Fermilab
FY2003 Self-assessment
Process Assessment Report
For
Technical Division

06-Feb-2003

Division/Section performing assessment

Technical Division

Name of organization that owns assessed process

Technical Division

Organization Strategy

Personnel and environmental safety is the number one concern for Fermilab and the Technical Division. As a result of the work done at Fermilab, some materials become radioactive, and as such pose a unique hazard for personnel and the environment. The Lab and the Division actively work to mitigate the risks posed by radioactive materials.

Names of Personnel on Assessment team

Jamie Blowers, Quality Assurance Officer

Name of process assessed

Radiation Safety Management

Brief description of process to be assessed

Radiation Safety Management is a part of the overall ES&H program at the Lab and in the Technical Division. The ultimate purpose of radiation safety management is to control personnel and environmental radiation exposure. This is fulfilled through defining appropriate policies and procedures, and training personnel on them.

Are metrics associated with this process? If so, what are they?

TD does not have any internal metrics associated with this process. TD does have minor contributions to the Lab performance measures, as defined in Appendix B of the Prime contract between the DOE and the URA.

What are the names of the procedures associated with this process?

The following documents were reviewed during the assessment:

Fermilab Radiation Control Manual (FRCM, only parts applicable to TD)
TD-1040 Children in Technical Division Buildings
TD-6010 Control of Radioactive Materials Class 2 and Higher in TD Buildings
TD-6020 Radioactive Waste Handling Program
TS-6030 Control and Release of Radioactive Materials from Radiological Areas to Controlled Areas
TS-6040 Radiation Monitor Program
TD-6060 Technical Division Machine Shop Material Receiving Procedure

Are these procedures being followed? Are they current?

These procedures are being followed, but it is acknowledged that several are not current and need to be reviewed and brought up to date.

Describe the methodology used to assess this process.

The methodology followed standard auditing practices. The Lead Auditor created a checklist (see attached) and sent it to the auditees prior to the audit. The audit consisted of interviews with those involved in radiation safety management. The interviews were based on the topics outlined in the checklist.

Results of the assessment:

The results of the assessment are **good**. All applicable policies reviewed in the FRCM are being followed by TD. Most issues that need to be addressed are centered around the need to update the TD policies, and not problems with the work practices themselves.

The success of the policies and training is evidenced in the excellent record the Division has maintained in the area of radiation safety. Although the Division does not employ Radiation Control Technicians, the graded approach of using Radiation Monitors ensures the success of the Division's radiation safety management program. These Radiation Monitors are trained in virtually all aspects of radiation safety, and serve as the eyes and ears of the Technical Division Radiation Safety Officer.

As stated above, the only issues found during the assessment had to do with the need to update several policy documents. It should be acknowledged that TD ES&H had identified this as an action item early in this fiscal year, and had already begun the work of updating the documents prior to the assessment.

Further details on the results of the assessment are in the attached checklist.

Identified opportunities for improvement

The following items were identified as opportunities for improvement:

1. A list needs to be generated and maintained to comply with the new policy (December 2002) in FRCM 362.16.
2. TD policy TD-1040 should be reviewed and updated.
3. TD policy TD-6010 should be reviewed and updated, and should include a section on training.
4. A connection between TD-6010 and ITNAs should be reviewed.
5. TD policy TS-6020 should be reviewed and updated (already in progress).
6. TD policy TS-6030 should be reviewed and updated.
7. TD policy TS-6040 should be reviewed and updated.

Schedule for implementation of improvements

Improvement item 1 is scheduled to be completed by XX-YY-ZZZZ.

Improvement items 2, 3, 5, 6 and 7 are scheduled to be completed by 01-Oct-2003.

Improvement item 4 is scheduled to be completed by XX-YY-ZZZZ.

Status of improvements from previous assessment

All improvements identified from previous assessments have been closed out.

Attachments (supporting data, worksheets, reports, etc.)

The following attachments have been incorporated into this report:

Checklist – the checklist used to conduct the assessment.

TD-1040 – Children in Technical Division Buildings

TD-6010 – Control of Radioactive Materials Class 2 and Higher into TD Buildings

TD-6020 – Radioactive Waster Handling Program

TS-6030 – Control and Release of Radioactive Materials from Radiological Areas to Controlled Areas

TS-6040 – Radiation Monitor Program

TD-6060 – Technical Division Machine Shop Material Receiving Procedure

Training records – Output from the TRAIN database regarding training courses on the subject of radiation safety.

FRCM – These records include the table of contents, and a list of articles that are applicable to TD (provided by the TD RSO).

TD-2003-13 Radiation Safety Management - Audit Checklist

Reference	*Criteria*	*Results* *Fully Sat*	*Minor Issue*	*Major Issue*	*Comments*
General	What is central to the TD Radiation Safety Program?	☒	☐	☐	Control people's/environmental radiation exposure, e.g. the entire Division is surveyed over a three year period.
FRCM 114	- "Graded approach" – how has TD applied the graded approach? - What are the areas we have chosen to focus on? - Have we ever not met a requirement from the FRCM (114.5)?	☒	☐	☐	- An example of using the "graded approach" is the fact that TD does not have RCTs (Radiological Control Technicians). Instead, TD used "Radiation Monitors", which is unique to TD. RCTs were seen as overkill, but the need was still there to have numerous people help in the area of radiation safety. Radiation Monitors are personnel who work in the Division, who have been trained to help the RSO (see TD policy TS-6040). - As stated above, TD focuses on people and environmental protection. - There are no instances of requiring a waiver because TD does not meet a requirement.
FRCM 121/ DOE O 231.1	- Does TD have any internal or external metrics? - Does TD make any reports directly to the DoE?	☒	☐	☐	- TD has very minor contributions to the Lab metrics (a.k.a. performance measures). TD does not have any internal metrics. - TD does not make any reports directly to the DOE. All reports go through a review by the ES&H Section and/or the Directorate.
FRCM 122	What assessments have been done on the TD program?	☒	☐	☐	- ES&H Section conducted a "Radiation Program Assessment" (summer 2001, no "final report" issued). - DOE conducted a PAAA review (May 2001). - All issues raised have been addressed.
FRCM 135	Is TD involved with PAAA?	☒	☐	☐	- PAAA means that the Lab can be held liable for radiation violations. - The Division's involvement is to contact the Lab PAAA coordinator whenever there is a question.

Checklist date: 17-Feb-2003
Audit date: 06-Feb-2003

TD-2003-13 Radiation Safety Management - Audit Checklist

Reference	*Criteria*	*Results*			*Comments*
		Fully Sat	*Minor Issue*	*Major Issue*	
FRCM 211	How is TD in regards to dose limits?	☒	☐	☐	TD has very low doses, and has never approached the defined limits.
FRCM 221	Do we have "fixed contamination areas"?	☒	☐	☐	TD does not have fixed contamination areas.
FRCM 231.2	- What areas in TD are radiological areas? - How are they controlled?	☒	☐	☐	- TD does not currently have any radiological areas. - When areas are defined as radiological areas, RWPs (Radiological Work Permits) are used to control them.
FRCM 242.1	Do we provide this list once per year?	☒	☐	☐	Yes, this list is kept current and provided to ES&H on request.
FRCM 321	- How does TD use RWPs? - How do we know when one is needed?	☒	☐	☐	- RWPs can be used for "general purpose" or for specific jobs. TD uses them for special jobs, and not usually for general purpose. - FRCM has thresholds for when RWPs are required; professional judgment is also used. Supervisors and Radiation Monitors are trained on when RWPs are needed, and TD historically has been very successful in this area.
FRCM 342.14, 423.2, 423.3	- Does TD send radioactive material offsite? - Have do we handle this? - What about receiving radioactive material?	☒	☐	☐	- TD has done this, but not frequently. - Whenever it does happen, ES&H and Business Services Sections are involved. - Receiving is always handled through BSS.
FRCM 344 FESHM 8030	Does TD have response plans?	☒	☐	☐	The TD does not have a documented response plan for radiation exposures. The Fire Department is formally trained in this area, and so the TD response is to call the Fire Department and have them handle it.

Checklist date: 17-Feb-2003
Audit date: 06-Feb-2003

TD-2003-13 Radiation Safety Management - Audit Checklist

Reference	*Criteria*	*Results*			*Comments*
		Fully Sat	*Minor Issue*	*Major Issue*	
FRCM 353, 355	Does TD do reviews?	☒	☐	☐	TD has done ALARA reviews from time to time. One example was the reworking of the Main Ring magnets for the Main Injector. Multiple Departments worked together with the RSO to create and implement ALARA systems for this project.
FRCM 362.16	Does TD have a list (e.g. the SEM)?	☐	☒	☐	This FRCM requirement was introduced in December 2002, and as such TD does not yet have a formal list. *It was acknowledged that a list needs to be created and maintained*.
FRCM 415	Does TD have radioactive material storage areas?	☒	☐	☐	The buildings from the 242.1 list have the potential of storing radioactive materials. Right now MSB and TPL store radioactive materials, and they do not meet the thresholds to warrant a RWP. Also, IB1, IB2, IB3, Lab 1, Lab 4 and MDL are posted as Radioactive Material Areas or have local areas posted due to work on radioactive material as an ongoing process.
FRCM 423.5	Log of class 3 (and higher) shipment trucks?	☒	☐	☐	Nothing of class 3 or higher has been shipped since this requirement was defined, and so a log does not exist. In the event something is shipped in the future, a log will be created.
FRCM 463	- Does TD use vacuum cleaners for cleanup (e.g. MS)? - If yes, how are they controlled?	☒	☐	☐	- TD does use vacuum cleaners for cleanup of radioactive materials. - Radiation Monitors control their use, and are trained on radioactive waste handling (TD policy TS-6020).
FRCM Chapter 7 (visitors 731, 941)	- What is the TD records system? - What about visitors?	☒	☐	☐	- The records are managed in-house (i.e. filing systems) until they reach critical mass and then are sent to offsite storage. - The records include survey records, tour groups, class 2 receipts, et cetera.

Checklist date: 17-Feb-2003
Audit date: 06-Feb-2003

TD-2003-13 Radiation Safety Management - Audit Checklist

Reference	*Criteria*	*Results*			*Comments*
		Fully Sat	*Minor Issue*	*Major Issue*	
FRCM 915.3	How does the WHMS ensure there is no machining of radioactive materials?	☒	☐	☐	Each machine shop surveys everything that comes to them (see TD policy TD-6060). Since this practice was enacted, there has been no radioactive material machined which was not known about, and some material has been rejected because it was radioactive.
TD-1040	How is this controlled?	☐	☒	☐	There is no formal orientation on this, but the sense of the ES&H Group is that this is OK. People are aware of the requirements. *It was acknowledged that this policy should be reviewed and updated.*
TD-6010	- How is this controlled? - Should the training (TD601001) be listed in the policy?	☐	☒	☐	- This policy is core to ALARA, and provides a good margin of safety for the Division. This policy is controlled through training (Radiation Monitors). - *It was acknowledged that this policy should be updated and it should include a section on training. The connection to ITNAs will also be reviewed.*
TS-6020	- How is this controlled? - Should 1.3 also reference the FRCM (441, 442, 443)?	☐	☒	☐	- This policy is controlled through training. - It was believed that there is no need to reference the FRCM manual, as this policy was created to fulfill a different requirement. - *It was acknowledged that this policy should be updated (already in progress).*

Checklist date: 17-Feb-2003
Audit date: 06-Feb-2003

TD-2003-13 Radiation Safety Management - Audit Checklist

Reference	*Criteria*	*Results*			*Comments*
		Fully Sat	*Minor Issue*	*Major Issue*	
TS-6030 (FRCM 421)	- Who is the RSO designee? - Is there a backup for the designee? - "TSS Release of Radioactive Materials" logbook, do we have this? - 421 refers to Table 2-2; how are table 2-2 and TS-6030 correlated?	☐	☒	☐	- The SSO is the RSO designee. - The designee backup is the ES&H Section Liaison. - This policy would be used if the Division had radiation areas (which at present it does not). In the event that it is used, it is envisioned that the RWP would be the logbook. - The table in 421 and the TD policy are correlated (i.e. the requirements are understood by the RSO). - *It was acknowledged that this policy should be updated.*
TS-6040	- TRAIN says six month, policy says two years; what is actual training frequency? - List maintained on the "TSS Gen Admin" server; is this still the case? - "TSS Sample Log"; do we have this? - "ES&H Instruments List"; do we have this?	☐	☒	☐	- The actual training frequency is six months. - The instruments list is still maintained, but not in the place named in the policy. - The sample log is also still maintained. - *It was acknowledged that this policy should be updated.*

Notes:

1. Please clarify the proper disposal of labels (FRCM 231.4i versus 441).
    - Proper disposal in TD is to dispose of all labels as radioactive waste.
2. FQAP does not exist (FRCM 743).
3. DOE O 1324.5B is obsolete, and off our contract (FRCM 775).

Checklist date: 17-Feb-2003
Audit date: 06-Feb-2003

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TD-1040

CHILDREN IN TECHNICAL DIVISION BUILDINGS

Written by: _____ **Date:** _____
Richard Ruthe, TD SSO

Reviewed by: _____ **Date:** _____
Romesh Sood, TD Support Head

Approved: ***Original signed by Peter Limon 4/20/99*** **Date:** _____
Peter Limon, Division Head

1.0 Purpose and Scope

The purpose of this policy is to control the access to Technical Division buildings by all children, defined for the purposes of this policy as those under 18 years of age.

2.0 Procedures

2.1 The following locations in the Technical Division are areas approved for access by children <u>without</u> prior Division Head approval:

-Lab 2 and MDL offices	Enter from the east office doors only.
-Village Machine Shop office	Enter from the east or west doors only.
-Industrial Center Building (second and third floor offices)	Enter from the south doors from the front parking lot only.
-Trailers 120, 129, 143, 156 and 157 office areas.	All areas are accessible.

An "office" area is one where traditional office activities are conducted and only traditional office hazards are present. The office must be accessed without passing through a non-office area.

All visitors (including children) may enter the above Technical Division

Buildings through the described locations without a Technical Division escort. An escort is defined as a Fermilab employee that works in the Technical Division and is knowledgeable of the local hazards and understands the exposures to these hazards. An adult (not necessarily from the Technical Division) must continuously supervise children in all areas.

