United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101

FMC Corporation (Yakima) Superfund Site
Yakima, Washington

Amended Record of Decision

September 2011

650128

DECLARATION

Site Name and Location

FMC Corporation (Yakima)
Yakima, Washington

The FMC Corporation (Yakima) Superfund Site (Site) is also known as the "FMC Pesticide Formulation Facility." This was the name used in the Record of Decision (ROD). However, the official name used in the Federal Register (FR) notice adding the Site to the National Priorities List (NPL) was "FMC Corporation (Yakima)."

Statement of Basis and Purpose

The purpose of this ROD Amendment is to ensure that the remedy selected in the ROD continues to be protective of human health and the environment into the future by limiting activities to those consistent with industrial land use and preventing the consumption of groundwater until the aquifer is restored to support all beneficial uses (including as a source of drinking water).

This ROD Amendment has been developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 United States Code (USC) Section 9601-75; and to the extent practicable, the "National Oil and Hazardous Substances Pollution Contingency Plan" (NCP), 40 Code of Federal Regulations (CFR) 300. This ROD Amendment is based on the Administrative Record for the FMC Corporation (Yakima) site (herein referred to as the "Site").

The United States Environmental Protection Agency (EPA) is the lead agency for the Site and the Washington State Department of Ecology is a support agency. The State of Washington concurs with the ROD Amendment.

Assessment of the Site

The response action selected in this ROD Amendment is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Such a release or threat of release may present an imminent and substantial endangerment to public health, welfare, or the environment.

Background and Description of the Amendment to the Remedy

The Site is located at 4 West Washington Avenue, approximately 1 mile east of the Yakima International Airport. FMC Corporation (FMC) operated a pesticide formulation plant at the Site from 1951 to 1986. The Site was contaminated with pesticides due to releases during operation.

The Site was placed on the NPL on September 8, 1983. The cleanup was conducted pursuant to a Consent Decree and in conformance with the ROD issued in 1990. Cleanup of the Site under the ROD included removing contaminated soil and concrete and incinerating the contaminated

materials onsite or disposal at an off-site hazardous waste landfill. A 1993 Explanation of Significant Differences (ESD) addressed the impracticability of cleaning up contaminated soil below the seasonal low water table and provided for the removal of contaminated concrete surfaces, among other changes to the initial remedy.

The Site has been cleaned up to be protective by meeting industrial cleanup standards appropriate for this Site and has been redeveloped. The latest review of the remedy (Third Five Year Review Report for FMC Yakima Superfund Site, Yakima, Washington – September 2008) indicates that land uses are consistent with industrial exposure assumptions. However, groundwater contamination at the Site has taken longer than anticipated to attenuate (decay and disperse naturally), and the original remedy did not include institutional controls to prevent human exposure and limit activities to those consistent with industrial land use. Future uses may change, and unless the Site is cleaned up to support unrestricted use/unlimited exposure (UU/UE), institutional controls need to be implemented.

To prevent human exposure to residual contamination at the Site, EPA has evaluated remedial alternatives including: 1) No Action; 2) Institutional Controls; 3) Soil Excavation and Off-Site Landfilling and Institutional Controls; and 4) Groundwater Extraction and Treatment and Institutional Controls. A detailed evaluation of the alternatives is provided in the Supplemental Feasibility Study (SFS) Report and was also summarized in the Proposed Plan (see Administrative Record for FMC Corporation [Yakima]) Superfund Site.

The remedy selected to address human exposure to the residual contamination at the Site is Alternative 2 - Institutional Controls. The Site is located in an industrial area and has been remediated to meet industrial land-use-based cleanup levels. Institutional controls need to be added to the remedy to ensure that future activities are consistent with industrial exposure assumptions and to prevent exposure to contaminated groundwater until the groundwater is restored to levels that support beneficial uses as a potential drinking water resource.

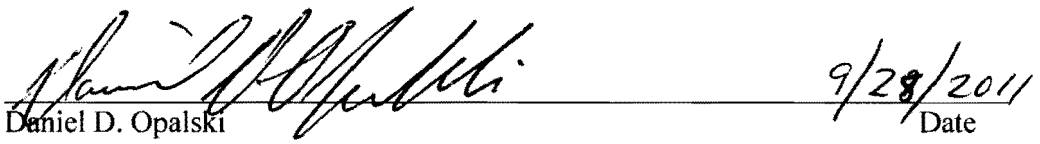
As part of this Amendment, EPA is also updating the remedial action objectives (RAOs) for groundwater and adding the pesticides aldrin and dieldrin to the list of contaminants of concern (COCs) for the Site for both soil and groundwater.

Statutory Determinations

The selected remedy, as amended herein, is protective of human health and the environment, complies with substantive Federal and State requirements that are legally applicable or relevant and appropriate, is cost effective, and utilizes permanent solutions to the maximum extent practicable. This Amendment does not result in additional treatment of contaminants, but rather limits exposure and risks to acceptable levels through fully enforceable institutional controls. The Site has already been cleaned up to meet industrial cleanup levels, and the shallow aquifer is only slightly contaminated above what would allow for beneficial uses. There is no Principal Threat Waste remaining at the Site, and the preference for treatment as a principal element of the remedy was satisfied by the incineration of pesticide-contaminated soils as part of the remedy implemented pursuant to the 1990 ROD.

