5/29/87

WELDON SPRING CHEMICAL PLANT

CONTAINERIZED WASTE ASSESSMENT

AND REMOVAL PLAN

DRAFT

PREPARED FOR

THE DEPARTMENT OF ENERGY

PREPARED BY:

WELDON SPRING SITE REMEDIAL ACTION PROJECT

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AND

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1.0 INTRODUCTION

The Weldon Spring Site (WSS) is a U.S. Department of Energy (DOE) surplus facility located in St. Charles County, Missouri (Figure 1). The site presently consists of the Weldon Spring Raffinate Pits (WSRP), the Weldon Spring Quarry (WSQ), the Weldon Spring Chemical Plant (WSCP), and properties in the vicinities of these areas that have become contaminated as a result of operations at the WSS.

On October 1, 1986, the MK-Ferguson and Jacobs Engineering Team assumed responsibilities as Project Management Contractor (PMC) for the Weldon Spring Site Remedial Action Program (WSSRAP). The PMC for WSSRAP is also responsible for completion of characterization of the WSCP area.

The WSCP will be characterized to determine its physical properties and to determine the magnitude and distribution of chemical and radioactive contamination at the site. This information will play a key part in DOE's ultimate decision regarding decontamination and decommissioning of the WSS and disposition of its wastes.

1.1 Purpose

The purpose of this containerized waste assessment and removal program is to address the identification and disposal of containerized wastes that currently exists at the WSCP. This program is a necessary prerequisite to the overall implementation of the WSSRAP.

The intent of this program is two fold: 1) to mitigate the potential for sudden or unexpected release to the environment

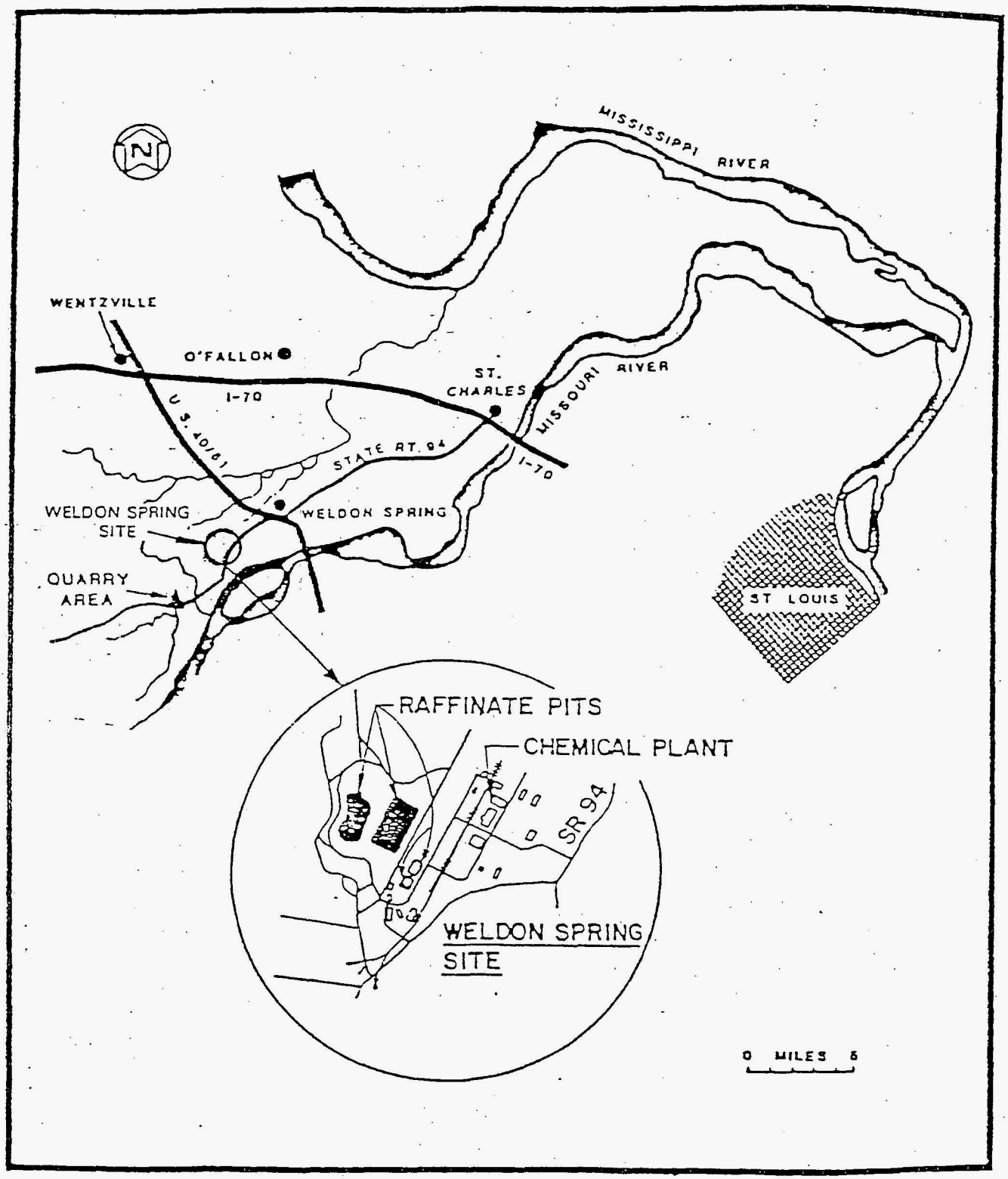

FIGURE 1 LOCATION OF WELDON SPRING CHEMICAL PLANT

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resulting from improper container storage, continued container degradation, or increased site remedial activities which may increase the potential for such releases; and 2) to identify and remove those materials which create potential exposure risks to the health and safety of site personnel during subsequent WSSRAP activities.

1.2 Scope

The containerized waste assessment and removal program is focused on those materials remaining in containers. These materials include: liquids, solids, sediments and sludges currently contained in surface and subsurface storage tanks, process vessels, sumps, drums, fuel tanks, laboratory containers, gas cylinders, fire extinguishers, batteries and other miscellaneous containers.

All materials identified above will be designated as waste materials and will be considered a hazardous substance until such time as the preliminary characterization and/or individual container sampling preclude their classification as a hazardous substance as defined by 40 CFR 300.6 under the Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA), or a hazardous waste under 40 CFR 261 The Resource Conservation and Recover Act (RCRA).

Furthermore, those containerized wastes which are identified as having radiologic activity above background levels will be segregated and placed in an interim storage area onsite for treatment and disposal with other radiologically contaminated materials from the WSS.

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1.3 Objectives

The objective of this program is to inventory, identify, segregate, package, transport, and dispose of all non-radiologically contaminated hazardous wastes in an environmentally acceptable manner consistent with applicable federal, state and local regulations. This program has the further objective of determining which, if any, of the radiologically contaminated materials are also hazardous wastes under RCRA. The major factors which will be considered in determining the feasibility and effectiveness of various treatment/disposal options will be focused toward permanent alternatives consistent with EPA's proposed alternative treatment/disposal technology guidance for removal and expedited response actions (EPA, September 1986).