2.2 Children must not enter any other buildings/areas without a Technical Division escort and prior approval from the Division Head. This applies to tours of school children as well. The procedure for obtaining Division Head approval is as follows:

1) Contact the TD Radiation Safety Officer (RSO), Mike Herr, at extension 3382 or via e-mail (herr@fnal.gov) with the date(s) of the planned visit and the areas to be visited. The appropriate Building Manager should also be contacted as a courtesy.

2) The TD RSO will ensure that the areas to be visited are safe for children to enter.

3) If the areas are safe for entry by children, the TD RSO will formally request approval for the visit from the Division Head.

4) If Division Head approval is given, the TD RSO will inform the requestor via e-mail and will provide a courtesy copy to the Building Manager.

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TD - 6010

TECHNICAL DIVISION

CONTROL OF RADIOACTIVE MATERIALS Class 2 AND HIGHER INTO TECHNICAL DIVISION BUILDINGS

Written by: _____ **Date:** _____
Mike Herr, TD RSO

Reviewed by: _____ **Date:** _____
Romesh Sood, TD Support Head

Approved: *Original signed by Peter Limon 4/20/99* **Date:** _____
Peter Limon, Division Head

1.0 PURPOSE AND SCOPE

1.1 Prior approval from the Technical Division Head is required to move radioactive materials that are Class 2 and higher into Technical Division buildings

1.2 The intent of this policy is to control the movement of radioactive materials Class 2 and higher and to ensure that planning consistent with ALARA principles and the requirements of the Fermilab Radiological Control Manual occurs.

2.0 PROCEDURE

2.1 Before any radioactive material Class 2 or higher is moved into a Technical Division building, a "*Request to Move Radioactive Materials Class 2 and Higher into Technical Division Buildings*" form (see Appendix A) must be completed by the requestor.

2.2 The completed form must be forwarded to the Technical Division Radiation Safety Officer (RSO) for review.

2.3 The RSO will forward the form to the Technical Division Head for review and approval.

2.4 Upon Division Head approval, the Class 2 or higher radioactive material can be moved into the specified Technical Division building.

2.5 The Radiation Safety Officer will send a copy to the approved form to the requestor and the appropriate Building Manager. The original will be kept in the Technical Division ES&H Group files.

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Fermilab National Accelerator Laboratory
Technical Division ES&H Group
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Fax: (630) 840-8032

Appendix A

Request to Move Radioactive Materials Class 2 and Higher into Technical Division Buildings

Requester: _____ Date: _____

Device: _____ Serial #: _____

Technical Division Building where Device is to be stored: _____

Date material will arrive: _____

Reviewed by: _____ Date: _____
Technical Division Radiation Safety Officer

Approved by: _____ Date: _____
Technical Division Head

Original: Technical Division ES&H Group
Copy: Requestor, Building Manager

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TS-6020

TECHNICAL SUPPORT SECTION
RADIOACTIVE WASTE HANDLING PROGRAM

PREPARED BY _____ **DATE** 4-4-95
M. Herr, TSS Radiation Safety Officer

REVIEWED BY _____ **DATE** 4-4-95
W. Boroski, TSS ES&H Group Leader

ACCEPTED BY _____ **DATE** 4/4/95
P. Limon, TSS Section Head

REVISION NO 01 **REVISION ISSUE DATE** April 4, 1995

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide the State of Washington, the burial site operator, Fermi National Accelerator Laboratory, and other interested parties the assurance that radioactive waste generated within the Technical Support Section (TSS) does not contain any hazardous materials or hazardous substances as defined by the Washington State Dangerous Waste Regulation (WAC-173-303) and that all burial site criteria for the proper disposal of waste are met.

Within the Technical Support Section, efforts are always made to minimize the amount of radioactive waste and mixed waste generated as a result of work activities. This is accomplished by segregation of materials at waste generation sites; by separating non-radioactive material from radioactive materials; and by separating regulated materials from radioactive materials.

1.2 Scope

The intent of this document is to provide TSS personnel with information on how to implement the Fermilab Low-Level Waste Certification Program. The information contained in this document applies to all materials that become activated due to the operation of the particle accelerator at Fermilab. This document provides guidance for proper segregation and waste minimization. It is not intended to provide instructions on the handling of hazardous waste and other type of waste unless there is an interaction with radioactive material that produces radioactive or mixed waste.

This document outlines the major requirements for the proper disposal of radioactive materials. Since it is impracticable to list all the burial site requirements in this document, users should contact the TSS ES&H Group for guidance and approval if they anticipate generating a waste that is either prohibited or does not fall into any category found within this document.

1.3 Origin of the Requirements

The requirements outlined in the TSS Radioactive Waste Handling Program are written with the intent of fulfilling all aspects of the Washington State Dangerous Waste Regulation (WAC-173-303). An instrumental tool in meeting the Washington State Dangerous Waste Regulation (WAC-173-303) is the proper use of the "Radioactive Waste Certification and Pickup Request Form" (Radiation Physics Form #31). A copy of the form and instructions for completing it are included as attachments.

1.4 Definitions

Absorbed Radioactive Liquid Waste-absorbent material that contains radioactive liquid waste.

Approved Radioactive Waste Containers-container authorized for transporting radioactive waste from the pickup location to the ES&H Section Waste Facility. All containers listed in the table shown below are available through the ES&H Section or through

the Fermilab Stockroom. Stock numbers are indicated for those items available from the Stockroom.

Table 1. Approved containers for the transportation of radioactive waste.

Dry Radioactive Waste	Liquid Radioactive Waste	Absorbed Liquid Radioactive Waste
55 gallon Radioactive Waste Drum	30 gallon Radioactive Waste Drums (drums are specifically designated for "water only" and "oil only")	Radioactive Waste Bags (sealed)
55 gallon Radioactive Waste Drum with large radioactive bag liners (for dry compactible)	5 gallon carboy (FNAL Stock #1640-2025)	
Pallet-used for large items. Items must be securely banded to the pallet and treated as a stand alone package	2 liter bottle (FNAL Stock #2540-0960)	
Radioactive Steel Waste Bins	250 ml bottles (FNAL Stock #2540-0945)	
Designated Radioactive Waste Vacuums certified by the ES&H Section		

Dry Radioactive Waste-radioactive waste that contains no free standing liquids or absorbed liquid waste.

Mixed Waste- radioactive waste which contains hazardous materials as defined by the Washington State Dangerous Waste Regulation (WAC-173-303).

Radioactive Waste Container Custodian- any person who is responsible for the contents of a radioactive waste container as indicated by their signature at the top of the "Radioactive Waste Certification/Pickup Forms".

Radioactive Waste Generator- any person who physically generates radioactive or mixed waste.

Radioactive Liquid Waste-radioactive waste in liquid form.

Radioactive Waste-any material, equipment or system component that has been identified as being radioactive due to exposure to the particle beams, or has been rendered contaminated (that is, to have removable radioactivity present on the surface) and whose economic value has been determined to be less than the cost of recovery of that particular item.

Stand Alone Package-a single package used to contain radioactive waste that has been assigned its own package number as described in Attachment B.

TSS Task Supervisor-any person who is assigned the responsibility of managing radioactive work within the Technical Support Section.

2.0 RESPONSIBILITIES

2.1 Technical Support Section Group Leaders

Technical Support Section Group Leaders shall:

1. Be responsible for ensuring that all requirements of this document are met for any activity within their scope of work that generates radioactive waste.

2. Ensure that their employees are trained in this program before generating radioactive waste.

3. Take prompt corrective action upon notification of waste procedure violations that may be discovered as a result of assessments or inspections.

2.2 Technical Support Section Task Supervisors

Technical Support Section Task Supervisors shall:

1. Be trained in the requirements of this program.

2. Provide sufficiently thorough instructions to persons they supervise to ensure that radioactive waste generated meets the requirements of this program.

2.3 Technical Support Section Radiation Safety Officer

The Technical Support Section Radiation Safety Officer shall:

1. Train all TSS radioactive waste generators and task supervisors in the requirements of this program.

2. Coordinate the issuing of approved radioactive waste containers.

3. Review submitted "Radioactive Waste Certification/Pickup Forms" for waste pickups.

4. Perform periodic reviews of TSS waste generation sites to ensure that the requirements of this program are being met.

5. Accompany the ES&H Section on periodic inspections and audits of radioactive waste generation sites.

2.4 Technical Support Section Radioactive Waste Container Custodian

Technical Support Section Radioactive Waste Container Custodians shall:

1. Ensure that generators properly characterize the waste prior to placing it in the radioactive waste container.

2. Maintain positive control over the containers assigned to them by keeping them locked or secured in an equivalent manner any time they are not present.

3. Maintain up-to-date "Radioactive Waste Certification/Pickup Forms" that reflect all items which have been place in their container(s).

4. Complete and submit "Radioactive Waste Certification/Pickup Forms" in accordance with this program to the TSS RSO for review.

2.5 Technical Support Section Radioactive Waste Generators

Technical Support Section Radioactive Waste Generators shall:

1. Survey items at the generation site to ensure that they are radioactive prior to placing them in a radioactive waste container.

2. Properly characterize and document on the "Radioactive Waste Certification/Pickup Form " each item that is placed in a radioactive waste container

3.0 TRAINING & QUALIFICATIONS

3.1 General Requirements

1. All TSS personnel who work with or generate radioactive waste must be trained in the requirements of this program.

2. Plans and requests to hire contractors or use other non-TSS employees for specific tasks that require work with radioactive materials shall be reviewed by the TSS RSO to ensure that appropriate training and supervision are provided.

3. All non-TSS personnel must be trained or directly supervised according to Section 3.4 of this document.

3.2 Training

1. The TSS RSO provides Radioactive Waste Handling training for TSS employees who work with or generate radioactive waste and for TSS task supervisors. This training consists of the following:

   a. The employee is instructed to review a copy of the TSS Radioactive Waste Handling Program.

   b. The worker meets with his/her supervisor to review radioactive waste disposal controls used for a specific area or process.

   c. The worker attend a formal training course presented by the TSS RSO.

   d. The employee completes a written exam to demonstrate knowledge of TSS radioactive waste handling requirements. The test results are reviewed with each employee.

3.3 Testing and Retraining

1. Persons who do not score a minimum grade of 70% are retrained in one of two ways.

   a. If the individual clearly has little or no knowledge of the "Radioactive Waste Handling Program," they will review the test with the TSS RSO and be required to attend another training class.

   b. If there are small deficiencies in the employee's knowledge the TSS RSO can complete remedial training through the test review with trainee.

2. Upon successful completion of testing, the person is considered to be qualified in radioactive waste handling and the training is entered into the Fermilab Safety Training database, TRAIN.

3.4 Non-TSS Employee Training

1. With respect to radioactive waste handling, non-TSS employees will be managed in one of two ways. (Attachment D contains an illustration of the decision process.)

   a. In cases where it is not practical to directly supervise non-TSS employees, task specific radioactive waste handling instructions will be given to the non-TSS employee by the task supervisor.

      The TSS Task Supervisor signs a Radioactive Waste Generation Control Card when instructions are complete. This card is also signed by the non-TSS employee to indicate that they understand the instructions given, and by the TSS RSO who assigns an expiration date and approves the issuance of this card.

   b. If non-TSS personnel are continuously supervised by a TSS radioactive waste qualified person, it is acceptable for the TSS radioactive waste qualified person to assume total responsibility for the radioactive waste disposal.

4.0 GENERAL REQUIREMENTS

4.1 Surveying Requirements

1. All waste generated while working on radioactive materials is to be surveyed and placed in an approved radioactive waste container by those workers who generate it.

   This requirement applies to all lab employees, regardless of their parent division or section; contractors; and all experimenters.

2. All materials that are placed in radioactive waste containers must be surveyed to ensure that they are indeed radioactive.

   The "Radioactive Waste Certification and Pickup Request Form" includes a statement that materials that are placed in a radioactive waste container have been checked for radioactivity and are radioactive. It is the <u>responsibility</u> of the <u>waste generator</u> to make this check.

3. Radioactive waste materials need to be disposed of promptly (i.e., at the end of a work shift) in an approved container as defined in this document.

4. Surveying items:

   a. The decision whether items are radioactive will be based on the frisker count rate. Typical background count rates found on the frisker are about 30 to 50 cpm. Items are considered to be radioactive if they have a contact count rate of 50 cpm above background.

NOTE: If the background count rate is greater than 100 counts per minute, it may not be possible to determine that an item is radioactive. Suspect materials need to be taken to an area where the background count rate is at or below 50 counts per minute.

   b. With the exception of any oil waste and hazardous waste, all waste found to be **non**-radioactive is to be thrown away in trash cans or dumpsters. A list of materials that may not be disposed of in dumpsters is included as Attachment A to this document.

4.2 Characterization of Radioactive Waste

1. Individuals who generate waste are required to certify that the waste contains no hazardous materials at the time it is placed in a radioactive waste container. Care must be taken to ensure that characterization of items placed in radioactive waste containers is accurate and complete.

   For example, printed circuit boards or copper fittings may contain lead due to solder being used on the item. If lead is present, the material must be characterized "Mixed Waste" and can not be placed in radioactive waste containers. The ES&H Group should be contacted for guidance in the proper handling of this type of waste.

2. Radioactive waste bags, any type of radiological signs, and radioactive class tapes shall **never** be thrown away in normal trash cans or dumpsters. It is immaterial that such items are below the release criteria of 50 counts per minute above background. These materials will always be discarded as radioactive waste in radioactive waste barrels.

4.3 Completing the Radioactive Waste Certification and Pickup Request Form

The "Radioactive Waste Certification and Pickup Request Form" is used to list the contents of each radioactive container

The description of the waste needs to satisfy two criteria and therefore consists of two parts.

1. The first criteria is that the description be understood by the waste generator so that if asked to recall the material, the generator can easily remember the item, for example, a "tie plate."

2. Secondly, the description must also be meaningful to personnel at the burial site. The description "tie plate" has no meaning to the burial site operator but "plate, 100% steel" does.