Signature

Record of Decision Amendment for the FMC Corporation (Yakima) Superfund Site.



9/28/2011

Daniel D. Opalski
Director
Office of Environmental Cleanup, Region 10
U.S. Environmental Protection Agency

Date

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ACRONYMS AND ABBREVIATIONS

ARARs	Applicable or Relevant and Appropriate Requirements
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
EPA	Environmental Protection Agency
FR	Federal Register
IRIS	Integrated Risk Information System
MTCA	Model Toxics Control Act (Washington State statute)
NCP	National Oil and Hazardous Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SFS	Supplemental Feasibility Study
USC	United States Code
UU/UE	Unrestricted Use/Unlimited Exposure

Record of Decision Amendment for the FMC Corporation (Yakima) Superfund Site

DECISION SUMMARY

I. INTRODUCTION

This document is an Amendment to the Record of Decision (ROD) for the FMC Corporation (Yakima) Superfund Site (Site).

Site Name and Location

FMC Corporation (Yakima)
Yakima, Washington

The Site is also known as the "FMC Pesticide Formulation Facility." This was the name used in the ROD. However, the official name used in the Federal Register (FR) notice adding the Site to the National Priorities List (NPL) was "FMC Corporation (Yakima)."

Lead and Support Agencies

The lead agency for this action is the U.S. Environmental Protection Agency (EPA). The support agency, the Washington State Department of Ecology, concurs with this action.

ROD and Explanation of Significant Differences (ESD) Background

The ROD was issued in 1990 and an ESD was issued in 1993. Active cleanup of the Site was completed in 1993 in accordance with the ROD and ESD. Upon completion of the cleanup the Site met industrial cleanup standards; however, excavation activities resulted in elevated concentrations of pesticides in the shallow groundwater aquifer. Groundwater monitoring required by the ROD has shown that concentrations have generally declined since implementation of the remedy. However, in the case of two pesticides, concentrations remain slightly above risk-based criteria. See the Site History section for more information on the ROD and ESD.

Statutory Requirements for Community Involvement Met

EPA has complied with the public involvement requirements of Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Contingency Plan (NCP). EPA, as lead agency, provided notice in a major local newspaper (the Yakima Herald-Republic) of the proposed Amendment to the Record of Decision. A Proposed Plan was issued for public comment during a 30-day public comment period held from August 15 to September 14, 2011. No public meetings were requested during the comment period. A Responsiveness Summary was prepared, as required by law, for the single very short supportive comment on the Proposed Plan. It is part of this Amendment to the Record of Decision and is included just

before the appendix containing the Administrative Record Index. Finally, a notice of availability of the Amendment was placed in a major local newspaper (*The Yakima Herald-Republic*) with the location of the Administrative Record where the Amendment can be found by the public.

Need for the ROD Amendment

The Site has been cleaned up to meet industrial cleanup standards and has been redeveloped. The latest review of the remedy *(Third Five Year Review Report for FMC Yakima Superfund Site, Yakima, Washington – September 2008)* indicates that land uses are consistent with industrial exposure assumptions. However, the Five Year Review identified several issues that are addressed by this ROD Amendment. Those issues are:

- The 1990 ROD did not provide for any institutional controls to ensure land use remains consistent with industrial land uses, as required by CERCLA and Washington State's Model Toxics Control Act (MTCA) when a site does not meet levels considered acceptable for unrestricted use or unlimited exposure (UU/UE).

- Groundwater monitoring has been performed pursuant to the ROD and, while concentrations of some pesticides have been restored to acceptable levels, groundwater contamination has not attenuated as quickly as predicted and some other pesticides (aldrin and dieldrin) remain slightly above levels considered acceptable for UU/UE. Therefore, to satisfy the ROD, specifically the remedial action objective (RAO) for groundwater, EPA has evaluated the need to take further remedial action, based on its standard criteria for remedial action selection, and has determined that institutional controls and monitoring are the most appropriate action to prevent human exposure until groundwater levels are protective for potable use. This is expected to occur in a reasonable timeframe of 30 years or less based on historic trends of declining contaminant concentrations in groundwater since the remedial actions in 1992-93.

- The ROD did not identify aldrin and dieldrin as groundwater COCs and did not establish cleanup levels for them.

In addition, the RAO for groundwater in the ROD requiring an evaluation of the need for additional actions has been satisfied by groundwater monitoring to date, and the Supplemental Feasibility Study (SFS) Report. However, groundwater monitoring will continue to ensure that the projected groundwater restoration occurs. The groundwater RAO is being altered to reflect this modification.

The change to the remedy is necessary to protect public health or welfare or the environment from past releases of hazardous substances into the environment.