2.0 SITE DESCRIPTION

The WSCP includes 13 major buildings and approximately 30 smaller buildings. Of the 13 major buildings, five were used as process buildings, and eight were major support buildings. Most of the buildings are shown and identified in Figure 2. The other two buildings (4-35, 4-3) are just beyond the southern boundary of this Figure.

The WSCP site encompasses a portion of what was previously the Weldon Spring Ordnance Works (WSOW), used to manufacture DNT and TNT between 1941 and 1944. In 1956, the Atomic Energy Commission acquired approximately 220 acres of the original WSOW site from the Department of the Army (DA) for use as a uranium feed materials plant (DA, March 1976).

Following shutdown of the Feed Materials Plant in 1966, the AEC

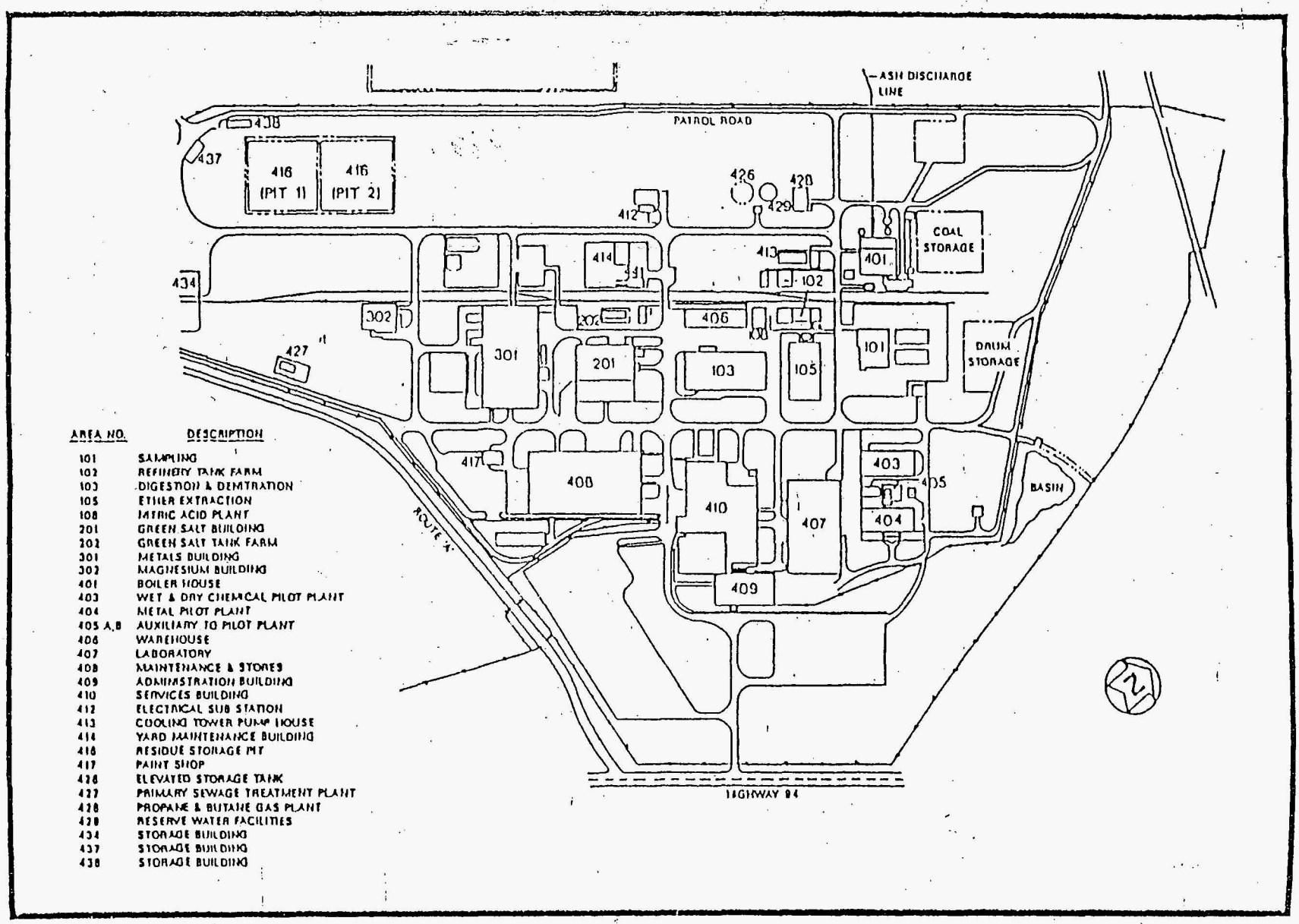

FIGURE 2 MAJOR STRUCTURES AT WSCP SITE

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transferred the facility to the DA for conversion to a defoliant production plant. The DA hauled approximately 6,000 cubic yards of radiologically contaminated materials to the WSQ and also dumped an undetermined amount of contaminated scrap material into Raffinate Pit 4 (DA, March 1976). Work on the defoliant project was canceled in 1969 before renovation of facilities was complete; therefore, herbicide was not produced at this site.

In 1983, the DA containerized the removable, radiologically-contaminated material from most of the buildings and appurtenant structures into 55 gallon drums these drums were placed in rows inside Building 301 and 406. The contaminated materials and machinery inside Building 301 were covered with a thin fabric and sprayed with a 1-inch-thick layer of hard-setting foam to prevent the spread of contamination as a result of rain leaking into the building (SNC, April 1984).

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3.0 TECHNICAL APPROACH

This containerized waste assessment and removal program will be performed in two phases. Phase I will involve two activities, container inventory and chemical characterization. These preliminary activities will be performed by the PMC. Information gathered in this first phase will be utilized to develop subcontractor bid specifications and other documents necessary to award a subcontract to perform Phase II activities. Phase II activities may include: site preparation for container staging, container staging, container sampling, waste bulking, manifest preparation and transportation/treatment/disposal of containerized materials.

All work performed under these activities will be subject to and controlled by DOE approved WSSRAP plans including:

- Environmental, Safety, and Health Plan for the Weldon Spring Site Remedial Action Project;
- Quality Assurance Program Plan for the Weldon Spring Site Remedial Action Project;
- Community Relations Plan for the Weldon Spring Site Remedial Actions Project;
- WSSRAP Spill Prevention, Control and Countermeasure Plan, and
- Applicable DOE Orders.

Activity specific operation plans and standard operating procedures will be developed and implemented by the PMC for the Phase I activities and by the removal subcontractor for Phase II activities to support the unique activities which will be performed during the container assessment and removal operations.

Details of each activity are presented in the following sections.

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3.1 PHASE I

Phase I will consist of container inventory and characterization steps.

3.1.1 Inventory of Containerized Chemical Waste

The container inventory will be the initial activity performed to identify and estimate the number, location, general condition, storage configuration, and sampling method required for WSCP containers. During the inventory, the indoor and surrounding area of each building will be surveyed for the presence of bottles, drums, tanks and other vessels. As containers are identified, their locations will be recorded on base maps. Additionally, each container, or group of containers, will be described on a container inventory form (Figures 3 and 4) as to the type of container(s), capacity, physical condition, markings, etc. and as to the type of material (liquid, solid, gas or sludge). Each container or group of containers will be assigned and labeled with a unique identifying number. When more than one identical container is present at one location, the entire group will be assigned a single number. Like containers will be physically grouped together and suitably labeled.