So for this example an appropriate description for entry on the "Radioactive Waste Certification and Pickup Request Form" would be "tie plate, (plate, 100% steel)"

4.4 Transportation of Radioactive Waste

1. Radioactive items being transported to designated disposal areas should either be labeled with class tape or placed in radioactive waste bags. Radioactive materials shall **not** be transported in bags used for normal trash.

2. Radioactive waste items can **not** be transported in personal vehicles.

4.5 Storage and Security of Radioactive Waste Containers

1. All radioactive waste containers are to be kept locked when unattended by the custodian.

   a. Fifty-five gallon barrels are issued with clevis pins, and thirty gallon barrels will be provided with drum locking devices. The person to whom a barrel is issued must provide the lock for the barrel.

   b. Other authorized containers shall be in locked in cabinets or have equivalent measures administered to ensure positive control over their contents.

2. The radioactive waste container custodian shall assure that all items placed in containers under their supervision are properly recorded and characterized at the time the items are placed in the container. A copy of the "Radioactive Waste Certification and Pickup Request Form" shall be maintained by the container custodian.

5.0 SPECIFIC REQUIREMENTS

5.1 Dry Radioactive Waste

1. **Dry** compactible waste such as shoe covers, gloves, other types of protective clothing, and dry rags that have not been exposed to solvents should be placed in barrels designated for compactible radioactive waste.

2. A large yellow plastic radioactive waste bag shall be used as a liner in the 55 gallon barrels.

3. No liquids of any type are to be placed in 55 gallon radioactive waste barrels. These barrels are to be used for dry radioactive waste only.

4. No hazardous materials such as lead or beryllium are to be disposed of in 55 gallon radioactive waste barrels.

5. Non-compactible waste such as contaminated lumber, structural steel, beam pipe, and other such materials are to be collected separately in 55 gallon drums.

6. Non-compactible radioactive waste items that are too large for 55 gallon barrels may be placed on wooden pallets and banded or otherwise secured to prevent their loss while being transported.

The pallet of material must be assigned a package number as described in Attachment B of this document.

7. Large quantities of materials such as grit blaster waste may be collected in large steel boxes. Arrangements to obtain large steel boxes should be made in advance with the TSS ES&H Group.

8. Some components to be disposed of may be coated with oils and grease. These items can only be disposed of as radioactive waste if all visible traces of oil and grease are removed.

   Cleaning may be required. Since the oil and grease are considered radioactive due to the possibility of containing tritium, rags that are used to clean these components need to be disposed of as outlined in Section 5.3.

5.2 Liquid Radioactive Waste

TSS rarely deals with radioactive liquids, however, all fluids from radioactive components must be treated as radioactive unless they can be determined not to be radioactive by direct sampling or process knowledge.

Water in main ring conventional magnets contain very small amounts of tritium that are below the levels permitted for surface water discharge and therefore should not be considered to be radioactive. These magnets are also required to be flushed prior to being received by TSS personnel.

Other types of magnets received from other sources will be reviewed by the TSS RSO on a case by case basis to determine waste water handling procedures.

1. Water and KPC-820N (FNAL Stock #1920-0705) are the only pre-approved solvents that may be used on radioactive materials. Refer to Section 5.6 if these are not adequate solvents.

2. Oil removed from equipment, such as vacuum pumps and leak detectors, that have been exposed in beam enclosures may contain tritium that is not detectable with hand-held instruments. This oil must be collected in properly labeled and approved containers and treated as radioactive waste until sampling and analysis has determined otherwise.

3. The type of container used for the collection of liquid radioactive wastes can be any of the following:
   - 30 gallon radioactive waste drum
   - 5 gallon carboy
   - 250 ml to 2 liter polyethylene bottles

   The type of container used should be appropriate for the quantity of waste being collected. Large volume generators should use 30 gallon radioactive waste drums. Small quantities of oil or water from systems collected infrequently that are known to be radioactive may be collected in 5 gallon carboys or smaller polyethylene bottles.

4. All liquid radioactive waste containers must be protected against filling by persons other than the specific waste generator who owns the container.

5. All liquid radioactive waste containers must be protected against damage. Barrels and other containers need to be stored in such a manner that damage by vehicle and/or equipment movement is not possible.

6. Thirty gallon barrels are issued with a locking device. Smaller containers such as 5 gallon carboys or polyethylene bottles must be kept locked up in cabinets or secured in a similar manner to assure that unauthorized filling of a container is not possible. (See Section 4.5.)

7. Thirty gallon barrels are issued specifically for either water or oil.

    a. No water may be added to oil waste barrels with the exception of incidental water that may be present in vacuum pumps as a result of operation of the pump.

    b. No oil shall be added to those barrels designated only for water waste.

8. A "Radioactive Waste Certification and Pickup Request Form" is to be filled out for each liquid radioactive waste container.

    a. The quantities and type of each oil added to an oil waste container must be indicated on the form.

    b. The person responsible for the container must ensure that all oils added to the container are acceptable.

    c. With the exception of certain oils, no halogenated or non-halogenated hydrocarbons of any kind are permitted to be disposed of in radioactive waste liquid containers.

5.3 Absorbed Liquid Radioactive Waste

1. Rags and Kimwipes used with water to clean radioactive materials can be checked with a frisker and disposed of as non-radioactive waste if their contact readings are found to be less than 50 counts per minute above background **and** not suspected of containing tritium.

NOTE: Tritium cannot be measured with any hand-held instruments available in the Technical Support Section. If tritium is suspected, a sample of the liquid should be collected and sent to the Fermilab Counting Lab for analysis.

2. Potentially radioactive absorbed liquids of non-hazardous oils and water may be collected together in a single bag since none of the materials are considered to be hazardous waste.

3. Rags and Kimwipes used to wipe up oil spills from equipment exposed in beam enclosures or to clean up oily parts of components exposed in the beam enclosures are to be collected separately in yellow radioactive waste bags.

   Since a frisker will not detect the presence of tritium in the oil, assume the rags are radioactive until sampling and analysis or process knowledge has determined otherwise.

4. All radioactive waste bags used to collect wet rags or Kimwipes must be collected separately.

   a. Waste containing absorbed liquids must be placed in a sealed radioactive waste bag and are considered to be a stand alone package.

      A stand alone package requires a separate "Radioactive Waste Certification and Pickup Request Form" with the type and name of the liquid included in the waste description.

   b. A package number must be generated for each bag as outlined in Attachment B of this document.

   c. Radioactive waste bags are **not** to be placed into radioactive waste barrels.

5.4 Mixed Radioactive Waste

1. Mixed radioactive wastes are those which are both radioactive and contain hazardous materials as defined by Washington State Dangerous Waste Regulation (WAC-173-303).

2. Oils normally found at Fermilab such as vacuum pump oils and Shell Diala AX dielectric oils are **not** hazardous and are **not** mixed waste when they become radioactive. They are to be disposed of as liquid radioactive waste as outlined in Section 5.2.

3. A complete list of hazardous materials contains hundreds of different items. Below are some factors and guidelines that may be used in determining if materials are hazardous

   a. Hazardous wastes have the characteristics of being ignitable, corrosive, reactive, persistent, carcinogenic, or toxic.

   b. Typical hazardous waste produced at Fermilab are those containing ethyl alcohol, Freon, methanol, acetone, lead, and beryllium; these materials are not permitted to be disposed of in radioactive waste containers.

   c. Other materials prohibited for disposal in radioactive waste containers are acids, bases, salts (including NaCl or ordinary table salt), Simple Green, and certain synthetic oils.

   d. If there is any **doubt** about whether a material is a hazardous material, contact the TSS ES&H Group **before** generating the waste.

4. In the case where mixed waste is generated, the TSS ES&H Group must be consulted for packaging instructions and to aid in the completion of the "Hazardous/Radioactive Waste Certification and Pickup Request Form;" (Radiation Physics Form #71).

5.5 Prohibited Material For Use On Radioactive Materials

1. Freon, methanol, acetone, or any other solvent of the type and nature as discussed in Section 5.4 above may not be used on radioactive materials without prior TSS ES&H Group approval.

2. Any other chemicals should only be used on radioactive materials if prior approval is received from the TSS ES&H Group so that it can be determined if they are acceptable for burial in radioactive waste containers.

5.6 Use Of Forbidden Solvents On Radioactive Materials

1. The use of solvents to clean radioactive material is generally forbidden. If it becomes necessary to clean radioactive components with hazardous materials, the TSS ES&H Group must be contacted for prior approval.

2. The items that are to be cleaned will need to be checked for loose surface contamination by the local radiation monitor or the TSS RSO prior to use of the solvent. Approval for the use of the solvent is indicated on the survey form by the TSS ES&H Group.

   b. If the part to be cleaned is found to be contaminated, the contamination shall be removed with water or KPC 890N.

   a. The rag or wipes used in this portion the procedure should be surveyed, and if radioactive, should be treated as absorbed radioactive liquid waste. (See Section 5.3.)

   c. After the part has been decontaminated and has been shown to be free of radioactive contamination, the part may be cleaned with an approved hazardous solvent such as ethyl alcohol, if necessary.

   d. Solvent laden rags or other wipers used in this portion the procedure will need to be collected as hazardous waste.

6.0 Waste Pickup Instructions

1. After radioactive waste containers are filled, the container custodian should complete the top portion of the "Radioactive Waste Certification and Pickup Request Form." See Attachment B for further information on completing this form.

2. The container custodian should make a copy of the form for their own records and send the original to the TSS ES&H Group to initiate a radioactive waste pickup.

3. A flow chart included as Attachment C is intended to be used as a guide to determine how wastes are to be segregated and categorized in preparation for pickup.

Attachment A

Prohibited Materials for Disposal in Dumpsters and Trash Cans

Acids (e.g., lead acid batteries)

Alkalines

Asbestos

De-greasers (Freon)

Empty Drums

Epoxy Components

Ethylene Glycol (anti-Freeze)

Flammable Liquid

Oils

Paints

PCB's

Pesticides

Radiological Signs & Labels

Radioactive Materials

Scrap Metals (steel, aluminum, copper, wire, etc.)

Solvents (acetone, alcohol)

Toxic Metals (lead, mercury, beryllium)

Nicad Batteries

Attachment B

Following is guidance on how to complete the "Radioactive Waste Certification and Pickup Request Form."

Name (Print) and Signature:
First and last name printed and written legibly of the person who will be held accountable for the proper and complete characterization of the waste.

Date:
The date the certification form is signed.

Mail Station:
Fermilab mail station number where you would like a copy of the form sent after the package is picked up.

Package #:
The number on the "Radioactive Waste Label" that is assigned to 30 gal. drums, 55 gal. drums, and steel boxes, by Radiation Physics personnel when the containers are issued empty. The generator shall assign an inventory number to all bags of compactibles, bulk items or any other type package that isn't assigned a number by Radiation Physics personnel, as follows: 901001JK01 - (90) year, (10) month, (01) day of the month, (JK) initials of the person assigning the number, (01) the first bag or item assigned a number that day. The number must be written on the package or item. If bulk items are palletized or banded together, one number may be assigned to each pallet or bundle.

Package Type:
55 gal. drum, 30 gal. drum, pallet, bulk, cardboard box (for fluorescent bulbs), bag, etc.

Package Weight:
Gross weight: weight of container plus waste weight.
Container weights: 30 gal. drums = 30 lbs
55 gal. drum = 50 lbs
HEPA Vacuum = 40 lbs
Steel Box = 280 lbs

Waste Volume: Volume of waste in cubic feet.
Container volumes: 30 gal. drum = 4 ft^3
55 gal. drum = 7.4 ft^3
HEPA Vacuum = 3.0 ft^3
Steel Box = 56 ft^3.

Waste Weight:
Net weight of the waste. Package weight minus container weight.

Contact Dose Rate:
The highest contact dose rate on the package.

Isotopes:
List all isotopes that contribute to more than 1% of total activity. TSS ES&H Group assistance may be necessary to complete this section of the form.

Activities:
The respective activities or specific activities for the above listed isotopes. TSS ES&H Group assistance may be necessary to complete this section of the form.

Sample Numbers:
The respective sample numbers of the sample used to characterize the waste (if applicable).

Method of Assay:
Check the boxes that apply. Include the applicable analytical results.

Pickup Location:
The location where the waste was packaged or prepared for pickup.

Transportation Category:
To be filled out by the ES&H Section Radiation Physics Technical Support Group.

Division/Section Review:
To be filled out by TSS ES&H Group.

Empty Pkg. Deliver: Qty: Type:
Enter quantity and type if empty packages are needed.

Pickup #: Pickup Date: By:
To be filled out by the ES&H Section Radiation Physics Technical Support Group.

Package Contents

Date:
The date the item was placed into the package.

Description of Waste:
A complete description of the contents of the package must be entered on the form. If more than one type of oil is placed in a 30 gal. drum, enter the volume of each type (i.e., HE-150 pump oil, 10 gal.). Use as many forms as necessary for each package.

The description of the waste should include the proper name of the part, its physical form, and, its chemical form.

