Detector Operator:

1) Is responsible for insuring all STAR detectors are operated in accordance with their safe operational envelope.

2) Is responsible for monitoring slow controls information regarding detector performance, and for taking appropriate action to turn detectors on and off when called for by the condition of the accelerator or of the beams during the course of an 8 hour shift.

3) Is responsible for having a detailed knowledge of the safe operational envelope of all STAR detectors, and is recognized as a resource and an authority in this area.

4) **Must concur that a given STAR detector or system is ready to be turned on before it is energized.** Further, If either the Detector Operator on duty or the Shift Leader feel the detector should not be turned on, or should be turned off from an energized state, the detector in question will remain off, or will be de-energized.

E) Shift Crew:

1) Reports directly to the Shift Leader, monitors all aspects of the STAR detector systems and make indicated adjustments in consultation with the Shift Leader. This will be done by reference to operating characteristics and to operating procedures set out by the Subsystem Experts. He/she monitors beam detectors, slow-controls (including, especially, all alarms), trigger, run control and data acquisition.

2) Maintains accurate and detailed entries in the run log concerning shift activities: detector characteristics, run chronology, actions taken and alarms observed.

3) Monitors the data for Quality Assurance.

4) Reports to and assists the Shift Leader during an emergency.

F) Offline Quality Assurance Person

The person on this shift will be responsible for regular completion of the following web based tasks:

a. Fetching the latest set of DST production jobs using the Auto QA browser and comparing a standard set of selected histograms from the production job to a reference

b. Monitoring the DST production farm periodically and reporting problems to the production staff

c. Monitoring the Auto QA production queue and reporting problems to the QA production crew

d. Filling in a web based report form listing the jobs that have been QA'd and giving detailed comments as needed

e. Notifying the appropriate people about suspected problems with hardware, calibrations, production, or reconstruction software

It is expected that once DST production is running at full capacity the offline QA shift will be very demanding and will require a full 8 hour shift to complete.

To perform the tasks associated with this responsibility, programming skills such as C++ are not required as the tasks are web based "point-and-click" activities. General knowledge of the STAR detector, reconstruction methods, and calibration issues are expected since the purpose of this activity is to spot problems with the detector hardware, calibrations, DST production and event reconstruction. However, expert level knowledge is not required. Documents explaining the procedures for Offline QA and Production Monitoring may be found at:

http://www.star.bnl.gov/STARAFS/comp/qa/shifts/

G) Subsystem Expert:

At all times there will be at least one expert on call for each operational subsystem of STAR. For the FY2001 /2002 run, the list of designated detector experts is:

TPC:(main det.)	Stringfellow, Wieman, Thomas, Lebedev
TPC:(gas sys)	Kotchenda, Kravtsov
Online:	Porter
LVL III: (main)	Adler, Dietel
LVL III: (display)	Berger
Trigger:	Crawford, Engelage, Judd, Milosevich, Nelson
Slow Controls:	Reichold
Real Time Sys:	Panitkin
Offline Prod:	Didenko
SVT:	Bellwied, Takahashi, Lynn, Willson
RICH:	Smirnov, Dunlop
FTPC:	Eckardt, Scheuttauf, LoCurto
Magnet:	Foley, Longacre
DAQ:	Nelson, Landgraf, Ljubicic
TOFp:	Llope, Guerts
Det. Ops:	Christie
Global Interlocks:	Christie, Brown, Stringfellow, Thomas
EMC:	Cormier, Suaide, Moura, Chattopadhyay, Tsai, Trentalange

Subsystem Expert:

1) Assists in training Shift Crews – including Shift Leaders

2) Responds to problems reported by the Shift Leader

3) Advises the Shift Leader/Operations Coordinator, whether problems can be addressed within the context of STAR skill of the craft procedures.

4) Recommends maintenance and repair procedures for those issues outside the scope of STAR skill of the craft procedures.

IV. SHIFT TIMES

A) The normal tour of duty for the Shift Leader, Detector Operator, and other Shift Crew members will be seven consecutive days plus an overlap day, starting on a Monday.

B) There will be three shifts per day.

C) The shift times will be:

Owl Shift:	0030 – 0730
Day Shift:	0730 – 1630
Swing Shift	1630 – 0030

D) For Shift Leaders and Shift Crew there will be sufficient overlap at the end of each shift to facilitate, as necessary, the exchange of information regarding the current status of the experiment.

E) Monday will be an overlap day during which incoming and outgoing Shift Leaders and Shift Crew will overlap in order to transfer information. Training for the new shift crew beginning its tour will also be provided during this period.

V. TRAINING PROCEDURES FOR STAR SHIFT PERSONNEL

A) STAR shift personnel will have the appropriate training (C-AD user training) to enter the STAR Wide Angle Hall during period where access is possible

B) All applicable C-AD/STAR/Physics Dept. training requirements for Shift Leaders and shift crew members will be communicated to STAR shift personnel by STAR Operations Management.

C) Operating procedures for each subsystem will be prepared by the Subsystem Experts and will be made available to all STAR Shift Personnel.