During the inventory, the potential hazards to on site personnel associated with the waste materials will be assessed using radiologic survey instruments, organic vapor survey meters, and combustible gas/oxygen meters.

3.1.2 Identification of Container Contents

Concurrent with inventory activities, efforts will be undertaken to identify the waste materials. Based on a site survey performed by PMC personnel in April 1987, approximately

FIGURE 3

Weldon Spring Site Remedial Action Project (WSSRAP)
Route 2, Highway 94 South, St. Charles, Missouri 63303
Phone (314) 441-8086 Telecopy (314) 447-0803

Containerized Chemical Inventory

Container Number: CC-2 -0587 Date: _____

Number of Containers Included In This Number: _____

LOCATION WHERE FOUND:

Building No.: _____

Floor No.: _____

Room Name/No.: _____

_____

Drawing No.: _____

LOCATION MOVED TO:

Staging Area No.: _____

Staging Area Name: _____

_____

CONTENTS IDENTIFICATION:

___ Definitely Known

___ Tentatively Known

___ Unknown

QUANTITY OF MATERIAL:

Gallons: _____

Pounds: _____

CONTAINER TYPE:

___ Drum - Open Top

___ Drum - Bung Top

___ Fiber Drum

___ Can - 5 gallon

___ Can - 1 gallon

___ Tank - Above Ground

___ Tank - Below Ground

___ High Pressure Tank

___ Gas Cylinder

___ Bag

___ Box

___ Sump

___ Pipe

___ Bottle

___ Jar

___ Other _____

CONTAINER INTEGRITY:

___ Over-Pressurized ___ Leaking ___ Rusted Through

___ Other _____

ORIGINAL LABEL WORDING:

_____

_____

_____

PERSONNEL HAZARD LEVEL SURVEY DATA:

PID Reading: _____ ppm calibrated to _____

Oxygen Concentration: _____ percent

Combustible Gas Level: _____% of LEL calibrated to _____

Radiation Levels: alpha: _____ beta: _____ gamma: _____

Other: _____

INVENTORIED BY:

Signature: _____ Employer: Jacobs Engineering

Form CC-1

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FIGURE 4

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Weldon Spring Site Remedial Action Project (WSSRAP)
Route 2, Highway 94 South, St. Charles, Missouri 63303
Phone (314) 441-8086 Telecopy (314) 447-0803

Condemned Fire Extinguisher Inventory

Building or Area Number _____

Floor _____

Type Of Extinguisher	Number (Hash Marks)	Total
Dry Chemical, Red (AB or ABC)		
10 pound		
30 pound		
350 pound (Wheeled)		
Other_____		
Dry Chemical, Yellow (for metal fires)		
30 pound		
150 pound (Wheeled)		
Other_____		
Carbon Dioxide		
5 pound		
10 pound		
15 pound		
20 pound		
Other_____		
Propellant Cartridge for Dry Chemical Extinguisher		
Ansul		
Other		
Other Types		
_____		
_____		

Inventoried By (Signature): _____

Date _____

Form CC-4

MK-Ferguson Company -- Project Management Contractor

two-thirds of the containers onsite are known to be labeled or the contents can be identified based on process drawings or knowledge of the process. Many of the containers are unopened and have intact labels. Appendix A lists the chemicals associated with processing activities that are potentially still present at the site.

During this identification step, all containers will be screened qualitatively in situ for radiologic activity. This screening will be performed using both alpha and beta/gamma radiation survey meters. The results of this screening will be used only to determine whether the material is grossly contaminated. It will not be used to determine whether materials are releasable offsite.

The contents of all containers determined to be radiologically contaminated during the above screening procedure will be sampled. These samples will be quantitatively analyzed onsite using gamma spectroscopy and offsite for RCRA characteristic testing. The radiologic activity will be determined onsite using one-hour counting times in the High Purity Germanium Gamma Spectroscopy System capable of detecting uranium-238, thorium-230 and radium-226. Other radioactive isotopes will not be measured since these materials are not present on site. The RCRA characteristics test will include EP-toxicity, ignitibility, reactivity, and corrosivity. These tests will be performed to determine whether the radioactive wastes from the site are also RCRA characteristic wastes.

A random sampling of approximately 10 percent of the remaining known and unknown materials which are not radiologically contaminated will be performed to confirm the label markings and physical appearance. The same quantitative tests for RCRA characteristics will be performed on those samples as were

performed on the radiologically contaminated samples. Collection of samples for these various parameters will be documented on the form shown in Figure 5.

This characterization will allow gross categorization of the types of waste on-site. This information will be used to prepare bid specifications, cost estimates, and to estimate the level of effort for the remaining removal activities. Costs for the removal phase are extremely variable depending on waste types, required overpacking, recontainerization, potential for bulking, distance to an acceptable disposal site, and personnel protective equipment required for safe handling. This sampling will also expand the general knowledge of the WSCP and provide information needed for worker protection.

The appropriate sampling techniques will be determined by the types of material, and any physical constraints or limitations determined during the field assessments. Sampling methods and equipment will vary with the physical form and medium of the sample. In each case, the sampling and collection procedures will be consistent with those identified in EPA guidance and methodology documents (EPA, December 1984, May 1985, and January 1986).

After completion of the container inventory and characterization, the information will be summarized into a graphical, tabular, or matrix formats. This information will be utilized in the development of the subcontractor bid specifications for containerized waste removal and disposal addressed under the following activities.

3.2 Phase II

The second phase will be performed by the subcontractor who is

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FIGURE 5

Weldon Spring Site Remedial Action Project (WSSRAP)
Route 2, Highway 94 South, St. Charles, Missouri 63303
Phone (314) 441-8086 Telecopy (314) 447-0803

Containerized Chemical Sampling

Container Number: CC-2 -0587

PHYSICAL DESCRIPTION

____ Solid ____ Liquid ____ Sludge ____ Gas

____ Homogeneous ____ Stratified

Color: _____

Viscosity: _____

Other:

Described By: (Signature) _____

Sample Type	Compatability	Radiologic	Chemical I.D.
Date Collected	_____	_____	_____
Duplicate Collected	Yes or No	Yes or No	Yes or No
Separate Phases to Be Analyzed Separately	Yes or No	Yes or No	Yes or No
Collected By: Signature	_____	_____	_____
Lab Receiving Sample	_____	_____	_____

COMMENTS:

Form CC-2
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the successful bidder on that portion of the project. The bid specifications for Phase II will be prepared as part of Phase I.

3.1.1 Site Preparation

Before container removal actions begin, preparation of support facilities will be required to provide for safe and efficient handling of the containers. Based on the Phase I findings appropriate support facilities will be designated and/or installed by the removal subcontractor. The nature and extent of site preparation will vary depending on the hazard level of wastes, their locations, etc. The number and location of support facilities, special operating areas, or temporary storage areas needed for the removal operations may include:

- Staging areas,
- Drum opening area(s),
- Waste consolidation/loading areas,
- Interim storage areas,
- Equipment and personnel decontamination areas,
- Mobile laboratory,
- Command post and administration area,
- Emergency medical facilities, and
- Equipment maintenance area.