Examples of proper waste description

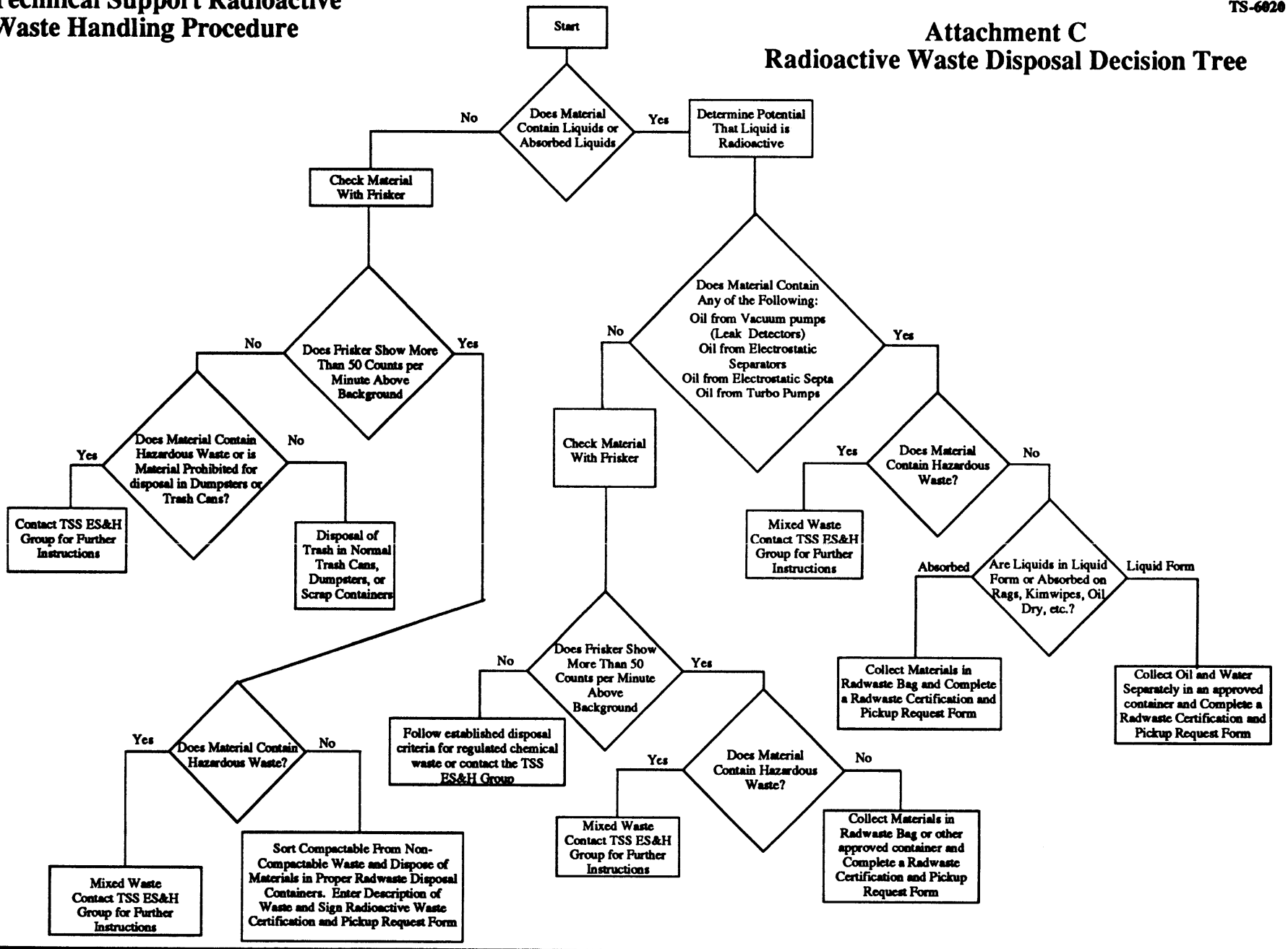
1. Kautzky Valve (solid, 49% stainless steel, 49% aluminum, 2% polypropylene)
2. Mineral oil absorbed on rags (absorbed liquid, 70% cotton cloth, 30% mineral oil)

Approx. Wt. in Lbs.:
Enter the item's approximate weight in pounds.

Signature of Waste Generator:
The person who generated the waste. By their signature, they are certifying that no dangerous wastes, as identified at the top of the form, are present in the item.

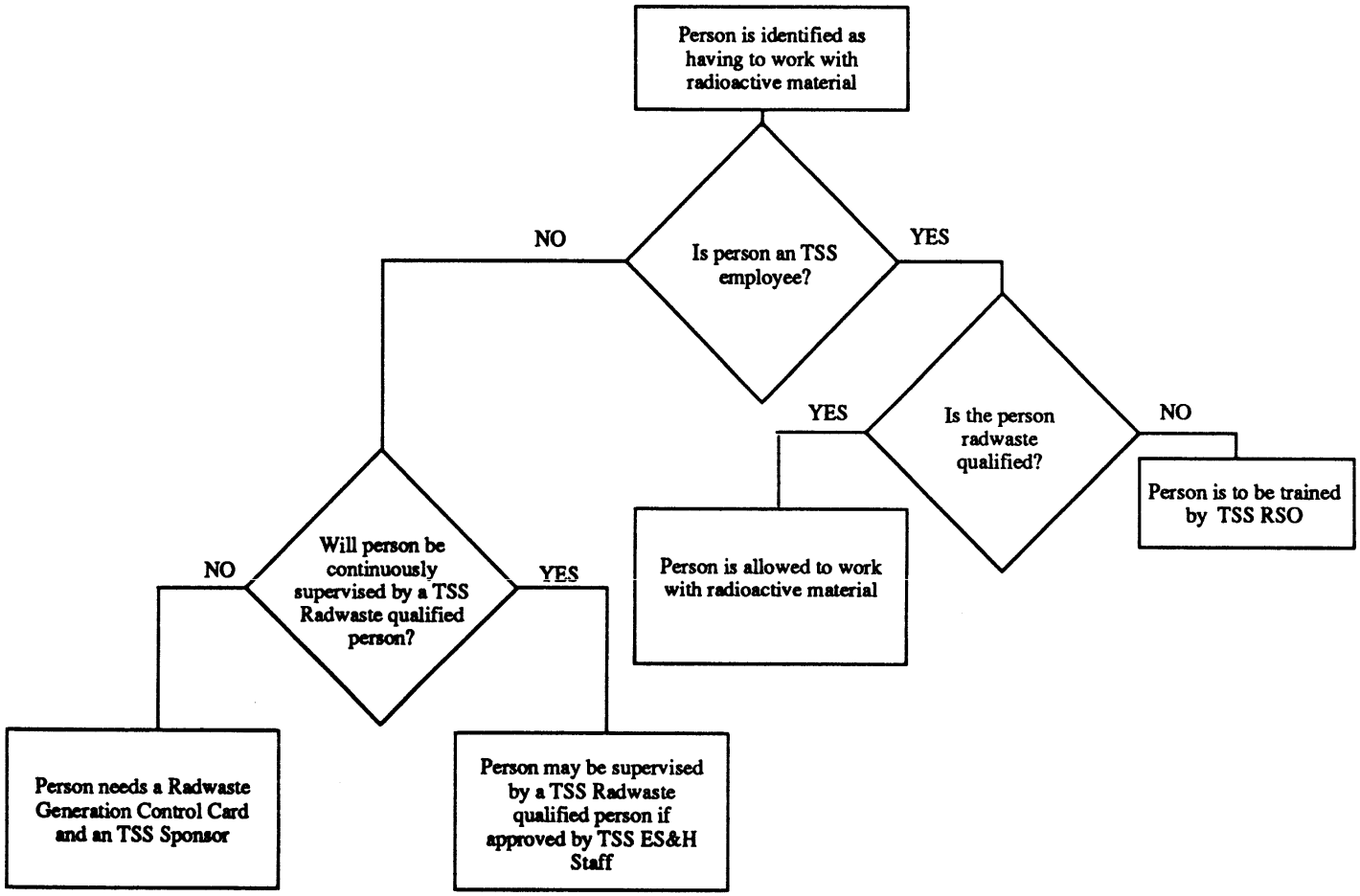
Disposition of Items:
To be filled out by the ES&H Section Radiation Physics Technical Support Group.

Attachment C
Radioactive Waste Disposal Decision Tree



Technical Support Radioactive Waste Handling Program

Attachment D
Radwaste Training Decision Tree



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Radioactive Waste Certification And Pickup Request Form

I certify that, to the best of my knowledge, the information entered below is accurate and the contents of the waste package are not mixed waste (radioactive & hazardous) as defined by Washington State Dangerous Waste Regulations (WAC 173-303) (i.e., ignitable, reactive, toxic, corrosive, toxicity characteristic, persistent, carcinogenic or containing any amount of spent halogenated or non-halogenated solvents such as freon, acetone or methanol) and has been checked for radioactivity.

Name (Print)_____ Signature_____ Date_____

Mail Station _____ Ext._____ Page _____ Package #_____ Package Type_____

Package Weight _____ lbs. Waste Volume _____ cu. ft. Waste Weight _____ lbs. Contact Dose Rate_____ mR/HR

*Radionuclides _____ _____ _____ _____ _____ _____ _____

*Activities _____ _____ _____ _____ _____ _____ _____

Method of Assay Used: ☐ Gamma Ray Spectroscopy ☐ Scintillation Counter (H-3) ☐ Dose Rate to Activity Conversion

Sample Numbers: _____ _____ _____ _____

Pickup Location_____ Transportation Category _____ Waste Category _____

Div/Sec Review_____ Empty Pkg. Delivery: Qty_____ Type_____

Pickup #: (To be assigned by Rad. Phys).		Pickup Date:	By:	
Date	Description of Waste	Approx. Wt. in Lbs.	Signature of Waste Generator (Generator's signature certifies that description is accurate, waste is not hazardous, and has been checked for radioactivity)	Disposition of Items (RPTS Use)

* Attach copies of all analytical results pertaining to the waste.

See Reverse Side For Instrustions

Radiation Physics Form #31 (1/94) Rev. 6

Guidance for Completion of Radiation Physics Form #31
"Radioactive Waste Certification and Pickup Request Form"

ITEM	DESCRIPTION OR EXAMPLE OF INFORMATION REQUIRED
Name (Print)	Generator's name (Printed)
Signature	Signature of waste generator
Date	Date request completed
Mail Station	Generator's mail station
Ext.	Generator's telephone extension
Package #	The inventory number assigned to 30 gal. and 55 gal. drums and steel boxes by Radiation Physics personnel. The number is written on the waste label. The generator must assign inventory numbers to other waste packages or items and write the number on each package or item (e.g., 910109BA01, 91 year, 01 month, 09 day, BA generator's initials, 01 1st. number assigned that day).
Package Type	Description of package (e.g., 55 gal. drum, 30 gal. drum, steel box, plastic rad. bag, unpackaged bulk, skid or pallet, 5 gal. plastic carboy, etc.)
Package Weight	Gross weight of the package.
Waste Volume	Volume of the waste in cubic feet (55 gal. drum = 7.4 cu. ft., steel box = 56 cu. ft., 30 gal. drum = 4 cu. ft. all other waste volumes calculated by generator).
Waste Weight	Net weight of the waste (Gross weight minus package weight). 55 gal. drum = 50 lbs, steel box without lid = 280 lbs. and 30 gal. drum = 25 lbs.
Contact Dose Rate	Highest contact dose rate of package or item for unpackaged in mR/hr
Isotopes	List all isotopes which contribute more that 1% of the total activity (H-3, Be-7, Na-22, Mn-54, Co-60, etc.)
Activities	The activity of the respective isotopes in curies, mCi, µCi, etc.
Method of Assay Used	Check all methods that apply and include copies of all analytical results with the pickup request.
Transportation Category	For ES&H RPTS Group use
Waste Category	For ES&H RPTS Group use
Pickup Location	Location where the waste is to be picked up
Empty Pkg. Delivery	Request empty container delivery by entering the quantity and type (55 gal. & 30 gal. drums, steel boxes, rad. bags)
Div/Sec. Review	Signature of designated Div/Section Waste Coordinators (no initials)
Pickup #	For ES&H RPTS Group use
Pickup Date	For ES&H RPTS Group use
By	For ES&H RPTS Group use
Date	Date waste was placed into container or described for unpackaged bulk items.
Description of Waste	A complete description of the waste including proper names when applicable and the materials of construction (e.g., Kautzky valve (49% stainless steel, 49% aluminum and 2% polypropylene), magnet bellows (stainless steel), HE-150 vacuum pump oil, PVC insulated copper cable, etc.). Use as many lines as necessary to describe an item.
Approx. Wt. in Lbs.	Approximate weight of the item or material.
Signature of Waste Generator	Signature of the person that generated and is describing the waste.
Disposition of Items	For ES&H RPTS Group use.

A "Radioactive Waste Certification and Pickup Request Form" (Radiation Physics Form 31) is required for each package. Use "Radioactive Waste Certification And Pickup Request Form Continuation Sheets" to describe additional waste that cannot be described on R.P. Form 31. Use as many continuation sheets as needed to thoroughly describe all waste in a package.

Radioactive Waste Certification And Pickup Request Form Continuation Sheet

Package #_____ Package Type_____

Pickup #

Date	Description of Waste	Approx. Wt.	Signature of Waste Generator (Generator's signature certifies that description is accurate, waste is not RCRA hazardous, and has been checked for radioactivity)	Disposition of Items (RPTS Use)

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TS-6030

Technical Support Section

CONTROL AND RELEASE OF RADIOACTIVE MATERIALS FROM RADIOLOGICAL AREAS TO CONTROLLED AREAS

Prepared: _____ Date: 12-21-95
M. Herr, TSS Radiation Safety Officer

Approved: _____ Date: 1-8-96
P. Limon, TSS Section Head

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1.0. APPLICABILITY

1.1 This procedure applies to the release of radioactive materials from radiological areas to controlled areas.

For purposes of this procedure, radioactive material is any material, equipment, or system component potentially made radioactive or contaminated by exposure to particle beams or rendered contaminated by contact with other contaminated material. This procedure does not apply to radioactive sealed and unsealed sources.

Radiological Areas are defined in detail in the Fermilab Radiological Control Manual. and include, Radiation Areas, Contamination Areas, and some beamline areas.

2.0 PURPOSE OF THIS PROCEDURE

2.1 The purpose of this procedure is to provide instructions to qualified personnel for the release of radioactive material from radiological areas to controlled areas and is intended to meet the requirements of the Fermilab Radiological Control Manual Article 421.

2.2 Proper labeling and storage of radioactive material is necessary to maintain control of radioactive material and to prevent Fermilab personnel from receiving unnecessary radiation exposure. This procedure provides instructions for that purpose.

2.3 Contamination areas are those areas where contamination is found or suspected of being present at levels greater than 0.5 nCi/100 cm^2 when averaged over 1 m^2 area or where contamination on any sample exceeds 1.5 nCi/100 cm^2. This procedure documents the controls which have been established to ensure loose surface contamination is not inadvertently transferred to uncontaminated areas by the movement of people or objects.

3.0 TRAINING/QUALIFICATION

3.1 Personnel who have completed Radiological Worker I or II training are qualified to release radioactive materials from radiological areas known to be free of loose surface contamination.

3.2 The Technical Support Section Radiation Safety Officer (TSS RSO) is qualified to release radioactive material from all areas, regardless of the contamination status of the area. In the absence of the TSS RSO, a qualified alternate will be designated to perform these responsibilites.