Administrative Record

This ROD Amendment is based on, and will become part of, the Administrative Record file for the FMC Corporation (Yakima) Superfund Site, as required by 40 CFR 300.825(a)(2), and is available to the public at the following information repositories:

Yakima Central Library
Yakima Valley Libraries
102 North 3rd Street
Yakima, WA 98901
509 452-8541

EPA Region 10
Records Center
1200 6th Avenue, Suite 900
Seattle, WA 98101
206-553-1200.

The file can also be found online at: http://yosemite.epa.gov/R10/cleanup.nsf/sites/fmcyakima . The index of the Administrative Record file is provided as an appendix to this ROD Amendment.

II. SITE HISTORY

The Site is located at 4 West Washington Avenue, Yakima, Washington. It is approximately 1 mile east of the Yakima International Airport (see Figure 1). The Site is a 58,000-square-foot fenced area that was leased by FMC from Union Pacific Railroad and is bounded to the east by Union Pacific Railroad property with tracks. Most of the surrounding area is zoned light industrial. There are a few parcels bordering the western side of the property (across Longfibre Road) that are zoned residential (see Figure 2). However, these parcels are up-gradient from the direction of groundwater flow.

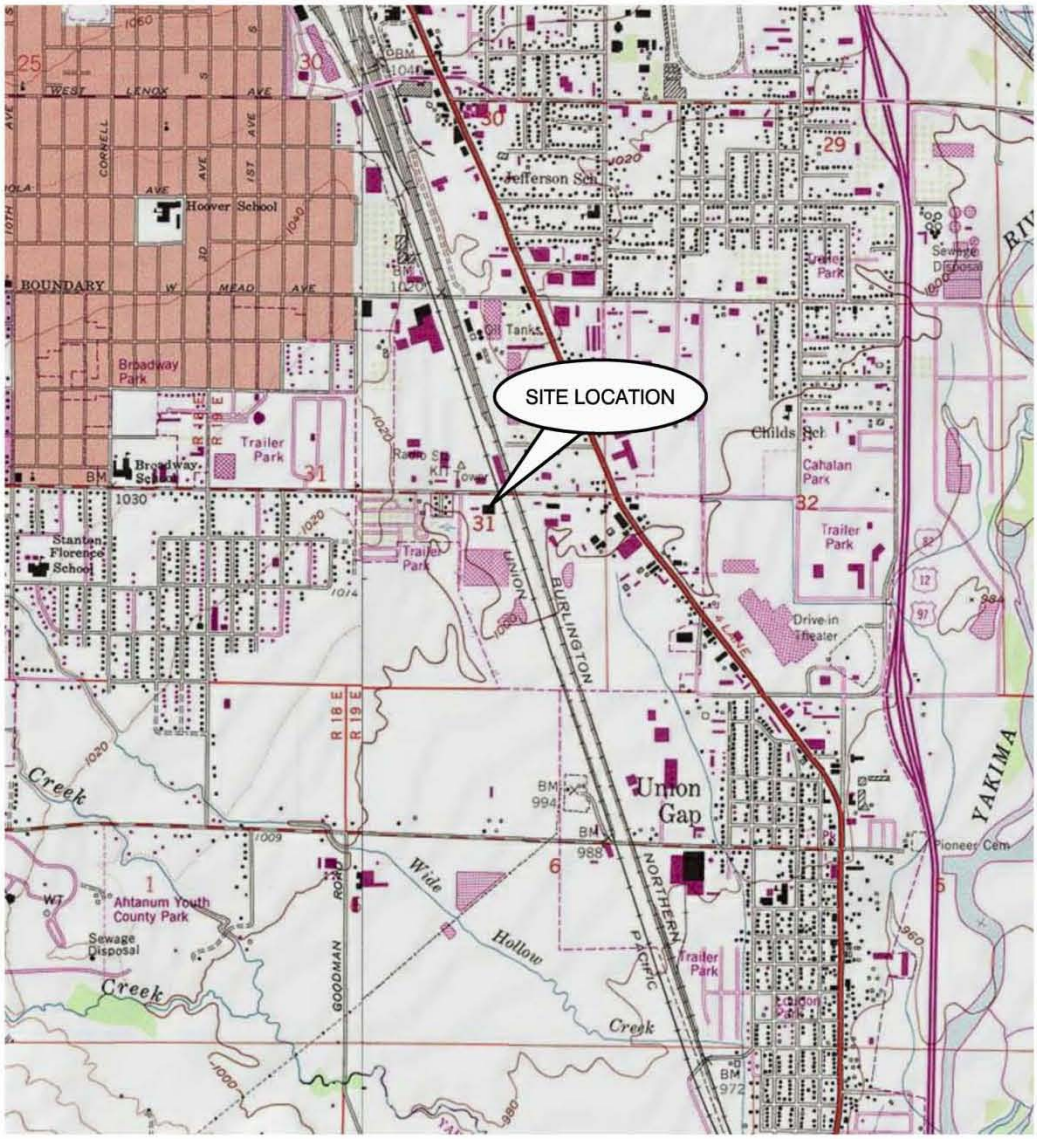
FMC formulated pesticide dusts at the Site from 1951 until 1986. Pesticide liquids were formulated there in the 1970s. Between 1952 and 1969, FMC disposed of wastes containing pesticides in an on-site pit. An estimated 2,000 pounds of waste consisting of raw material containers, soil contaminated by leaks or spills, and process wastes was dumped into the excavated pit and covered with soil. After 1969, waste materials were disposed of at Yakima Valley Disposal in Yakima and at Chemical Waste Management's Arlington, Oregon facility.