The site layout will be such that there is a safe travel distance between staging areas, opening/sampling areas, temporary storage areas, etc. Container inventory and characterization data gathered during Phase I will be used to determine the number and size of the various operating areas.

Highly hazardous containers such as those containing explosives, highly radioactive materials, pressurized drums, compressed gas

cylinders, etc. may require separate staging/opening areas located as far as possible from the routine container handling operations and other site operations.

3.1.2 Staging

Any containers which were identified in the inventory and characterization activities which were leaking, badly corroded, or deformed will be overpacked or the contents transferred to a new or reconditioned container as soon as the removal subcontractor is on-site and site preparations are complete.

Once any immediate hazard(s) have been eliminated, removal activities will begin.

A container will not be moved or opened unless it has been ascertained beyond a reasonable doubt that the container is structurally sound, and the contents are not explosive or shock sensitive.

Staging of drums and other movable containers will be considered when the following conditions exist:

- Containers cannot be sampled in place due to physical restrictions,
- Potentially hazardous materials are stored together (i.e., storage of incompatible or reactive materials next to each other),
- There are severe access/egress restrictions,
- Drums can be grouped by waste type to facilitate bulking,
- Containers are pressurized, contain compressed gas, or exhibit unusual conditions.

During staging, the containers will be physically separated into the following categories (when possible): liquids, solids, laboratory materials/packs, gas cylinders, and radioactive wastes.

The use of combined container staging/container opening areas, will be used when possible where container contents are known or suspected, (i.e., similar drum markings, labels, preliminary characterization indicate similar contents, etc.). Containers will be staged in rows of two or in groups of four, with sufficient distance between each row or group to provide easy access for drum opening equipment and adequate space for emergency evacuation.

3.1.3 Sampling for Compatibility and Disposal

A detailed work plan will be developed by the selected subcontractor and will be reviewed and approved in writing by the PMC prior to the start of on-site sampling activities. Generally, a typical plan for tank and drum sampling will address the following topics:

- Goals of the sampling effort,
- Use of sampling data (to select treatment or disposal options),
- Types of sampling to be performed (detailed drums laboratory container, gas cylinder sampling, detailed tank, vessel sampling, etc.),
- Sample analyses/compatibility testing,
- Methodology describing sampling and analytical procedures, and
- QA and safety.

The plan will be reviewed to ensure compliance with applicable

WSSRAP programs (See Section 3.0 - Technical Approach).

Container sampling activities, including sample collection, analysis, quality assurance and control, chain of custody, and documentation and reporting will be conducted in accordance with the guidelines set forth by the EPA in SW 846 (EPA, July 1982). In addition, the hazardous waste requirements established by the State of Missouri Department of Natural Resources (MODNR) and EPA Region VII will be implemented for these sampling activities.

Sampling of the drums and laboratory containers will be performed as the containers are opened in the staging area(s). Concurrent with the required analytical analysis, compatibility testing will be performed on-site to reduce turn-around time and increase staging/opening/bulking efficiency.

As each container is opened, the contents will be scanned for radioactivity. If activity levels are above background, one sample will be collected for radiologic identification and another collected for chemical analysis. After sampling, the container will be marked and removed to the designated radiological waste interim storage area. The final disposition of the radiologically contaminated wastes is not within the scope of this program. If activity levels equal background, a sample will be taken for compatibility testing.

Compatibility testing protocols, which have been developed by the Chemical Manufacturers Association (CMA, 1982), will be followed as outlined in Figure 6.

These compatibility testing procedures shown may require tailoring for site-specific containers at the WSCP or to meet the testing requirements of prospective treatment disposal facilities. A form similar to that shown in Figure 7 will be

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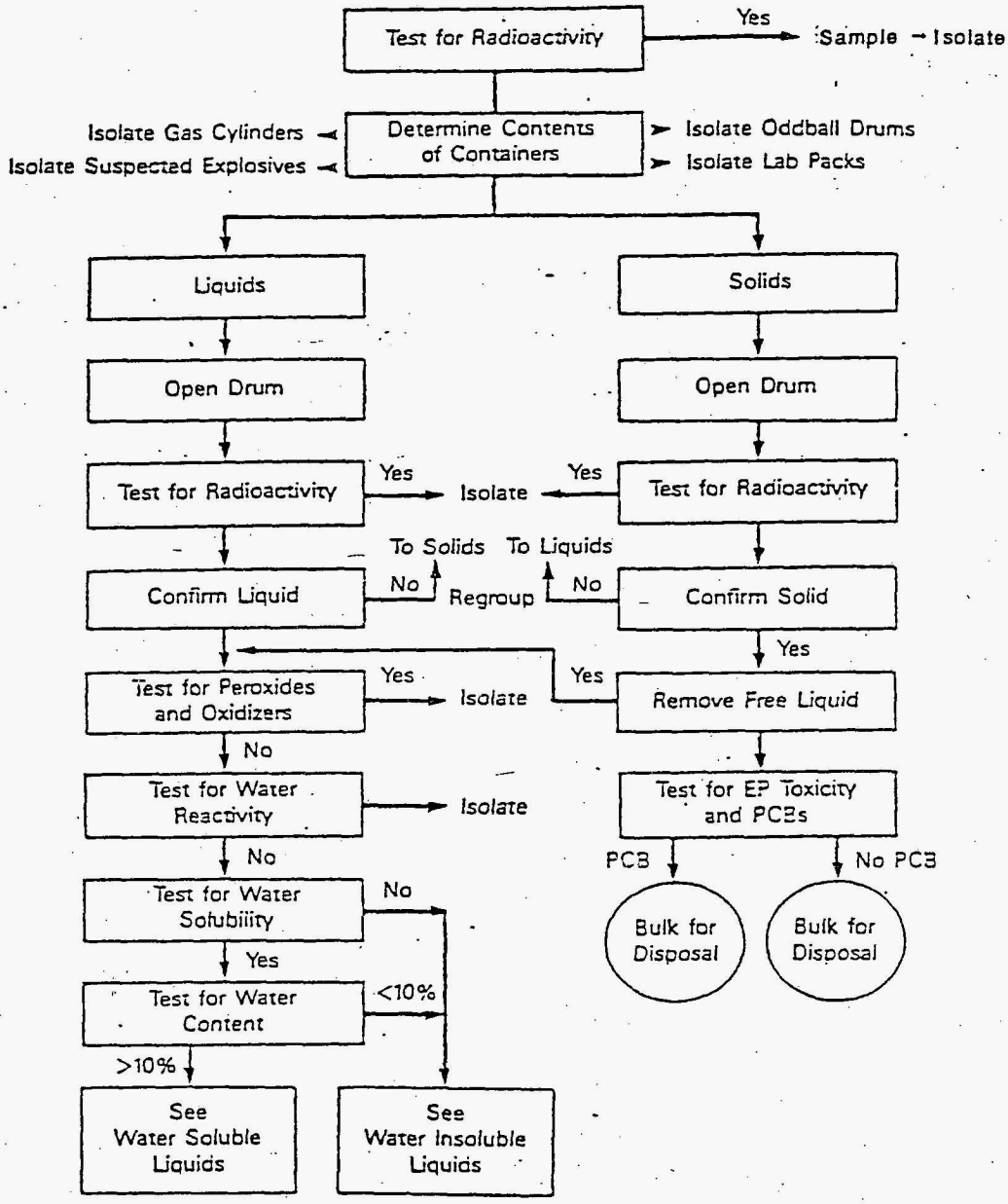

FIGURE 6 Compatibility Testing Protocol (Modified by Princeton Aqua Science)
(Reprinted courtesy of Chemical Manufacturer's Association, Washington, D.C.)