3.3 General Employee Radiation Training (GERT) alone is insufficient for persons to perform any portion of this procedure.

4.0 RESPONSIBILITIES

4.1 All qualified personnel (including lab employees, users, contractors, and visiting scientists) are responsible for:

a) proper labeling and storage of any radioactive material that comes into their possession as part of their assigned work responsibilities.

b) proper labeling and storage of radioactive parts and components that result from the disassembly of items that are radioactive.

c) calling the TSS Radiation Safety Officer before commencing work in or removing material from areas known or suspected to be contaminated.

4.2 The TSS Radiation Safety Officer is responsible for:

a) performing contamination checks in areas known or suspected to be contaminated.

b) documenting the status of areas checked for removable contamination.

c) documenting the release of contaminated materials from radiological areas to controlled areas.

d) determining the contamination status prior to any work being conducted in areas suspected of being contaminated.

e) overseeing the decontamination of areas known to be contaminated.

5.0 REMOVAL OF MATERIAL FROM AREAS KNOWN OR SUSPECTED OF BEING CONTAMINATED

5.1 Materials which are to be released from radiological areas and which are known or suspected to be contaminated are required to be surveyed prior to release. Such surveys are required to be documented.

5.2 In order to reduce the potential burden of the documentation requirement; characterization studies, initial entry surveys, and previous experience are used to define contaminated and potentially contaminated areas within TSS areas.

5.3 The basis for the instructions for the release of materials from potentially contaminated areas is:

a) Most of the previous survey data shows that significant contamination is not found on surfaces until dose rates exceed 50 mR/hr at one foot.

b) Historically, wipes have been collected when dose rates exceed 20 mR/hr at one foot for conservatism, and tend to support the conclusion in (a) above.

c) Contamination should be controlled at the source and should not be permitted to spread away from the immediate area in which it is created.

d) Areas known or suspected to be free of contamination should not be allowed to become contaminated by the movement or use of contaminated material within them unless specific planning is done to minimize the impact.

e) Item which are classified as Class 2 and above must have a detailed contamination radiation survey conducted on them and documented prior to being shipped to TSS.

5.4 In general, grinding, drilling, machining and similar processes performed on Class 1 and Class 2 radioactive material do not produce measurable radioactive contamination as described in section 2.3 above. Such processes performed on higher radioactive class objects may create contamination or airborne radioactivity areas.

All such work on radioactive materials of any radioactive classification must be reviewed and approved by the TSS RSO or designee prior to commencement of the work . The TSS RSO or designee is responsible for evaluating the scope of all such work and prescribe containment controls, contamination area boundaries, monitoring requirements, personnel protective equipment, and clean-up requirements commensurate with the scope of work.

6.0. PROCEDURE FOR LOGGING THE RELEASE OF MATERIAL FROM AIRBORNE RADIOACTIVITY OR CONTAMINATION AREAS AND FOR DOCUMENTING THE STATUS OF AREAS SUSPECTED OF BEING CONTAMINATED PRIOR TO PERMITTING WORK

6.1 The TSS RSO, or his designee, will record the following in the TSS Release of Radioactive Materials logbook:

a) Description of the item and serial number if available

b) Name and ID no. of the individual removing the item

c) Date of the survey

d) Survey instrument type, identification number, calibration date, and battery and source check result

e) Survey results

f) Record if the item was decontaminated

g) Record if the item was released free of removable contamination

h) Record if the item was labeled as being contaminated

i) Record if the item was labeled as potentially containing contamination

j) Name and ID no. of the surveyor

k) Record if the area was surveyed and declared free of contamination

7.0 RELEASE OF MATERIAL FROM AREAS KNOWN TO BE FREE OF REMOVABLE SURFACE CONTAMINATION

7.1 Items that are free of removable external surface contamination, but could potentially contain removable contamination on internal surfaces, should only be removed after TSS RSO consultation.

7.2 Upon exiting a radiological area with material known to be free of removable surface contamination, perform the following steps:

a) Determine if the item(s) are radioactive with a frisker as per Appendix A "Frisker Procedure for Material Surveys."

b) If the material is radioactive, determine the radioactivity class using the wallflower as per Appendix B "Wallflower Procedure for Radioactivity Class Determination ."

c) If the item is radioactive, select the appropriate radioactivity class tape. If the item is Class 2 or Class 3 consult the TSS RSO for further instruction.

d) Fill out the blank lines on the class tape, which includes the dose rate in mR/hr at one foot, the date of the survey, and the name of the person performing the survey.

8.0. GENERAL STORAGE REQUIREMENTS FOR RADIOACTIVE MATERIAL

8.1 Class tape is used to designate that the material to which it is affixed is radioactive.

8.2 "Caution Radioactive Materials" signs are used to designate radioactive material storage areas.

8.3 The use of radioactive classicification tape and "Caution Radioactive Material" signs is not interchangeable.

8.4 Cabinets that are used for storing radioactive material are required to be labeled with "Caution Radioactive Material" signs.

8.5 Labeled radioactive items may be stored on shelves or other open areas designated as radioactive material storage areas.

8.6 When locked cabinets are used for radioactive material storage, it is recommended that radioactive and non-radioactive components be segregated.

8.7 Radioactive items are not to be stored in offices.

8.8 Uncontaminated radioactive items may be stored in Controlled Areas or Radioactive Material Areas if labeled with class tape. Contaminated radioactive items must be stored in Radiological Areas.

8.9 Radioactive items are not to be stored on or in workbenches. Radioactive items may be present on work benches temporarily to perform work on them. Radioactive items that are not part of work in progress are to be stored in a designated radioactive material storage area.

9.0 UNLABELED RADIOACTIVE MATERIAL

9.1 In general, all components that are removed from known radioactive items are to be checked for radioactivity and labeled accordingly. Some radioactive components cannot be labeled because the adhesive from the tape would compromise the component surfaces. Other radioactive components are too small and numerous for labeling to be practical. In these cases the components need not be labeled with class tape. Unlabeled radioactive items are to be controlled under the provisions of this section.

9.2 Unlabeled radioactive materials may be stored together in containers that have been labeled with the appropriate class tape. Such containers are acceptable provided that they are either continuously attended, or are locked up in a designated radioactive material storage cabinet that is labeled "Caution Radioactive Material."

9.3 Containers which are lockable and locked are equivalent to storage cabinets and should be labeled "Caution Radioactive Material."

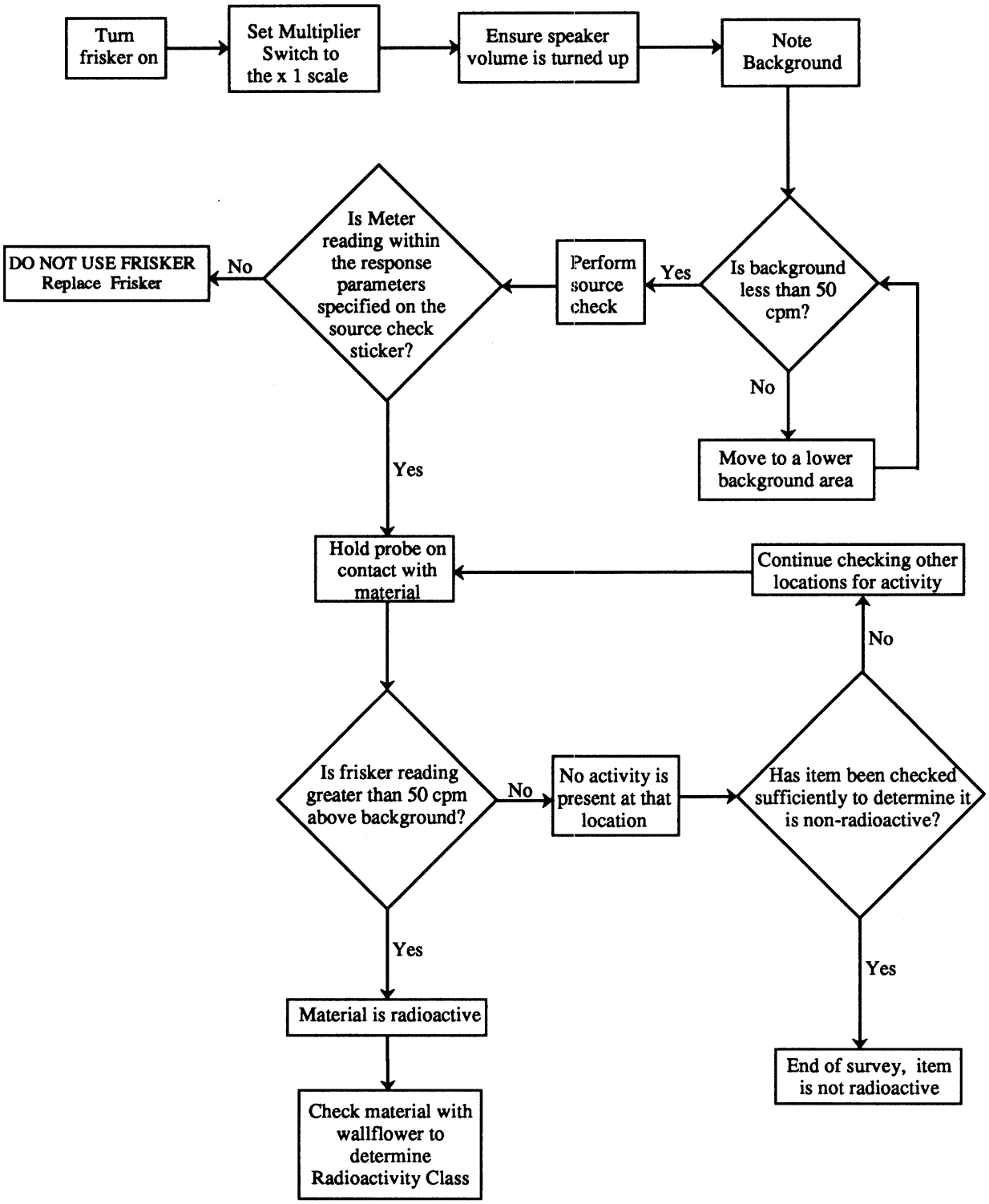
9.4 Unlabeled disassembled radioactive components are not to be left unattended. Unlabeled components may be left unattended for short durations such as lunch periods and breaks provided that the area has been roped off and posted with signs which read "Caution - Unlabeled Radioactive Material."

9.5 The "Caution - Unlabeled Radioactive Material " designation of an area is intended for short durations only. This posting is not to be used for extended time periods. For overnight or other extended time periods, "Caution - Unlabeled Radioactive Material" posting of unlabeled radioactive material is not permitted unless otherwise approved by the TSS RSO.

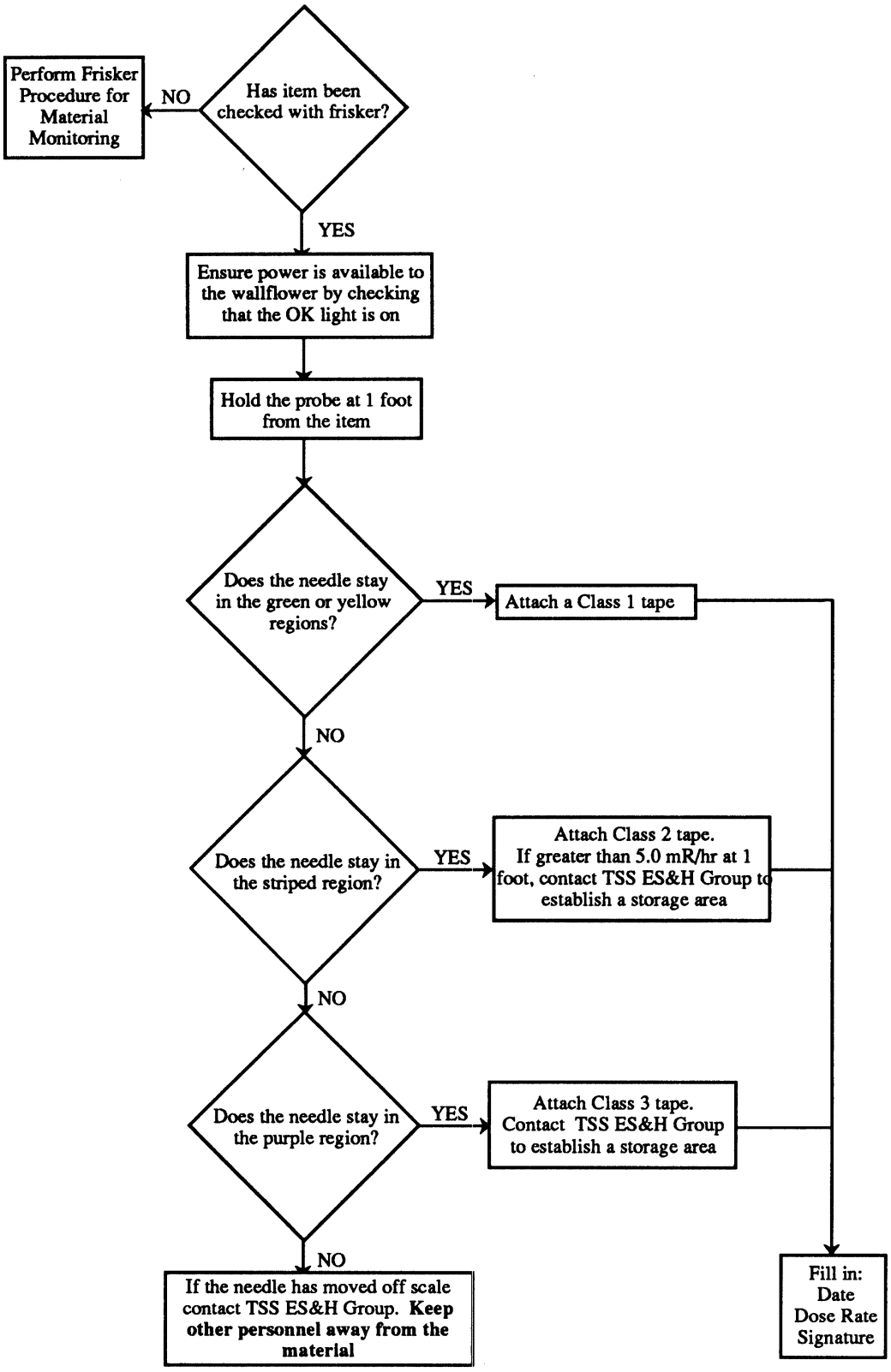
10.0 EXEMPTIONS

10.1 Exemptions to the requirements of this procedure may be authorized only by the TSS RSO or designee.

Appendix A - Frisker Procedure for Material Surveys



Appendix B - Wallflower Procedure for Radioactivity Class Determination



Fermilab

TS-6040

Technical Support Section

RADIATION MONITOR PROGRAM

Approved: _____ Date: *10- 18-96*
Peter Limon, Section Head

SCOPE

This policy defines the duties, responsibilities, and the limitations for the Technical Support Section (TSS) Radiation Monitors. Training requirements for the Radiation Monitors are also describe in this policy.