The Site currently contains an active metal fabrication facility, parking lot, and equipment storage yard owned by Stephens Metal Products. Two businesses have purchased parts of the former FMC leased property west of Stephens Metal Products and have erected buildings, a Country Farm & Garden True Value Hardware store and Butlers Welding and RV Accessories. Most current operations are on paved ground, isolated from contamination remaining at depth.

Investigations of contamination at the Site were conducted in the 1980s and culminated with the Remedial Investigation/Feasibility Study (RI/FS) which began in 1987. EPA required FMC to remove the disposal pit contents in two phases in 1988 and 1989, prior to the completion of the RI/FS. Waste from the removal activities was disposed of offsite at an approved hazardous waste landfill.

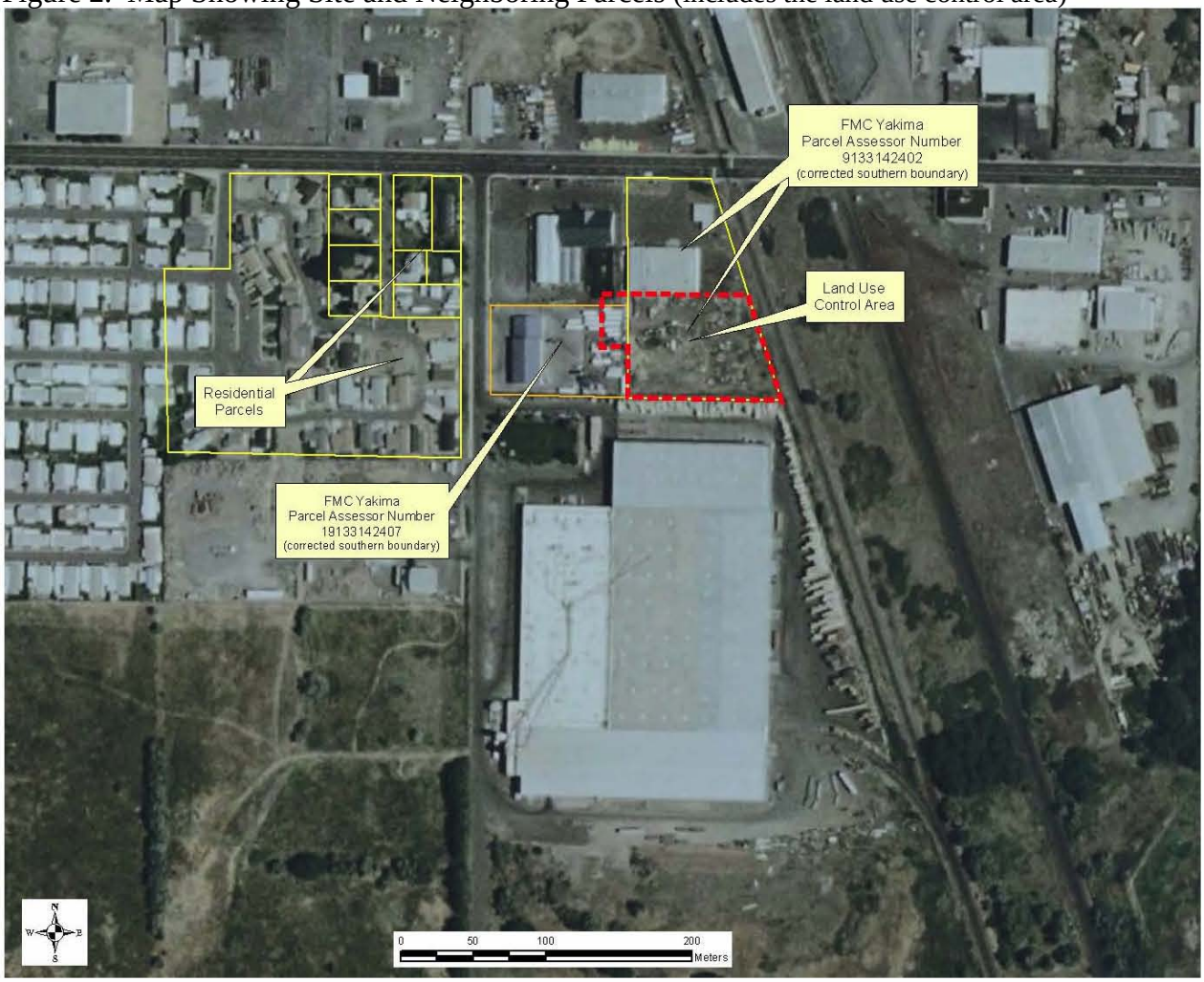
The contaminants of concern for human health at the Site were DDD (l,l-dichloro-2,2-bis(p-chlorophenol) ethane), DDE (1,1,dichloro-2,2-bis(p-chlorophenol) ethylene), DDT(l,l,l-trichloro2,2-bis(p-chlorophenol) ethane), dieldrin, endosulfans, malathion, ethion, ethyl parathion, parathion, DNOC (4,6-dinitroo-cresol), cadmium, and chromium VI.