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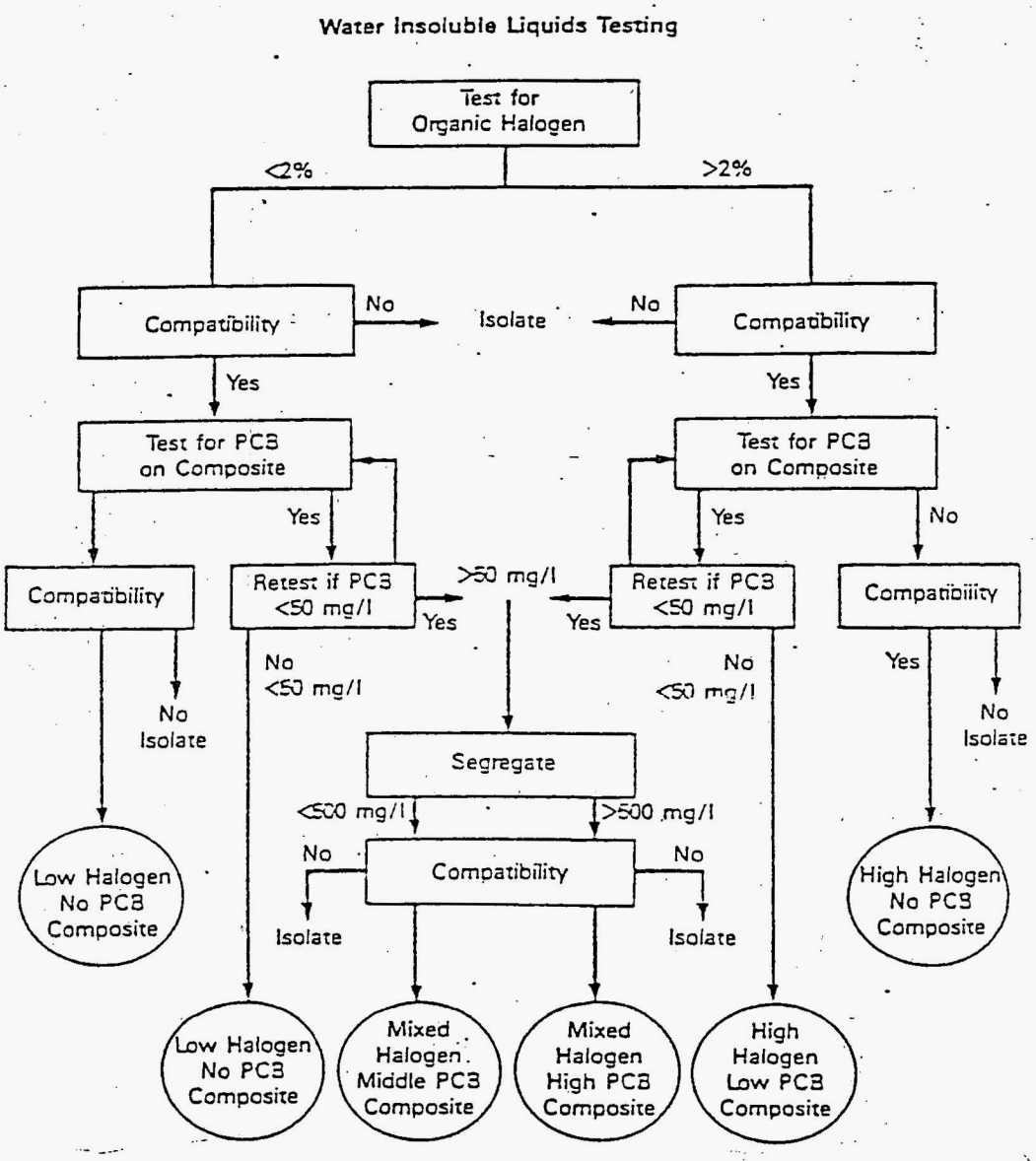

FIGURE 6 (continued) (Modified by Princeton Aqua Science). (Reprinted courtesy of Chemical Manufacturer's Association, Washington, D.C.)

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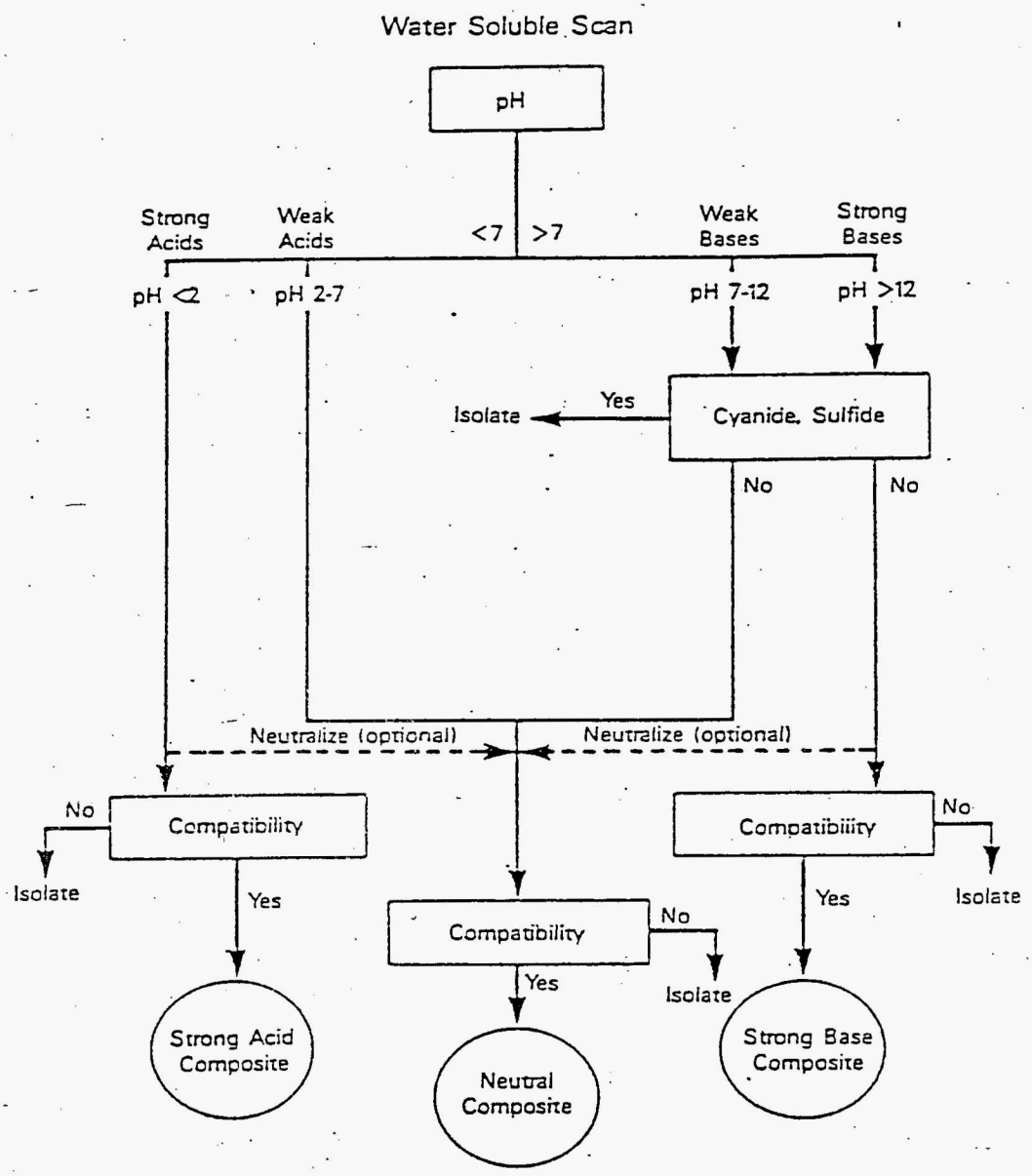