TSS RADIATION MONITOR HISTORY

Since the earlier 1980's, the TSS Radiation Monitors have played a vital role in the TSS Radiological Control Organization. They are essential to the successful implementation of the "Fermilab Radiological Control Manual" (FRCM) within TSS.

In recent years, the Radiation Monitors' performances have been characterized with attentiveness and dedication to their duties. To further enhance and formalize this program, this policy is being issued along with the upgrading of the Radiation Monitor training program.

TRAINING REQUIREMENTS FOR TSS RADIATION MONITORS

Radiation Monitors are required to attend the TSS Radiation Monitor training course (Course # TS000043). Implementation of this policy will include a requirement of course retraining every two years.

Supplementary training required of Radiation Monitors includes, Radiological Worker II training (Course # FN000243) and ES&H Material Move Training (Course # FN000125).

The TSS RSO will also have semiannual continuing education training sessions for TSS Radiation Monitors and specialized job briefings as required.

TSS RADIATION MONITOR DUTIES

The duties of the TSS Radiation Monitor include:

1. Surveillance of their Group's Areas

   This duty is accomplished by conducting periodic radiological surveys. Included are radiation surveys, contamination surveys, and the search for unlabeled radioactive material. The Radiation Monitor is also encouraged to keep a constant vigilance for safe work practices.

Special surveys may also be requested by the TSS RSO such as support surveys for Radiological Work Permits (RWP's), follow up surveys of incidents, radioactive waste characterization surveys, radiography coverage, or other special surveys as required.

After completing each survey, the Radiation Monitor is responsible for documenting the survey, submitting wipe samples to the ES&H Section for analysis, and forwarding the results and documented surveys to the TSS RSO.

2. Material Move Surveys

Radiation Monitors are to conduct material move surveys for their respective groups. Included in these surveys are verification surveys of scrap metal before the scrap is picked up by Business Service Section.

Only personnel who have attended ES&H Material Move Training (Course # FN000125) can conduct material move surveys. As previously stated, all Radiation Monitors are required to attend the ES&H Material Move Training as part of their supplementary training. This course also has a two year requalification requirement. A list of qualified material move surveyors is maintained on the TSS General Administration server within the ES&H Information folder.

3. Sampling Materials

The Radiation Monitor is responsible for sampling materials for waste characterization and whenever samples are requested to be taken by the TSS RSO. The TSS RSO shall provide instructions for sampling technique and methods for each sample.

After samples have been collected, the Radiation Monitor must document the collection of the sample in the TSS Sample Log located in the TSS ES&H safety office. A FNAL Chain Of Custody Form must also be completed at this time.

The Radiation Monitor must coordinate with the FNAL Analysis Lab Manager to arrange for the delivery of the sample to the lab. Upon the Radiation Monitor's arrival to the lab, the Radiation Monitor will have the person receiving the sample sign the chain of custody form. The Radiation Monitor will make a copy of the signed chain of custody form and deliver it to the TSS ES&H Office.

Once the samples have been analyzed, the Radiation Monitor shall coordinate with the FNAL Analysis Lab Manager to pick up the samples. After taking custody of the samples, the Radiation Monitor will sign the original chain of custody form and bring it back to the TSS ES&H Office. The TSS RSO will determine the method for sample disposal.

4. Radiological Equipment

Radiation Monitors are issued radiological control equipment such as survey instruments and radiological designated vacuums through the TSS RSO. The TSS RSO determines the quantities and types of equipment that each group is issued based on their needs. An inventory of TSS radiological equipment is maintained in a file named "ES&H Instruments List" which can be found on theTSS File server under ES&H Group in the Radiological Protection folder.

Radiation Monitors must maintain the radiological control equipment assigned to them in ready working condition. The ES&H Section provides calibration and service for the radiological equipment. Notification of when an instrument is due for calibration is provided by the TSS ES&H Office. Radiation Monitors must ensure that equipment is delivered in a timely manner to the ES&H Section so that calibration can be completed.

Radiation Monitors shall also inform the TSS ES&H Office when any radiological control equipment has been obtained, exchanged, calibrated, or damaged.

5. Radiological Work Permits

Radiation Monitors shall prepare RWP's with the assistance of the TSS ES&H Office, for jobs that include the machining of radioactive materials. All RWP's must be approved by the RSO before the start of work.

As mentioned in part one of this section, Radiation Monitors will also conduct surveys associated with RWP's. Radiation Monitors shall ensure that the TSS ES&H Office receives the original RWP and survey documentation upon completion of the job.

6. Stop Work Authority

Radiation Monitors have the authority to stop any radiological job in which they feel that a radiological control standard is being or will be violated by a worker's actions or by the job process itself. The TSS RSO shall be immediately informed when a Radiation Monitor has stopped work. Once a job has been stopped, approval of the TSS RSO, ES&H Group Leader, or Section Head is required to recommence work.

7. Communications

Effective communication is a vital element to the successful implementation of this program. Radiation Monitors shall inform the TSS RSO when:

- Any sample results exceed FNAL standards.
- A discovery of unlabeled radioactive material is made within their areas. This discovery shall also be documented on a survey map.
- Machining of radioactive material is taking place that has not been specifically authorized by the TSS RSO.
- A job involving a radiological work permit is completed. The Radiation Monitor shall also inform the TSS RSO of the sample results. From this information, the RSO can make the determination if the area may be released for unrestricted use.
- He/she has any other radiological concerns, problems, abnormalities, or has taken any type of corrective actions related to a radiological issue.

TSS RADIATION MONITOR LIMITATIONS

TSS Radiation Monitors **can not:**

1. Grant permission to machine radioactive materials. In accordance with FRCM Article 337.5.b, only the area RSO can grant approval to machine radioactive material.

2. Release any personnel, areas, materials, or equipment that are contaminated above the limits stated in the FRCM Articles 221 and 222.

3. Approve RWP's. Only the area RSO or personnel designated by the Fermilab Senior Radiation Safety Officer can approve RWP's per FRCM Article 323.3.

4. Grant an extension of exposure limits of any kind.

5. Post any type of radiological area without the direction of the TSS RSO.

6. Perform any type of decontamination of any area, equipment, or personnel without the direct supervision of the TSS RSO.

7. Perform any other duties or function related to radiological controls which are not expressly stated in this document or in the Radiological Worker II training.

Fermilab

TD-6060

TECHNICAL DIVISION
MACHINE SHOP MATERIAL RECEIVING PROCEDURE

PREPARED BY _____ **DATE** _____
M. Herr, TD Radiation Safety Officer

REVIEWED BY _____ **DATE** _____
R. Sood, TD Support Department Head

ACCEPTED BY ***Original signed by Thomas Dombeck for PJL 2/24/99*** **DATE** _____
P. Limon, TD Head

REVISION NO 01 **REVISION ISSUE DATE** February 23, 1999

1.0 PURPOSE & SCOPE

The purpose of this document is to provide controls for the receipt of materials and to prevent the inadvertent machining of radioactive materials in the TD Machine Shop Department.

This procedure applies to all unlabled materials or any other suspect materials that are are brought to the Technical Division Machine Shop Department by the Beams Division, Particle Physics Division, Technical Division, Business Services Section, Facilities Engineering Services.

2.0 QUALIFICATIONS

The personnel performing the material surveys required by this procedure are identified by the Machine Shop Department Supervisor and must complete the following training:

- Radiological Worker (Course # FN0000243)
- Technical Division Machine Shop Surveyor (Course # TD606001)

3.0 PROCEDURE FOR UNLABELED MATERIAL

3.1 All unlabeled material received by the TD Machine Shop Department must be surveyed by a qualified person as defined in Section 2.0 of this procedure.

3.2 The survey must be conducted in accordance with one of the following procedures, dependent upon the type of instrument used.

3.3 Frisker Survey Procedure

1. Perform instrument checks for: the instrument's general physical condition, battery (if applicable), and calibration date. Perform the instrument's source response check.

2. If the instrument fails any of the checks; DO NOT USE THE INSTRUMENT. Contact the local Radiation Monitor or the TD RSO to have the instrument exchanged.

3. Set the scale selector switch to the "X 1" position. Turn the speaker on and turn the volume all the way up.

4. Note the background reading. If background is more than 50 cpm, you cannot use the instrument in this area. Move to an area that is less than 50 cpm.

5. Survey the item by holding the probe within ¼" to ½" of the material's surface. Scan the surface of the material at a rate of 1" to 2" per second. If count rate increases, pause over the area 15 to 30 seconds and note the reading.

6. If the reading is 50 cpm above the background reading, **immediately** call the TD RSO. DO NOT MACHINE THE MATERIAL.

7. If the reading is less than 50 cpm above background, repeat step 5 until **all** accessible areas have been surveyed. If there are any areas inaccessible to a survey, contact the TD RSO.

8. After all areas have been surveyed and no readings were 50 cpm above background, complete and attach the Technical Division Machine Shop Survey Sticker to the job ticket.

3.3 Bicron Analyst Procedure

1. Perform instrument checks for: the instrument's general physical condition, battery, and calibration date. Perform the instrument's source response check.

2. If the instrument fails any of the checks; DO NOT USE THE INSTRUMENT. Contact the local Radiation Monitor or the TD RSO to have the instrument exchanged.

3. Set the scale selector switch to the "X 10" position. Turn the speaker on and turn the volume all the way up.

4. Note the background reading. If the background reading is greater than 3000 cpm; you cannot use the instrument in this area. Move into an area that is less than 3000 cpm.

5. Scan the surface of the material at a rate of 1" to 2" per second. If count rate increases, pause over the area 15 to 30 seconds and note the reading.

6. Compare the reading with the below table to determine if the material is considered radioactive.

Background Reading (Bkgd)	**Readings Required for the Material to be considered Radioactive**	**Examples**
< 2000 cpm	2 times the background reading.	If Bkgd =1800 cpm Any reading 3600 cpm or greater, the material is considered radioactive.
>2000 cpm ≤ 3000 cpm	2000 cpm above background	If Bkgd =2200 Any reading 4200 cpm or greater, the material is considered radioactive.
> 3000 cpm	Do not use the instrument in this area. Move to a lower background area.	Not applicable.

7. If the material is found to be radioactive, **immediately** call the TD RSO. DO NOT MACHINE THE ITEM.

8. If the readings do not indicate that the item is radioactive, repeat step 5 until **all** accessible areas have been surveyed. If there are any areas inaccessible to a survey, contact the TD RSO.

9. After all areas have been surveyed and the material is determined not to be radioactive, complete and attach the Technical Division Machine Shop Survey Sticker to the job ticket.

4.0 PROCEDURE FOR RADIOACTIVE MATERIAL

4.1 The machining of radioactive material must first be approved by the TD RSO prior to the delivery of any radioactive materials to the TD Machine Shop Department.

4.2 The TD RSO will determine the controls necessary to do the machining in accordance with the Fermilab Radiological Control Manual.

TRAIN Course Summary

Course: Material Move Survey [FN000125/CR/00]
Prerequisites: FN000301 Radiological Worker
Requal. Interval: 24 Months
Contact: Joel Kofron
Reference Material:
Target Audience: Employees performing radiation surveys for MMR forms
Objective: Proper procedure to perform radiation surveys required by Material Move Request (MMR) forms
Course Content: Requirements of MMR survey; proper use of instruments and survey documentation
Instructors Only: Tickler

TD

Include Sub-Organizations? Yes No

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TRAIN Course Summary

TD Individuals That Have Completed

FN000125/CR

Organization	Fermi ID	Name	Complete Date	Due Date
TD/MC/IB4-OPS/CS	12698N	Cliff Besch	10/01/2002	10/31/2004
TD/EF/FAB/ASSM	05310N	Howard Brooks	05/08/2002	05/31/2004
TD/EF/MDL	04992N	David Burk	07/10/2001	07/31/2003
TD/MS/TS	02522N	Donald Fisher	01/22/2002	01/31/2004
TD/EF/PE	03362N	Dennis Gaw	09/18/2001	09/30/2003
TD/EF/RDSUP	04965N	Steven Gould	06/05/2001	06/30/2003
TD/MS/CS	04417N	Gerald Green	12/11/2000	
TD/DT/TO/IC/TS	05072N	Steven Helis	05/08/1997	
TD/HQ/SUPP/ESH	08913N	Michael Herr	04/24/2001	04/30/2003
TD/MC/IB4-OPS/CS	12304N	William Kelley	04/12/2002	04/30/2004
TD/MS/VMS	09294N	Gary Markiewicz	01/08/2002	01/31/2004
TD/DT/TO/COI/MT	03700N	William Mumper Jr.	02/18/2000	
TD/EF/RDSUP	04990N	Donald Nurczyk	04/12/2002	04/30/2004
TD/EF/FAB/ASSM	13326N	Wayne Ostrom	04/24/2001	
TD/MS/VMS	04404N	Carl Penson	09/18/2001	09/30/2003
TD/MS/VMS	03114N	Louis Ramirez	05/04/1999	
TD/EF/RDSUP	04895N	James Rife	02/18/2000	
TD/DT/TO/COI/MT	05077N	Allen Rusy	03/03/2000	
TD/HQ/SUPP/ESH	12260N	Richard Ruthe	04/27/2001	04/30/2003
TD/EF/FAB/ASSM	04363N	Inpeng Samayavong	05/23/2001	05/31/2003
TD/EF/RFDEV	04548N	Brian Smith	02/18/2000	
TD/EF/FAB/CMS	03275N	Glenn Smith	01/08/1992	
TD/EF/RUNII&AS	04479N	Dean Sorensen	04/27/2001	04/30/2003
TD/EF/PE	13019N	Jan Szal	09/18/2001	09/30/2003
TD/DT/TO/COI/MT	06183N	Mark Thompson	05/08/2002	05/31/2004
TD/MS/MR	08974N	Wesley Tollefson	01/22/2002	01/31/2004
TD/DT/TO/COI/MT	04095N	Dean Validis	05/24/2000	
TD/MC/IB4-OPS/CS	11939N	Gary Vezain	04/12/2002	04/30/2004
TD/MS/WHMSTS	03820N	James Wilson	11/16/2001	11/30/2003