D) As directed by STAR Operations Management, Subsystem Experts will provide training materials and training opportunities that may be necessary for safe and effective operation of the STAR Detector.

E) STAR Period Coordinators, Shift Leaders, and Shift Crew members are responsible for completing all applicable training courses required ***before*** they serve as STAR Shift Personnel.

F) STAR Shift Personnel are responsible for keeping their BNL training credentials up-to-date.

VI. STAR OPERATION WITH REDUCED SHIFT CREWS

During the nominal running period certain conditions (e.g. gas or scheduled /unscheduled downtime for RHIC) may indicate operation of STAR with a reduced Shift Crew. The decision to run STAR with a reduced Shift Crew is made by the Shift Leader, after consultation with the Operations Coordinator and MCR.

A) The minimum number of Shift Personnel at the STAR site is five, if RHIC is running and STAR is taking data. These shift crew positions are:

Shift Leader
Detector Operator
Shift Crew Member
Run Time Systems (DAQ, Trig, LVL III) person
Fast Offline QA person

In addition, an Offline QA person will be on shift for 2 shifts per day (day and swing), although this person does not need to be located at the STAR site. A Period Coordinator will also be on duty, although the person serving as Period Coordinator does not need to maintain a continual presence at the STAR site.

B) The minimum number of Shift Personnel is two if RHIC is off, but STAR is taking data (for example, cosmic rays) with STAR detectors in an energized state.

C) The minimum number of Shift Personnel is two, if RHIC is off and STAR is not taking data but manipulation of energized STAR subsystems is required.

D) Regardless whether RHIC is on or off, the minimum number of Shift Personnel is one, if STAR is powered down but flammable gas is being flowed through the system.

E) Regardless of whether RHIC is on or off, STAR is not required to maintain a shift if it is powered down, and non-flammable gas is being flowed through the system.

APPENDIX A

Training Requirements for STAR Shift Personnel

Period Coordinator

1) C-AD User Training
2) General Employee Environmental Training
3) STAR Skill of the Craft Read and Acknowledge

Period Coordinators are appointed by, and report to the STAR Spokesperson.

Shift Leader

1) C-AD User Training
2) Radiation Worker I
3) General Employee Environmental Training
4) STAR Skill of the Craft Read and Acknowledge
5) STAR Shift Leader Training and Certification
6) HP-IND-200 Hazard Communication
7) C-AD Read and Acknowledge Training

C-AD Read and Acknowledge Training requirement:

C-A OPM 2.5.2 RHIC Accelerator Safety Envelope Parameters

C-A OPM 3.17 Emergency Procedures for the STAR Detector & the 1006 Complex

C-A OPM 11.1 Policy for Conduct of Operations for the RHIC Experiment Shift Leaders

C-A OPM 11.4.4 Procedure For Exciting the STAR Magnet

The process for new shift leader candidates to be trained and certified:

i) The person should sign up as a regular shift crew member for one shift-week prior to the time they would like to mentor as a shift leader, in order to learn general aspects of STAR Detector Operation.

ii) At the end of one week as a regular shift crew member, the Shift Leader who served during that period should provide an informal recommendation to the QA Board indicating the candidate is ready to mentor as a shift leader.

(For people who served at least 7 consecutive days in 2000 in the STAR Control Room doing shift work, it is considered that steps i) and ii) above have been completed)

iii) The candidate should serve one shift-week as a shift leader apprentice in the spot on the sign-up specifically designated for this position. During this week, the Shift Leader on duty will mentor the Shift Leader Candidate.

iv) At the end of a shift-week as an apprentice, the candidate will be considered by the QA Board for certification. The primary input for this consideration by the Board will be a standard evaluation provided by the Shift Leader who mentored the person during this period. A positive evaluation will serve as the criterion for certification in the absence of serious concerns.

v) Candidates not certified at a particular meeting of the Board are free to continue to train as an apprentice, in order to be reconsidered for certification.

Certification of STAR Shift Leaders is made by the Chairman of the Collider-Accelerator Department upon recommendation by the STAR Spokesperson.

Detector Operator

1) C-AD User Training
2) General Employee Environmental Training
3) STAR Skill of the Craft Read and Acknowledge
4) STAR Detector Operator Training and Certification

The process for new shift leader candidates to be trained and certified:

i) For people who attended the Detector Operator School in June 2001, successful completion of the school accompanied by a positive recommendation from the instructors is the basis for certification. This consideration is expedient because of the "chicken and egg" problem STAR has in establishing an initial pool of trained Detector Operators

ii) For people who did not attend the school, but wish to train to be a detector operator in the future, the procedure will be to sign up as a regular shift crew member for one shift week, during which time they will be mentored by the Detector Operator for that shift. At the conclusion of that week, a positive recommendation by the Detector Operator will be the basis for certification. It is imagined that this process will eliminate the need for future Detector Operator Schools.

Shift Crew

5) C-AD User Training
6) General Employee Environmental Training
7) STAR Skill of the Craft Read and Acknowledge