FIGURE 6 (continued) (Modified by Princeton Aqua Science) (Reprinted courtesy of Chemical Manufacturer's Association, Washington, D.C.)

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FIGURE 7

Weldon Spring Site Remedial Action Project (WSSRAP)
Route 2, Highway 94 South, St. Charles, Missouri 63303
Phone (314) 441-8086 Telecopy (314) 447-0803

CONTAINERIZED CHEMICAL CONTENTS IDENTIFICATION

Container Number CC-2 -0587

Radioactivity Level

Alpha	_____	Uranium-Natural	_____
Beta	_____	Uranium-238	_____
Gamma	_____	Thorium-230	_____
		Radium-226	_____
		Others_____	_____
		_____	_____

Radiologically Releasable Off-Site: Yes or No

COMPATABILITY DATA

pH	_____
Peroxide or Oxidizer	Yes or No
Reducing Agent	Yes or No
Water-Reactive	Yes or No
Halogen Content	Low or High
Acid	Strong, Weak, or No
Base	Strong, Weak, or No
Cyanides	Yes or No
Sulfides	Yes or No
Flammability	_____
Specific Gravity	_____
Heat Content	_____ BTU/lb
Solids Content	_____ percent
Hydrocarbon	Yes or No
Pesticides	Yes or No
Sulfur Content	Low or High
Phenols	Yes or No
Oil and Grease	_____ percent
Water	_____ percent
Viscosity	_____
Organochlorine Content	_____ percent
EP Toxicity Metals	Yes or No
Solubility	H_2O H_2SO_4 or $(CH_3)_2SO$

HAZARDOUS MATERIAL:

Yes or No

Comments:

Lab Reports Transcribed By: (signature)_____

Date:_____

Form CC-3
MK-Ferguson Company -- Project Management Contractor

used to compile the results of these test.

Based on the CMA protocol, wastes may be segregated into the following broad waste categories:

- o Liquids
  - Radioactive
  - Peroxides and oxidizing agents
  - Reducing agents
  - Water-reactive compounds

- o Water insoluble
  - Low halogen, low PCB
  - Mixed halogen, high PCB
  - High halogen, low PCB

- o Acids
  - Strong (pH <2)
  - Weak (pH 2-7)

- o Bases
  - Strong (pH >12), with or without cyanides or sulfides
  - Weak (pH 7-12), with or without cyanides or sulfides

- o Solids
  - Radioactive
  - Nonradioactive

The collection and analysis of samples from process equipment, tanks, vessels, sumps, and lines will require specialized access and sampling methodology. Because of their relative volume and quiescent condition, the contents will be stratified. It is anticipated that as many as three phases (oil, liquid, sludge) may be discovered and a sample from each will be collected to

determine material characteristics, compatibility,and handling requirements.

Unique or special containers, such as gas cylinders, batteries, fire extinguishers, lab packs, over-pressurized drums, etc. will be handled on a case-by-case basis as these containers are found. Since a much higher level of risk is associated with the handling or disturbance of these containers, separate procedures will be developed for handling and removal of these materials.

3.1.4 Bulking

By identifying broad waste categories, compatible waste types can be safely combined into bulk containers on-site without risk of fire or explosion, and disposal options can be determined without exhaustive or costly analysis of individual drums.

Once a compatible group of samples is identified a final disposal analysis will be conducted. Analytical requirements of a number of disposal facilities have been compared (MBL, 1982). The tests identified in Table 1 are representative of tests that may be required prior to acceptance of liquids and solids for disposal.

3.1.5 Interim Storage

Liquid and solid wastes identified during the sampling which exhibit radiation levels statistically significant above background will be transferred into interim storage at the WSCP for later incorporation into treatment/disposal activities to be performed under the WSSRAP. The specific location of the WSCP interim storage facility will be determined by the PMC once the total volume of radiologically contaminated containerized wastes are determined.

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3.1.6 Treatment/Disposal

Once the containerized wastes have been categorized, they will be assigned appropriate treatment/disposal options. These options will be selected based on such factors as protection of public health, regulatory requirements, availability of treatment/disposal facilities, and applicability to site specific conditions (i.e., numbers of containers, volume of waste type(s), etc.).

A matrix, such as the one shown in Table 2, will be utilized to relate the type of containerized wastes to be handled from the WSCP to the types of waste treatment and disposal systems available. Only those treatment methods which have potential applicability to a given waste type and/or disposal categories (based on best engineering judgment) will be considered.

After the final treatment/disposal options have been determined, the wastes will be prepared to meet the requirements of the treatment or disposal facility and applicable Department of Transportation (DOT) shipping regulations.

Wastes will be removed and transported from the WSCP by the subcontractor to the designated treatment/disposal facility.

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TABLE 1

POTENTIAL ANALYTICAL REQUIREMENTS
FOR DISPOSAL *

1. Flammability
2. pH
3. Specific gravity
4. PCB analysis
5. Thermal content (BTU/lb)
6. Physical state at 70°F
7. Phases (layering in liquids)
8. Solids (%)
9. Hydrocarbon composition
10. Pesticide analysis
11. Sulfur content
12. Phenols
13. Oil and grease (%)
14. Water (%)
15. Viscosity
16. Organochlorine percentage
17. Metals analysis
    a. Liquids for soluble metals.
    b. Solids extracted according to the EPA Toxicant Extraction Procedure (24 hr.) which shows leachable metals.
    c. Both liquid and solids checked for concentrations of the following metals:

Arsenic	Mercury
Barium	Nickel
Cadmium	Selenium
Chromium	Silver

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TABLE 1 (continued)

Copper	Zinc
Lead	

18. Both free and total cyanide content.
19. Solids checked for solubility in water, sulfuric acid, and dimethyl sulfoxide.