Total: 29

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TRAIN Course Summary

Course: TD Radioactive Waste Handling Program [TS040004/CR/01]
Prerequisites: RADIOLOGICAL WORKER I OR II
Requal. Interval: One Time Only
Contact: Michael Herr
Reference Material:
Target Audience: TSS RADIOACTIVE WASTE GENERATORS
Objective: to meet the requirements of the fnal low level waste certification program
Course Content: REQUIREMENTS OF WA-173-330 REGARDING BARIAL SITE CRITERIA FOR SPECIFIC RESPONSIBILITIES WITHIN TSS ... More
Instructors Only: Tickler

TD

Include Sub-Organizations? Yes No

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TRAIN Course Summary

TD Individuals That Have Completed

TS040004/CR

Organization	Fermi ID	Name	Complete Date	Due Date
TD/EF/FAB/ASSM	05310N	Howard Brooks	03/16/2000	
TD/EF/MDL	04992N	David Burk	09/04/1998	
TD/EF/RDSUP	04965N	Steven Gould	04/06/1995	
TD/MC/IB4-OPS/CS	12304N	William Kelley	03/16/2000	
TD/MS/VMS	09294N	Gary Markiewicz	12/03/1996	
TD/EF/RDSUP	04990N	Donald Nurczyk	03/16/2000	
TD/EF/FAB/ASSM	13326N	Wayne Ostrom	01/17/2001	
TD/MS/VMS	04404N	Carl Penson	09/04/1998	
TD/MS/VMS	03114N	Louis Ramirez	04/06/1995	
TD/EF/RDSUP	04895N	James Rife	04/06/1995	
TD/EF/FAB/ASSM	04363N	Inpeng Samayavong	09/04/1998	
TD/EF/RFDEV	04548N	Brian Smith	09/16/1997	
TD/DT/TO/COI/MT	06183N	Mark Thompson	03/16/2000	
TD/DT/TO/COI/MT	04095N	Dean Validis	03/16/2000	
TD/MC/IB4-OPS/CS	11939N	Gary Vezain	02/11/1998	

Total: 15

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TRAIN Course Summary

Course: TD Radiation Monitor Training [TD000043/CR/00]
Prerequisites:
Requal. Interval: 6 Months
Contact: Michael Herr
Reference Material:
Target Audience:
Objective:
Course Content:
Instructors Only: Tickler

TD

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TRAIN Course Summary

TD Individuals That Have Completed

TD000043/CR

Organization	Fermi ID	Name	Complete Date	Due Date
TD/EF/FAB/TOOL	04950N	Daniel Assell	07/28/1983	
TD/EF/FAB/ASSM	05310N	Howard Brooks	08/22/2002	02/22/2003
TD/EF/MDL	04992N	David Burk	12/04/2002	06/04/2003
TD/EF/DD	02854N	Kerry Ewald	04/23/1987	
TD/EF/PE	04569N	Thomas Gardner	12/14/1983	
TD/EF/PE	03362N	Dennis Gaw	05/22/2001	
TD/EF/RDSUP	04965N	Steven Gould	08/22/2002	02/22/2003
TD/DT/TO/IC/TS	05072N	Steven Helis	07/15/1998	
TD/EF/PE	00315N	Robert Jensen	11/17/1982	
TD/MC/IB4-OPS/CS	12304N	William Kelley	03/08/2001	
TD/MS/VMS	09294N	Gary Markiewicz	08/22/2002	02/22/2003
TD/DT/TO/COI/MT	03700N	William Mumper Jr.	07/09/1998	
TD/EF/RDSUP	04990N	Donald Nurczyk	04/09/2002	10/09/2002
TD/EF/FAB/ASSM	13326N	Wayne Ostrom	12/04/2002	06/04/2003
TD/MS/VMS	04404N	Carl Penson	08/23/2002	02/23/2003
TD/MS/VMS	03114N	Louis Ramirez	08/28/1989	
TD/EF/RDSUP	04895N	James Rife	07/09/1998	
TD/MC/IB4-OPS/QC	05857N	Robert Riley	07/28/1983	
TD/EF/FAB/ASSM	04363N	Inpeng Samayavong	08/22/2002	02/22/2003
TD/EF	03088N	Gary Sliwicki	11/17/1982	
TD/EF/RFDEV	04548N	Brian Smith	09/22/1999	
TD/EF/RUNII&AS	04479N	Dean Sorensen	09/13/2002	03/13/2003
TD/DT/TO/COI/MT	06183N	Mark Thompson	08/21/2002	02/21/2003
TD/DT/TO/COI/MT	04095N	Dean Validis	10/25/2000	
TD/MC/IB4-OPS/CS	11939N	Gary Vezain	03/08/2001	
TD/EF/RDSUP	04568N	Gilbert Whitson	07/28/1983	

Total: 26

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suggestions.

TRAIN Course Summary

Course: TD Rad Class 2 & Higher Procedure Review [TD601001/CR/01]

Prerequisites: N/A

Requal. Interval: 24 Months

Contact: Michael Herr

Reference Material:

Target Audience: TD Rad Workers

Objective: Ensure knowledge of Technical Division procedure for receipt and work on Rad Class 2 & higher materials.

Course Content: Review of current division procedure in examining, handling, and working with items class 2 and abov... More

Instructors Only: Tickler

TD

Include Sub-Organizations? Yes No

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TRAIN Course Summary

TD Individuals That Have Completed

TD601001/CR

Organization	Fermi ID	Name	Complete Date	Due Date
TD/MC/IB4-OPS/CS	12698N	Cliff Besch	04/10/2002	04/10/2004
TD/EF/RDSUP	12413N	Damon Bice	10/08/1999	
TD/EF/FAB/ASSM	05310N	Howard Brooks	02/14/2002	02/14/2004
TD/EF/RDSUP	04965N	Steven Gould	10/08/1999	
TD/MS/CS	04417N	Gerald Green	09/16/1999	
TD/EF/FAB/ASSM	01527N	Junior Jones	09/22/1999	
TD/MC/IB4-OPS/CS	12304N	William Kelley	06/25/2001	06/25/2003
TD/DT/TO/COI/MT	04142N	George Kirschbaum	10/08/1999	
TD/MS/VMS	09294N	Gary Markiewicz	09/16/1999	
TD/EF/RDSUP	12792N	Paul Mayer III	10/08/1999	
TD/EF/RDSUP	04990N	Donald Nurczyk	10/08/1999	
TD/EF/FAB/ASSM	13326N	Wayne Ostrom	04/10/2002	04/10/2004
TD/MS/VMS	04404N	Carl Penson	09/16/1999	
TD/MS/VMS	03114N	Louis Ramirez	06/28/2001	06/28/2003
TD/EF/RDSUP	04895N	James Rife	10/08/1999	
TD/EF/RDSUP	07160N	Eloisa Ruiz	10/08/1999	
TD/DT/TO/COI/MT	05077N	Allen Rusy	10/08/1999	
TD/EF/FAB/ASSM	04363N	Inpeng Samayavong	12/11/2001	12/11/2003
TD/EF/FAB/ASSM	03712N	Patsy Sanchez	12/11/2001	12/11/2003
TD/EF/FAB/ASSM	03421N	Sergio Sanchez	12/11/2001	12/11/2003
TD/EF/RFDEV	04548N	Brian Smith	09/16/1999	
TD/EF/FAB/ASSM	01513N	Daniel Smith	09/22/1999	
TD/EF/RUNII&AS	04479N	Dean Sorensen	12/11/2001	12/11/2003
TD/EF/FAB/TOOL	12812N	Stephen Strysik	10/08/1999	
TD/DT/TO	09000N	Michael Tartaglia	12/11/2001	12/11/2003
TD/MS/MR	08974N	Wesley Tollefson	09/16/1999	
TD/DT/TO/COI/MT	04095N	Dean Validis	10/08/1999	
TD/MC/IB4-OPS/CS	11939N	Gary Vezain	04/10/2002	04/10/2004
TD/EF/RDSUP	04568N	Gilbert Whitson	10/08/1999	

Total: 29

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TRAIN Course Summary

Course: TD Machine Shop Surveyor [TD606001/CR/01]
Prerequisites: Radiological Worker (FN000301) or Equivelent
Requal. Interval: 24 Months
Contact: Michael Herr
Reference Material:
Target Audience: TD Machine Shop Material Surveyors
Objective: Train TD Machine Shop Surveyors in the use of instruments for conduct of surveys.
Course Content: Hands on training with survey instruments.
Instructors Only: Tickler

TD

Include Sub-Organizations? Yes No

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TRAIN Course Summary

TD Individuals That Have Completed

TD606001/CR

Organization	Fermi ID	Name	Complete Date	Due Date
TD/MS/WS	12271N	Michael Cooper	04/25/2001	04/25/2003
TD/MS/TS	01832N	Homer Cunningham	02/26/1999	
TD/MS/TS	02522N	Donald Fisher	04/12/2001	04/12/2003
TD/MS/WS	04609N	William Gatfield	04/25/2001	04/25/2003
TD/MS/CS	04417N	Gerald Green	04/12/2001	04/12/2003
TD/MS/WS	12261N	Lenny Harbacek	08/22/2001	08/22/2003
TD/HQ/SUPP/ESH	08913N	Michael Herr	04/12/2001	
TD/MS TD/MS/WS	00362N	Roger Hiller	04/17/2001	04/17/2003
TD/MS/WHMSTS	08262N	Patrick Hughes	04/12/2001	04/12/2003
TD/MS/VMS	08553N	Alan Kandziorski	04/12/2001	
TD/MS/TS	04447N	Michael Kerwin	04/17/2001	04/17/2003
TD/MS/VMS	09294N	Gary Markiewicz	04/25/2001	04/25/2003
TD/MS/TS	08925N	William Medley	04/12/2001	04/12/2003
BD/ENG/CRYO/CRYO-SYS TD/MS/	05066N	James O'Neill	04/25/2001	04/25/2003
TD/MS/VMS	04404N	Carl Penson	04/12/2001	04/12/2003
TD/MS/VMS	03114N	Louis Ramirez	02/26/1999	
TD/MS/TS	03113N	James Reed	04/25/2001	04/25/2003
TD/MS/WS	03993N	Michael Reynolds	04/25/2001	04/25/2003
TD/MS/WS	02174N	Jeffrey Roberts	04/25/2001	04/25/2003
BD/ENG/MSD TD/MS/WS	03800N	Chander Sood	04/25/2001	04/25/2003
TD/MS/WHMSTS	04554N	Bobby Stroud	04/12/2001	04/12/2003
TD/MS/MR	08974N	Wesley Tollefson	04/12/2001	04/12/2003
TD/MS/VMS	08083N	Scott Walters	04/25/2001	04/25/2003
TD/MS/WS	03991N	Daniel Watkins	04/12/2001	04/12/2003
TD/MS/TS	03885N	Edward Weiten	08/22/2001	08/22/2003
TD/MS/WS	04656N	Robert Williams	04/17/2001	04/17/2003
TD/MS/WHMSTS	03820N	James Wilson	08/22/2001	08/22/2003

Total: 27

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TRAIN Course Summary

Course: Radiological Worker (CR) [FN000301/CR/01]

Prerequisites: CLASSROOM SESSION: NONE. CHALLENGE EXAM: REVIEW COURSE HANDOUT MATERIAL.

Requal. Interval: 24 Months

Contact: Joel Kofron

Reference Material: Radiological Worker Study Guide

Target Audience: RADIOLOGICAL WORKERS

Objective: upon completion of this course, participant will have the knowlege to work safely in areas controlled for rad purposes using proper rad practices.

Course Content: UPON COMPLETION OF THIS UNIT PARTICIPANT SHOULD BE ABLE TO UNDERSTAND THE FUNDAMENTAL OF RADIATION, ... More

Instructors Only: Tickler

TD

Include Sub-Organizations? Yes No

Show if completed. Show if NOT completed or Past Due.