Figure 1. Site Location



References:
TOPO!® Software
U.S.G.S. 7.5 Minute Series (Topographic) Quadrangle,
Yakima East, WA
Version: 1985; Current: 1981

Figure 2. Map Showing Site and Neighboring Parcels (includes the land use control area)



All of these compounds are considered toxic to humans; cadmium, chromium VI, DDD, DDE, DDT, and dieldrin are also carcinogenic. The contaminants of concern for potential ecological effects were DDD, DDE, DDT, endosulfans, ethion, malathion and zinc. Groundwater contaminants included the organo-chlorines (DDT, DDD and DDE), dieldrin and endosulfans.

The 1990 ROD required soil and concrete contaminated above health-based levels to be removed and incinerated on site or disposed off site in an approved disposal facility. Structures remaining on the Site included an office building, a warehouse with loading dock, and a parking lot. The remedy also required groundwater monitoring.

After initiation of remedial action in 1992, EPA modified the selected remedy and cleanup goals on April 21, 1993, in an ESD. EPA deemed that changes were necessary due to difficulties encountered during implementation of the selected remedy, in particular the discovery that the depth of soil contamination in some areas was greater than expected and below the water table. Changes included relaxing the soil cleanup goal from a lifetime excess cancer risk of $1x10^{-6}$ (one in one million) to a risk of $5x10^{-6}$ for excavation at depths greater than 2 feet, but less than 7 feet below ground surface (bgs) and a determination that the extent of the excavation would not exceed 7 feet bgs. EPA determined that excavation below 7 feet was technically impracticable, and that the material did not pose an exposure risk or a threat to the groundwater. For UU/UE in Washington State, a $1x10^{-6}$ risk level must be attained, a 1×10^{-5} risk level is generally acceptable for sites limited to industrial uses with enforceable land use controls (i.e. institutional controls).

The excavation phase consisted of excavating contaminated material, followed by sampling the bottom and sides of the excavations to determine if the cleanup levels were met. If the remaining material was still above cleanup levels, excavation and sampling of an area continued until the cleanup levels were met. Contaminated material was stockpiled in a lined area on the west side of the property prior to incineration. At the conclusion of the excavation phase, the material was incinerated. Incinerator ash was stored in bags until sampling determined that it met the required standards. The ash was then used as a soil cover over the cobble backfill.

In addition, during the soil excavation activities a second pesticide disposal pit located directly west of the first pit was identified. These factors resulted in a significant increase in the volume of soil excavated and incinerated. During the remedial action, 5,600 cubic yards of contaminated material were excavated and treated.

At the conclusion of the remedial action after demobilization of the incinerator, FMC determined that 1,000 cubic yards of additional soil under the stockpile liner were contaminated due to breaches in the liner. Equipment operation on the stockpile area had punctured the liner in a number of places, and precipitation leached contaminants from the stockpile to the ground below. This additional contaminated soil was excavated and sent off site to an approved hazardous waste landfill. EPA conducted an inspection of the Site on August 19, 1993, and found that no additional work was required beyond periodic groundwater monitoring.

III. REMEDY SELECTED IN THE 1990 ROD

A ROD was issued on September 14, 1990, to address all post-removal residual site contamination. Subsequent remedial action included removal and incineration of contaminated soil and concrete as well as groundwater monitoring. Structures remaining on site included an office building, a warehouse with loading dock, and a parking lot. After initiation of remedial action in 1992, EPA modified the selected remedy and cleanup goals on April 21, 1993, in an ESD. EPA deemed that changes were necessary due to difficulties encountered during implementation of the selected remedy, in particular the discovery that the depth of contamination in some areas was greater than expected and below the water table. Both the ROD and ESD are discussed below.

A. Discussion of ROD Requirements

The remedial action objectives for the Site included:

- Preventing human exposure to contaminated soil, structures, and debris that exceed health-based cleanup levels;

- Reducing the potential for the contaminated soil to act as a source for groundwater contamination; and

- Further defining the extent of groundwater contamination and confirming that contamination does not exceed health-based levels, or if the quality of the groundwater exceeds these levels during monitoring, evaluating the need to take appropriate measures as further response action.