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* Reprinted from Muller, Broad, and Leo, 1982. Table originally printed in the Proceedings of the National Conference on Management of Uncontrolled hazardous Waste Sites, 1982. Available from Hazardous Materials Control Research Institute, 9300 Columbia Blvd., Silver Spring, MD 20910.

TABLE 2 CATEGORIES AND POTENTIAL TREATMENT/DISPOSAL TECHNOLOGIES

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TANK AND DRUM WASTE CATEGORIES	ON-SITE PREP ACTIVITIES			TREATMENT AND DISPOSAL									
	Bulking/ Consolidation	Absorption/ Solidification	Physical/Chemical Pretreatment	Solidification/ Chemical Fixation	Detoxification	Physical/Chemical Treatment	Biological Treatment	Land Application	Secure Landfill	Incineration/Thermal Reduction	Recycle/Reuse w/ Treatment	Recycle/Reuse w/o Treatment	Deepwell Injection
AQUEOUS WASTES													
• Acid: pH < 2.0	1	2	1	2	2	1	2	2	2	2	1	1	1*
• Base: pH > 12.0	1	2	1	2	2	1	2	2	2	2	1	1	1*
• Base with Sulfur	1	2	1	2	2	1	2	2	2	2	2	2	2*
• Base with Cyanide	1	2	1	2	2	1	2	2	2	2	2	2	2*
ORGANIC LIQUIDS													
• High Halogen content (>2%)	1	2	2	2	2	2	2	2	2	1	2	2	2*
• Organic liquids including Low Halogen content (0-2%)	1	2	2	2	2	1	1	1	2	1	1	2	2*
• Oils non-PCB contaminated	1	2	2	2	2	1	1	1	2	1	1	1	2
• PCB Contaminated Liquid (50-500 ppm)	1	2	2	2	2	1	2	2	2	1	2	2	2
• PCB Contaminated Liquid (> 500 ppm)	1	2	2	2	2	1	2	2	2	1	2	2	2
CONTAMINATED WATER													
• 2 < pH < 12	1	2	1	2	2	1	2	2	2	2	2	2	1*
• Inorganic	1	2	1	2	2	1	2	2	2	2	2	2	1*
• Organic	1	2	1	2	2	1	1	1	2	2	2	2	1*
• PCB Contaminated Liquid (< 50 ppm)	1	2	2	2	2	1	2	2	2	1	2	2	2
• Pesticide	1	2	1	2	2	1	1	2	2	2	2	2	2
SLUDGE/SOLIDS													
• Organic Low Halogen	1	1	1	1	2	1	1	2	1	1	2	2	2
• Organic High Halogen	1	2	2	2	2	1	1	2	1	1	2	2	2
• Inorganic	1	1	1	1	2	1	2	2	1	2	2	2	2
• Flash point (< 70 °F)	2	2*	2	2	2	2	2	2	2	1	2	2	2
• Flash point (>70 - 140°F)	1	2	2	2	2	2	2	2	1*	1	2	2	2
• Flash point (> 140 °F)	1	1	1	1	2	1	2	2	1	1	2	2	2
• PCB Contaminated Solid (<50 ppm)	1	1	2	2	2	1	1	1*	1	1	2	2	2
• PCB Contaminated Solid (>50 - 500 ppm)	1	2	2	2	2	2	1	2	1*	1	2	2	2
• PCB Contaminated Solid (>500ppm)	1	2	2	2	2	2	1	2	1*	1	2	2	2
• Pesticide	1*	2	1	2	2	1	2	2	1	1	2	2	2
• Petroleum Residues	1	1	1	1	2	1	1	1	1	1	1	2	2
SPECIAL WASTES													
• Radioactive	*	*	*	*	*	*	*	*	*	*	*	*	*
• Strong Oxidizer	2	2	1	2	2	1	2	2	1	2	2	2	2
• Strong Reducer	1	2	1	2	2	1	2	2	1	2	2	2	2
• Lab Packs	2	2	2	2	1*	1	2	2	1	1	2	2	2
• Explosives	2	2	2	2	1	1	2	2	2	1	2	2	2

Phased waste shall be separated and handled as individual waste items

Mixed waste shall be classified under the more restrictive disposal category

1 = Reasonable Option

2 = Not Reasonable (Impractical, Technically Infeasible)

* = Further detailed analysis is warranted

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APPENDIX A

Chemicals Used at the Weldon Spring Feed Materials Plant

Building	Chemical Name	Reference	
All	CO2 Fire Extinguishers	D	S
All	Dry Powder Fire Extinguishers	D	S
All	Janitorical Chemicals		S
All	Soda Acid Fire Extinguishers	D	S
Most	Asphaltic Mastic Sealer	D	
Most	Asbestos Pipe Insulation		S
Many	Flaking Paint (May be Lead)		S
Many	Sumps	D	S
Overhead Utilities	Asbestos Pipe Insulation		S
Transformers	No-PCB Oil		S
Transformers	PCB Oil		S
101	Elevator Cable Cleaner		S
102	Hexane	D	
102	Nitric Acid	D	
102	Nitrogen	D	
102	Sodium Hydroxide	D	
102	Sulphuric Acid	D	
103 and 403	Alkali Wash	D	
103 and 403	Aluminum Solution	D	
103 and 403	ANN	D	
103 and 403	Calcium Oxide	D	
103 and 403	Condensate Water	D	
103 and 403	Deionized Water	D	
103 and 403	Dust Collector (Vacuum) Catch	D	
103 and 403	Filtrate	D	
103	Floor Wax		S
103 and 403	Fuel Gas	D	
103 and 403	Hydrostatic Precipitator	D	
103 and 403	Iron	D	
103 and 403	Lime Slurry	D	
103 and 403	Magnesium Oxide	D	
103 and 403	Misc. Metal	D	
103 and 403	Nitric Acid	D	
103 and 403	N. G. Liquor from Ether Ext.	D	
103 and 403	Orange Salt	D	
103 and 403	O.X. Liquors	D	
103 and 403	Raffinate	D	
103 and 403	Sawdust Converter Waste	D	
103 and 403	Scrap Metal	D	
103 and 403	Sodium Carbonate	D	
103 and 403	Sodium Hydroxide	D	
103 and 403	Sump Liquor (Bldg 103)	D	
103 and 403	U3O3	D	
103 and 403	UNH	D	
103 and 403	UO3	D	

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Chemicals Used at the Weldon Spring Feed Materials Plant