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TRAIN Course Summary

TD Individuals That Have Completed

FN000301/CR

Organization	Fermi ID	Name	Complete Date	Due Date
TD/EF/RDSUP	08173N	Jesus Alvarez	01/31/2002	01/31/2004
TD/EF	07400N	Giorgio Apollinari	08/29/2002	08/31/2004
TD/EF/FAB/TOOL	04950N	Daniel Assell	01/09/2003	01/31/2005
TD/DT/SM	10965N	Emanuela Barzi	11/15/2001	
TD/EF/RFDEV	12817N	Marco Battistoni	12/05/2002	12/31/2004
TD/MS/VMS	11944N	Michael Berens	04/23/2002	04/30/2004
TD/MC/IB4-OPS/CS	12698N	Cliff Besch	08/29/2002	08/31/2004
TD/EF/RDSUP	12413N	Damon Bice	02/20/2002	02/29/2004
TD/MS/WHMSTS	08905N	Howard Blair	02/27/2002	02/29/2004
TD/EF/PE	12405N	Jamie Blowers	08/23/2001	08/31/2003
TD/EF/RFDEV	12223N	Cristian Boffo	10/24/2002	
TD/EF/LHC	04451N	Rodger Bossert	04/14/1998	
TD/EF/DD	07837N	Jeffrey Brandt	04/24/2002	04/30/2004
TD/EF/FAB/ASSM	05310N	Howard Brooks	01/09/2002	01/31/2004
TD/MS/MR	06137N	Tarcisio Bucio	04/16/2002	04/30/2004
TD/MS/VMS	13075N	Greg Bulat	04/19/2001	04/30/2003
TD/EF/MDL	04992N	David Burk	03/21/2001	03/31/2003
TD/EF/RFDEV	03236N	Harry Carter	06/18/2002	06/30/2004
TD/EF/RUNII&AS	09006N	Nelson Chester	12/12/2001	12/31/2003
TD/EF/FAB/TOOL	05640N	Dean Connolly	10/07/1999	
TD/MS/WS	12271N	Michael Cooper	08/29/2002	08/31/2004
TD/MS/VMS	11665N	Phillip Cowan Jr.	01/31/2002	01/31/2004
TD/EF/PE	13134N	Matt Cullen	08/30/2001	08/31/2003
TD/MS/TS	01832N	Homer Cunningham	02/14/2002	02/29/2004
TD/EF/FAB/CMS	13037N	Kerry Dees	01/09/2003	01/31/2005
TD/DT/SM	13611N	Licia Del Frate	01/23/2003	01/31/2005
TD/DT/SDS	04783N	Eugene Desavouret	08/17/2000	
TD/DT/MA	08451N	E. Joseph Dimarco	05/06/1998	
TD/EF/FAB/TOOL	12841N	Luciano Elementi	01/10/2002	01/31/2004
TD/MS/WHMSTS	05021N	Mark Eriks	08/20/2002	08/31/2004
TD/EF/RDSUP	13493N	Randy Evans	11/01/2001	11/30/2003
TD/EF/DD	02854N	Kerry Ewald	04/14/1998	

TD/EF/LC/R&D	05121N	David Finley	11/02/2000	
TD/MS/TS	02522N	Donald Fisher	02/06/2002	02/29/2004
TD/EF/RDSUP	13492N	Oliver Frianeza	11/01/2001	11/30/2003
TD/EF/FAB/ASSM	04485N	Philippe Gallo	12/05/2002	12/31/2004
TD/EF/PE	04569N	Thomas Gardner	09/25/2002	09/30/2004
TD/MS/WS	04609N	William Gatfield	12/19/2001	12/31/2003
TD/EF/PE	03362N	Dennis Gaw	06/04/2002	06/30/2004
TD/DT	09496N	Henry Glass	02/27/2002	02/29/2004
TD/EF/RDSUP	04965N	Steven Gould	01/31/2002	01/31/2004
TD/MS/CS	04417N	Gerald Green	04/24/2002	04/30/2004
TD/MS/VMS	02971N	Edward Hagler	01/16/2002	01/31/2004
TD/MS/WS	12261N	Lenny Harbacek	08/07/2002	08/31/2004
TD/EF/RUNII&AS	03457N	David Harding	08/07/2002	08/31/2004
TD/MS/WHMSTS	06288N	Alan Haugen	01/09/2002	01/31/2004
TD/DT/TO/IC/TS	05072N	Steven Helis	04/18/2000	
TD/HQ/SUPP/ESH	08913N	Michael Herr	12/07/2001	12/31/2003
TD/EF/FAB/ASSM	12799N	Rob Hill Jr.	09/25/2002	09/30/2004
TD/MS TD/MS/WS	00362N	Roger Hiller	04/17/2002	04/30/2004
TD/MS/WHMSTS	08262N	Patrick Hughes	12/19/2001	12/31/2003
TD/MS/VMS	02114N	Leo Jackson	01/16/2002	01/31/2004
TD/EF/PE	00315N	Robert Jensen	04/24/2002	04/30/2004
TD/MS/VMS	08176N	Robert Johanek	01/16/2002	01/31/2004
TD/EF/FAB/ASSM	01527N	Junior Jones	01/31/2002	01/31/2004
TD/MC/IB4-OPS/QC	01491N	Frank Juravic Jr.	01/09/2003	01/31/2005
TD/MS/VMS	08553N	Alan Kandziorski	01/09/2002	01/31/2004
TD/MC/IB4-OPS/CS	12304N	William Kelley	05/07/2002	05/31/2004
TD/MS/WHMSTS	08894N	Thomas Kelly	04/23/2002	04/30/2004
TD	03329N	Robert Kephart	02/26/2002	02/29/2004
TD/MS/TS	04447N	Michael Kerwin	01/10/2002	01/31/2004
TD/EF/RFDEV	13342N	Timergali Khabiboulline	01/23/2003	01/31/2005
TD/DT/TO/COI/MT	04142N	George Kirschbaum	05/01/2002	05/31/2004
TD/MS/TS	03486N	Bill Koch	04/23/2002	04/30/2004
TD/MS/VMS	12206N	Alice Laroche	01/09/2002	01/31/2004
TD/EF/RUNII&AS	13322N	Adam Levy	09/25/2002	09/30/2004
TD/DT/TO/IC/TS	05379N	Fred Lewis	02/27/2002	02/29/2004
TD/HQ	02012N	Peter Limon	06/04/2002	
TD/MC/IB4-OPS/QC	06835N	Oscar Lira	02/27/2002	

TD/HQ/SUPP/FM	07956N	Gary Lorenz	06/10/1998	
TD/MS/VMS	12205N	Raven Mabe-Wortman	01/09/2002	01/31/2004
TD/MS/VMS	09294N	Gary Markiewicz	08/07/2002	08/31/2004
TD/DT/TO/COI/MT	06132N	Danny Massengill	06/26/2002	06/30/2004
TD/EF/RDSUP	12792N	Paul Mayer III	09/25/2002	09/30/2004
TD/DT/EXPASTRO	02902N	Peter Mazur	04/26/2000	
TD/MS/MR	11746N	Todd Mcgowan	01/09/2002	01/31/2004
TD/MS/TS	08925N	William Medley	02/14/2002	02/29/2004
TD/MC/IB4-OPS/QC	02825N	Stephen Merkler	02/12/1998	
TD/MS/VMS	12421N	Joe Mueller	01/09/2002	01/31/2004
TD/DT/TO/COI/MT	03700N	William Mumper Jr.	08/07/2002	08/31/2004
TD/MS/WHMSTS	06133N	John Nowak	04/23/2002	04/30/2004
TD/EF/RDSUP	04990N	Donald Nurczyk	05/07/2002	05/31/2004
BD/ENG/CRYO/CRYO-SYS TD/MS/	05066N	James O'Neill	01/31/2002	01/31/2004
TD/EF/RUNII&AS	00228N	Andrew Oleck	12/05/2002	12/31/2004
TD/EF/FAB/ASSM	13326N	Wayne Ostrom	01/31/2002	01/31/2004
TD/MS/VMS	10033N	Harry Parkhurst	02/27/2002	02/29/2004
TD/MS/VMS	04404N	Carl Penson	06/04/2002	06/30/2004
TD/DT/DEV/ADP	03030N	Thomas Peterson	04/23/2002	04/30/2004
TD/EF/RUNII&AS	12122N	Henryk Piekarz	10/17/2002	
TD/DT/TO/IC/TS	13074N	Yuriy Pischalnikov	07/20/2000	
TD/EF/FAB/ASSM	12357N	Charles Pribyl	04/23/2002	04/30/2004
TD/EF/CMS/CKM	11363N	Oleg Prokofiev	05/19/2000	
TD/DT/TO/COE	10654N	Roger Rabehl	12/12/2001	12/31/2003
TD/MS/VMS	03114N	Louis Ramirez	04/19/2000	
TD/MS/TS	03113N	James Reed	02/06/2002	02/29/2004
TD/MS/WS	03993N	Michael Reynolds	05/01/2002	05/31/2004
TD/EF/RDSUP	04895N	James Rife	05/07/2002	05/31/2004
TD/MC/IB4-OPS/QC	05857N	Robert Riley	11/02/2000	
TD/EF/FAB/TOOL	06460N	William Robatzek	01/09/2003	01/31/2005
TD/MS/WS	02174N	Jeffrey Roberts	04/23/2002	04/30/2004
TD/EF/RUNII&AS	12815N	Gennady Romanov	01/14/2003	01/31/2005
TD/EF/RDSUP	07160N	Eloisa Ruiz	01/10/2002	01/31/2004
TD/DT/TO/COI/MT	05077N	Allen Rusy	04/16/2002	04/30/2004
TD/HQ/SUPP/ESH	12260N	Richard Ruthe	10/02/2002	10/31/2004
TD/EF/FAB/ASSM	04363N	Inpeng Samayavong	09/25/2002	09/30/2004
TD/EF/FAB/ASSM	03712N	Patsy Sanchez	01/16/2002	01/31/2004

TD/EF/FAB/ASSM	03421N	Sergio Sanchez	01/31/2002	01/31/2004
TD/EF/RDSUP	13491N	Wayne Schewe Jr.	11/01/2001	11/30/2003
TD/DT/MA	11309N	Philip Schlabach	02/12/2002	02/29/2004
TD/EF/FAB/ASSM	12723N	Jerry Schmitt	03/08/2001	03/31/2003
TD/EF/RFDEV	04548N	Brian Smith	12/05/2002	12/31/2004
TD/EF/FAB/ASSM	01513N	Daniel Smith	05/30/2002	05/31/2004
TD/EF/FAB/TOOL	04893N	Richard Smith	04/25/2001	
TD/EF/RFDEV	12664N	Nikolay Solyak	01/14/2000	
BD/ENG/MSD TD/MS/WS	03800N	Chander Sood	01/09/2002	01/31/2004
TD/EF/RUNII&AS	04479N	Dean Sorensen	05/01/2002	05/31/2004
TD/MS/VMS	12643N	Kuldeep Sra	04/16/2002	04/30/2004
TD/HQ	03339N	Richard Stanek	06/18/2002	06/30/2004
TD/MS/WHMSTS	04554N	Bobby Stroud	12/19/2001	12/31/2003
TD/EF/RDSUP	13017N	Ed Strysik	01/09/2002	01/31/2004
TD/EF/FAB/TOOL	12812N	Stephen Strysik	01/14/2003	01/31/2005
TD/DT/TO/COE	11009N	Cosmore Sylvester	06/27/2001	06/30/2003
TD/EF/PE	13019N	Jan Szal	10/03/2001	10/31/2003
TD/DT/TO/COI/MT	06183N	Mark Thompson	04/24/2002	04/30/2004
TD/MS/MR	08974N	Wesley Tollefson	04/19/2001	04/30/2003
TD/DT/TO/COI/MT	04095N	Dean Validis	05/01/2002	05/31/2004
TD/EF/LAB	05082N	Thomas Van Raes	11/02/2000	
TD/DT/MA	11257N	Gueorgui Velev	02/20/2002	02/29/2004
TD/MC/IB4-OPS/CS	11939N	Gary Vezain	01/16/2002	01/31/2004
TD/MS/VMS	06117N	Ronald Wagner	01/03/2002	01/31/2004
TD/DT/SDS	08673N	Dana Walbridge	05/06/1998	
TD/MS/VMS	08083N	Scott Walters	08/07/2002	08/31/2004
TD/DT/TO/COI/MT	13103N	Randy Ward	04/19/2001	04/30/2003
TD/MS/WS	03991N	Daniel Watkins	01/23/2002	01/31/2004
TD/MS/TS	03885N	Edward Weiten	01/30/2002	01/31/2004
TD/EF/RDSUP	04568N	Gilbert Whitson	08/07/2002	08/31/2004
TD/MS/WS	04656N	Robert Williams	01/23/2002	01/31/2004
TD/DT/TO/COI/MT	03789N	Fred Wilson	09/12/2002	09/30/2004
TD/MS/WHMSTS	03820N	James Wilson	12/19/2001	12/31/2003
TD/EF/LAB	04650N	Thomas Wokas	03/25/1998	
TD/DT/SM	00114N	Ryuji Yamada	02/21/2001	

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ES&H Tools → Manuals & Procedures → Manuals → FRCM -- Fermilab Radiological Control Manual

- 1. Fermilab Radiological Control Program -- [PDF Version] (Revised: September 2001)
- 2. Radiological Standards -- [PDF Version] (Revised: September 2001)
- 3. Conduct Of Radiological Work -- [PDF Version] (Revised: December 2002)
- 4. Radioactive Materials -- [PDF Version] (Revised July 2002)
- 5. Radiological Health Support Operations -- [PDF Version] (Revised: September 2002)
- 6. Training And Qualification -- [PDF Version] (Revised: April 2001)
- 7. Radiological Records -- [PDF Version] (Revised: September 1999)
- 8. Accelerator Shielding And Radioactivation -- [PDF Version] (Revised: September 1999)
- 9. Special Circumstances -- [PDF Version] (Revised: July 2002)
- 10. Radiation Safety Interlock Systems -- [PDF Version] (Revised: September 1999)
- 11. Environmental Radiation Monitoring And Control -- [PDF Version] (Revised: September 1999)
- 12. Glossary -- [PDF Version] (Revised: September 1999)
- 13. Radiological Control Organization Chart [PDF] (Revised 07/2002)
- 14. FRCM Forms List (Revised 11/00)

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M. Hern

Applicable Portions of FRCM for TD

Chapter One

- Boiler Plate

Chapter Two

Limits

Contamination Control

Postings - important

236 not applicable to us

Release Procedures.

Chapter Three

Planning - Most Projects TD Piece Work

Work Prep — RWPs

Entry

335 → (TD-6060) Radwork Controls

346 Truck incident

347-348 Not applicable

Alara - Not many reviews

Trigger Pretty high

Chapter Four

Ram Storage

421 → TS-6030 Important

441 → TS-6020 Release Transport

Surveys

Radioactive Sources

One Source

Rad Waste Management

TD Rad Waste Program

Rad Liq - Airbone

N/A TD

Support —] ES&H

Chapter Five

External dosimetry

Dose records

551

~~[illegible]~~ → TS-6040

Internal

NIA TD

Respirator

NIA 6H- TD

Contamination

Two Job out of 100's

Surveys

Periodic Surveys

Instrument Calibration

Notices

Exposure Investigations

Lost Badges

Chapter 6 Training

Rad Trng - ES&H

RCT's Home in TD

Radiation Monitors

Chapter Eleven

Record Storage Req's

Chapter - 8

Not Applicable to TD

Chapter 9

Wilson Hall - No Machine

Special Exposures - None

Controlling Dose to Minor

931 → TD Policy 1040

Policy for Visitors

Tours.

Chapter 10

N/A TD

Chapter 11

ESH Section