The selected remedy in the ROD addressed the remaining contaminated soils and structures at the Site. The selected remedy called for the following:

- Sampling of soils and concrete structures to refine the RI/FS estimate of the lateral and vertical extent of material requiring treatment,

- Excavation of contaminated soils exceeding cleanup levels,

- On-site incineration of contaminated soils,

- Dismantling of contaminated slabs and portions of the buildings that are determined to exceed cleanup goals,

- On-site incineration of contaminated concrete and debris or disposal at a Resource Conservation and Recovery Act (RCRA) Subtitle C permitted hazardous waste disposal facility, depending on volume,

- Analysis of incinerator ash to determine the degree of contaminant destruction and leachability, and delisting of the ash as a RCRA-listed waste if health-based cleanup goals are met,

- Groundwater monitoring for 5 years to confirm source removal. Groundwater was monitored quarterly for 2 years following completion of the contaminant removal activities, and then for 3 more years on an annual basis. If contamination was detected above the protective levels and groundwater remediation proved to be necessary, it would be addressed in a ROD Amendment. The acceptable levels were 0.1 µg/L for DDT (the 10^{-6} excess lifetime cancer risk) and 2 µg/L for endosulfans (the 1.0 Hazard Quotient level at that time).

B. 1993 Explanation of Significant Differences – Changes to the Remedy

1) Change in Site Cleanup Goals:
Two changes in the site soil cleanup goals became necessary as a result of the mechanical difficulties associated with excavation below the water table and the discovery that the depth of the contamination in some areas was greater than expected.

a) Change in soil cleanup goal from a risk of $1x10^{-6}$ to a risk of $5x10^{-6}$ for excavation at depths greater than 2 feet, but less than 7 feet below the ground surface (bgs); and

b) Determination that the extent of the soil excavation would not exceed 7 feet bgs. EPA determined that excavation below 7 feet into the water table was technically impracticable, and that the material did not pose an exposure risk or a threat to the groundwater.

2) Change in Volume of Soil to Be Excavated:
The ROD estimated that there would be from 900 to 4,000 cubic yards of excavated contaminated material. As a result of contamination extending deeper than expected, approximately 5,600 cubic yards of material was excavated.

3) Determination that Cobble Did Not Require Incineration:
Approximately one third of the material excavated was cobble, approximately 2 to 6 inches in diameter. It was crushed and sampled and found to meet health-based and RCRA-based cleanup requirements. Therefore, EPA determined the cobble did not require incineration prior to use as backfill.

4) Modification to the Cleanup Criteria for the Warehouse Floor:
At the time the remedy was selected, there were no promulgated cleanup standards applicable to buildings. Subsequent to the beginning of site excavation, RCRA technology-based criteria were developed for decontamination of concrete debris (57 FR 371904), which EPA determined appropriate to apply to the warehouse floor.

The RCRA decontamination criteria require scarification to a depth of 0.6 cm (approximately 1/4 inch) and removal of any additional visual staining. As part of the remedial action, the warehouse floors were scarified to a depth of 1/4 inch or more, and no visible contamination

remained. It was therefore determined that the warehouse floors were clean. The floors were restored to allow the building to return to its functional use.

Need for the ROD Amendment

The Site has been cleaned up to meet industrial cleanup levels as specified in the 1990 ROD and has been redeveloped. The latest review of the remedy *(Third Five Year Review Report for FMC Yakima Superfund Site, Yakima, Washington – September 2008)* indicates that current land uses are consistent with industrial exposure assumptions. However, the Five Year Review identified several issues that addressed in this ROD Amendment. Those issues are:

- The 1990 ROD did not provide for any institutional controls to ensure that future land use remains consistent with industrial land uses, as required by CERCLA and MTCA when a site does not meet levels considered acceptable for unrestricted use or unlimited exposure (UU/UE).

- Groundwater monitoring has been performed pursuant to the ROD and, while concentrations of some pesticides have been restored to acceptable levels, groundwater contamination has not attenuated as quickly as predicted and some other pesticides (aldrin and dieldrin) remain slightly above acceptable levels considered acceptable for UU/UE. Therefore to satisfy the ROD, specifically the remedial action objective (RAO) for groundwater, EPA has evaluated the need to take further remedial action, based on its standard criteria for remedial action selection, and has determined that institutional controls and monitoring are the most appropriate action to prevent human exposure to groundwater until groundwater levels are protective for potable use. This is expected to occur in a reasonable timeframe of 30 years or less based on the historic trends of declining contaminant concentrations in groundwater since the remedial actions in 1992-93.

  The ROD did not identify aldrin and dieldrin as groundwater COCs and did not establish acceptable levels for potable use.

In addition, since the RAO for groundwater in the ROD requiring an evaluation of the need for additional actions has been satisfied by groundwater monitoring to date, and by the Supplemental Feasibility Study (SFS) Report, the RAO is being modified. Groundwater monitoring will continue to ensure that groundwater is restored to levels for potable use.

The SFS and other documents that support the need for this Amendment have been added to the Administrative Record for the Site.

The change to the remedy is necessary to protect public health or welfare or the environment from past releases of hazardous substances into the environment.