Building	Chemical Name	Reference	
103 and 403	Uranium Ore Concentrates	D	
103 and 403	Wash Water	D	
103 and 403	Water	D	
103 and 403	Wet Scrubber Waste	D	
105 and 403	Deionized Water	D	
105 and 403	Deionizer Chemicals	D	
105 and 403	Ether	D	
105 and 403	Ethylene Glycol	D	
105 and 403	Filter Press Waste	D	
105 and 403	Hexane	D	
105 and 403	Nitric Acid	D	
105 and 403	Raffinate	D	
105 and 403	Rubberized Mastic	D	
105 and 403	Sodium Carbonate	D	
105 and 403	Sodium Hydroxide	D	
105 and 403	Sump Liquor (Bldg 105)	D	
105 and 403	Tributyl Phosphate	D	
108	Ferric Nitrate	D	
108	Nitric Acid	D	
109	Compressed Gas Cylinders		S
201	Anhydrous Hydrogen Fluoride	D	
201	Ammonia	D	
201	Asbestos Cement Siding	D	S
201	Asbestos Insulation (on Tanks)		S
201	Azeo		S
201	Bottle of Clear Liquid		S
201	Condensate	D	
201	Drums of Unknown Chemicals		S
201	Dust Collector Catches	D	S
201	Elevator Cable Cleaner		S
201	Fibered Roofing Sealer		S
201	Green Salt	D	
201	Hydraulic Oil	D	
201	Hydrofluoric Acid	D	
201	Hydrogen Gas	D	
201	Lime Scrubbing System Waste	D	
201	Nitrogen Gas	D	
201	Orange Oxide	D	
201	Propane	D	
201	Reverter Off-Gas Waste (Rerun)	D	
201	Reverter Product	D	
202	Anyhdrous Hydrogen Fluoride	D	
202	Ammonia	D	
202	Asbestos Cement Siding	D	S
202	Hydrofluoric Acid	D	
301	Air Filter Catches	D	

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Chemicals Used at the Weldon Spring Feed Materials Plant

Building	Chemical Name	Reference	
301	Asbestos Cement Siding	D	S
301	Caustic Flake	D	
301	Caustic Liquid	D	
301	Condensate From Process	D	
301	Dust Collector Catches	D	
301	Green Salt	D	
301	Magnesium	D	
301	Metal Oxide (from Saws)	D	
301	Precipitation Tank Sediment	D	
301	Process Sewer Filter Cake	D	
301	Salt Bath Supplies	D	
301	Salt (Unknown Type)	D	
301	Settling Tank Sediment	D	
301	Slag	D	
301	Uranium Metal	D	
302	Magnesium	D	S
302	Wet Scrubber Catch	D	
302	Graphite Sheets		S
401	Acid	D	
401	Asbestos (Bags)		S
401	Asbestos Cement Siding	D	S
401	Asbestos Floor Tile (offices)	D	
401	Asbestos Pipe Insulation		S
401	Ash	D	
401	Batteries		S
401	Diesel	D	
401	Fuel Oil	D	
401	Gasoline	D	
401	Hydrofluoric Acid		S
401	Hydrogen Zeolite--Water Softener	D	
401	Lube Oil	D	
401	Oil Sorber (for Air Compressor)	D	
401	Phosphate	D	
401	Refrigeration Brine	D	
401	Salt	D	
401	Sodium Zeolite -- Water Softener	D	
401	Sulfite	D	
401	Water Testing Chemicals		S
403	(See Buildings 103 and 105)		
404	Barium Fluoride		S
404	Degreaser Chemicals	D	
404	Filter Cake	D	
404	Graphite		S
404	Green Salt	D	
404	Helium	D	
404	Hydraulic Oil	D	
404	Hydrogen	D	
404	Lithium Fluoride		S

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Chemicals Used at the Weldon Spring Feed Materials Plant

Building	Chemical Name	Reference	
404	Slag	D	
404	Uranium Metal	D	
405	Dust Collector Catch	D	
406	Drum Storage	D	
406	Dry Chemical Storage	D	
406	Graphite Blocks		S
406	Waste from Feed Materials Plant In Drums filled During Army Decontamination Efforts		S
406	Lime		S
406	Sealers		S
407	Asbestos Cement Siding	D	S
407	Asbestos Pipe Insulation		S
407	Ether	D	
407	Hydrofluoric Acid	D	
407	Laboratory Chemicals	D	
407	Non-Sparking Floor (Ether Lab)	D	
407	Perchloric Acid	D	
407	Photograph Developing Chemicals	D	
408	Acetylene Cylinders	D	
408	Air Filters	D	
408	Anti Radioactivity Cleaner		S
408	Asbestos (Bags)		S
408	Asbestos Ceiling Board	D	
408	Asbestos Pipe Insulation		S
408	Batteries	D	
408	Carbide Tool Grinder Dust	D	
408	Carpentry Shop supplies	D	
408	Cleaning Solvent		S
408	Compressed Gas Cylinders		S
408	Decon Wastes	D	
408	Electrical Maintenance Supplies	D	
408	Gasoline	D	
408	Grease	D	S
408	Hydraulic Oil	D	S
408	Inert Gas (for Welding)	D	
408	Instrument Maintenance Supplies	D	
408	Insulating Supplies	D	S
408	Isopropyl Alcohol		S
408	Machine Shop Supplies	D	S
408	Millwright Supplies	D	
408	Nitric Acid	D	
408	Oil		S
408	Oxygen Cylinders	D	
408	Pipefitting Supplies	D	
408	Rigger's Supplies	D	
408	Sheet Metal Working Supplies	D	
408	Sodium Phosphate		S

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Chemicals Used at the Weldon Spring Feed Materials Plant

Building	Chemical Name	Reference	
408	Thread Cutting Oils	D	S
408	Welding Supplies	D	S
408	Window Washing Supplies	D	
409	Ammonia		S
409	Asbestos Pipe Insulation		S
409	Lead Wall Lining (Teletype Room)		S
409	Photograph Developer Chemicals		S
409	Printing Press Cleaner		S
409	Printing Press Inks		S
410	Asbestos Pipe Insulation	D	S
410	Laundry Room Supplies	D	S
410	Medical Clinic Supplies	D	S
410	Medical Laboratory Chemicals	D	S
410	Perchloric Acid	D	
410	SCBA Oxygen Generation Canisters	D	S
412	Batteries	D	S
413	Chlorine	D	
413	Chromate Phosphate	D	
413	Sulphuric Acid	D	
414	(Not Inspected)		
415	(None Found)		S
416	Raffinate Pits	D	S
417	Asbestos Pipe Insulation		S
417	Flammable Materials	D	S
417	Paint		S
417	Paint Solvents		S
426	Water Tower (Drinking Water for County)		
427	Sewage Sludge	D	S
428	Propane	D	
429	(County Water Company Building)		
430	(None Found)		S
431	(Not Inspected)		
432	(None Found)		S
433	Dehydrating Agents		S
433	Cement Mix		S
433	Drums of Unknown Contents		S

Chemicals Used at the Weldon Spring Feed Materials Plant

Building	Chemical Name	Reference
434	Drum of Unknown Contents	S
435	Batteries	S
435	Drum of Unknown Contents	S
435	Cryogenic Liquid Containers	S
435	Water Treatment Chemicals	S
436	Cans of Unknown Contents	S
437	Drums of Unknown Contents	S
438	Drums of Unknown Contents	S
438	Sodium Fluoride	S
438	Paints	S
438	Paint Solvents	S
439	(None Found)	S
441	Compressed Gas Cylinders	S
443	Drums of Unknown Contents	S
Ash Pond Area	Open Dump with Assorted Wastes	S

D = Drawings by Blaw-Knox of Plant As-Built.
S = Survey by PMC Personnel Confirmed Presence of Container or Chemical.
NOTE: This list is not exhaustive, other chemicals are present.

Source: WSSRAP, 1987.

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