IV. DESCRIPTION OF THE MODIFIED REMEDY

This document provides the following remedy changes:

1) Implementation of Institutional Controls

This Amendment adds legally enforceable institutional controls in the form of environmental restrictive land use covenants pursuant to the Washington state version of the Uniform Environmental Covenants Act (UECA) and further groundwater monitoring. Both the State and EPA would have full enforcement rights if covenant restrictions are violated. These institutional controls are necessary to maintain protection of human health and the environment consistent with acceptable industrial use of the Site, including forbidding excavation into contaminated soils and preventing the use of the shallow groundwater aquifer for drinking water purposes (until it can support potable use). These institutional controls would remain in place until the Site can meet UU/UE. See Figure 2 for the land use control area over which the institutional controls will be placed.

2) Add contaminant of concerns to monitoring parameters

Along with institutional controls, the modified remedy includes continued groundwater monitoring to evaluate groundwater contaminant trends until EPA determines that the monitoring wells can be abandoned in accordance with State of Washington regulations. The modified remedy clarifies that aldrin and dieldrin are soil and groundwater COCs for the Site.

3) Establish new RAOs for groundwater

EPA concluded that groundwater will likely be restored to support all beneficial uses within a reasonable restoration time frame of 30 years from the issuance of this ROD Amendment. The amended remedy updates the RAOs consistent with groundwater restoration progress to date (see discussion below).

<u>Remedial Action Objectives</u>

As EPA proposed in the Proposed Plan, the Amended Remedy retains the first two Remedial Action Objectives (RAOs) from the 1990 ROD and replaces the third RAO with two new groundwater RAOs. The updated RAOs the remedial action must meet are as follows:

1. Preventing human exposure to contaminated soil, structures, and debris that exceed health-based cleanup levels;

2. Reducing the potential for the contaminated soil to act as a source for groundwater contamination;

3. Prevent human ingestion of groundwater contaminated with contaminants of concern from the Site that exceed acceptable levels; and

4. Ensure groundwater is restored to levels that are protective for its beneficial use as a drinking water resource in a reasonable timeframe.

The first two RAOs have largely been accomplished by the actions taken to date, with the only exception being the need to control on-Site excavation or other activities that could result in exposure to residual soil contamination at depth. The two new RAOs address the residual groundwater contamination. The remedial alternatives considered in the SFS were evaluated on how they achieve these objectives, as measured and compared using the nine CERCLA remedial selection criteria.

V. EVALUATION OF ALTERNATIVES

Summary of Remedial Alternatives

The four alternatives evaluated in the SFS are summarized in this section. Common elements for three of the alternatives are provided in Table 1.

Alternative 1 – No Action is required for comparison purposes with more active alternatives. The No Action alternative is not protective into the future because there are no enforceable controls on land use that would prevent activities that would pose unacceptable risks to human health and the environment. Since the No Action alternative does not meet the threshold criterion of overall protectiveness, it was not evaluated in detail for the other criteria.

Alternative 2 – Institutional Controls would add legally enforceable environmental land use controls in the form of a Washington UECA covenants. Both the State and EPA would have full enforcement rights if any covenant restrictions are violated. These institutional controls are necessary to maintain protection of human health and the environment consistent with acceptable industrial use of the Site, including forbidding excavation into contaminated soils and preventing the use of the shallow groundwater aquifer for drinking water purposes. These institutional controls would remain in place until the Site can meet UU/UE.

Alternative 3 – Soil Excavation and Off-Site Landfilling and Institutional Controls would require the excavation and removal of the primary continuing source of groundwater contamination, the contaminated soil in the former pit area near to or below the lower water table. Contamination levels for aldrin and dieldrin below the 1992 cleanup levels but above MTCA soil-to protect groundwater cleanup levels may also contribute to continued groundwater contamination. This remedy would require digging at least partly into the saturated zone along with engineering controls for groundwater in the bottom of the excavation. It would also place institutional controls over portions of the former operational areas of the Site containing residual contamination above unrestricted cleanup levels.

Alternative 4 – Groundwater Extraction and Treatment and Institutional Controls would require pumping the marginally contaminated groundwater, treating it to remove contaminants, and disposing of the contaminated treatment resin off site at an EPA approved disposal facility. The treatment system would be sized to address the plume in the shallow groundwater of the Stephens Metal Products property. EPA estimates that two extraction wells would be required for the system to operate efficiently and effectively. Like alternatives 2 and 3, institutional controls would be placed over portions of the former operational areas of the Site to limit activities to those consistent with industrial land use exposure assumptions.

Table 1. Common Elements of Remedial Alternatives (excluding No Action alternative)

Element	Description
Institutional Controls	Institutional Controls are an integral element of alternatives #2 through 4. They would be required over specified areas to: 1) prevent access to contaminated soils below 2 feet bgs; 2) control future well drilling and protect environmental monitoring wells; and 3) prevent the use of contaminated groundwater as drinking water. Controls would remain in place until the site meets UU/UE.
Continued Groundwater Monitoring	Groundwater monitoring until groundwater is restored to its highest beneficial use as a potential drinking water source is a second integral common element of alternatives #2 through 4. Monitoring would follow an EPA approved groundwater monitoring plan which specifies sampling and analysis protocols, including frequency, methodologies, quality controls and contaminants of concern. Monitoring wells will be maintained and replaced as necessary.

Summary of the Evaluation of Alternatives

The SFS developed the Remedial Alternatives with EPA oversight and provided an initial detailed comparative evaluation to identify the advantages and disadvantages of each alternative relative to one another using the nine criteria for remedy selection set forth in the NCP. EPA subsequently performed its own detailed analysis using the same criteria and issued a formal preferred alternative (Alternative 2) for public comment. A summary comparative evaluation of the four Remedial Alternative outlined above is presented below. The nine NCP criteria for remedy selection are briefly summarized in the following text box:

Nine Criteria to Evaluate Remedial Alternatives
Threshold Criteria
Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
Compliance with ARARs evaluates whether the alternative meets substantive requirements in Federal and more stringent State environmental statutes, regulations, or whether a waiver may be justified. ARARs must be met or waived upon or before completion of remedial action.
Primary Balancing Criteria
Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate to within a range of +50 to -30 percent.
Modifying Criteria
State/Support Agency Acceptance considers whether the State agrees with EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.
Community Acceptance considers whether the local community agrees with the EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

The nine criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. A remedial alternative must meet the two "threshold criteria," overall protection and compliance with ARARs, to be eligible as a preferred alternative. The five "primary balancing criteria" allow for a comparison of major trade-offs among the alternatives. State and community acceptance are the modifying criteria. They are not fully considered and applied until after state and community input on the Proposed Plan is received. The modifying criteria are of equal importance to the primary balancing criteria in the final evaluation of remedial alternatives. The remedial alternatives evaluation from the SFS is summarized below.

Threshold Criteria –

Overall Protection of Human Health and the Environment

Alternative 1, the "No Action" alternative, would not provide adequate protection of human health and the environment as no measures would be taken to control exposure to residual contamination in the soil and groundwater to reduce risks. The alternative does not meet this threshold criterion and is not discussed further.

Alternative 2 would be protective of human health and the environment by controlling exposure to residual contamination in the soil and groundwater presenting unacceptable risks by: 1) controlling extraction and use of groundwater from the shallow, contaminated aquifer to prevent its use as drinking water; and 2) preventing intrusion into contaminated soil at depth. The institutional controls would remain in effect for as long as exposures must be limited to industrial land use exposure assumptions (i.e., until the Site meets UU/UE).

Alternative 3 would be protective of human health and the environment by removing and appropriately disposing of soil contamination that may act as a source of groundwater contamination, and by placing institutional controls over other areas of the Site that were previously remediated to meet industrial cleanup levels. Excavated contaminants would be disposed of in an approved off-site landfill. Institutional controls would remain in effect until the Site meets UU/UE.

Alternative 4 would be similarly protective because contaminated groundwater would be removed and treated, and institutional controls would limit exposure to residual soil contamination in the same manner as Alternative 3. Also, institutional controls would be necessary to prevent use of groundwater prior to restoration of groundwater to all beneficial uses.

Compliance with ARARs

The primary ARARs for the Site are MTCA soil and groundwater cleanup standards and maximum contaminant levels (MCLs) from the federal Safe Drinking Water Act (the state has equivalent drinking water standards). Alternatives 2 through 4 all comply with ARARs primarily through the common element of institutional controls.

Alternative #2 complies with ARARs because the Site already meets industrial cleanup levels for soils (meets MTCA Method C requirements for industrial properties), it adds the institutional controls required under MTCA when Method C cleanup levels are used, and it satisfies the MTCA requirement for institutional controls to prevent exposure to groundwater until the aquifer supports its highest beneficial use as drinking water. The groundwater contaminants that have MCLs have already met those standards, and the other contaminants are expected to meet acceptable risk levels within a reasonable restoration timeframe (within approximately 30 years). All other ARARs already are or would be met.

Alternatives 3 and 4 comply with ARARs by using the same institutional controls, to the extent they are needed, as Alternative 2 which complies with ARARs. These alternatives add, by different means, a more active remedial component to accelerate groundwater restoration. Alternative 3 would remove soil contamination as a source of groundwater contamination to promote restoration. Alternative 4 would pump and treat contaminated groundwater toward this same end.

Balancing Criteria –

Long-term Effectiveness and Permanence

Alternative 2 provides for protection in the long term by using enforceable covenants to limit exposures presenting risks, consistent with the industrial exposure assumptions for the Site. Groundwater is only marginally contaminated, and plume concentrations above acceptable risk levels are contained within the Site boundaries. Groundwater should be potable within a reasonable restoration timeframe and will continue to be monitored to assure that it does.

Alternative 3 provides similar long-term protection and could achieve it more quickly by removing additional soil contamination beyond what was originally excavated and treated as required by the ROD and ESD. This would result in a slight reduction in the risk consequences of inadvertent intrusion (violation of institutional controls) for those areas receiving excavation, as well as potentially accelerating restoration of the groundwater.

Alternative 4 also provides similar long-term protection and could also achieve it more quickly by treating and thereby restoring the groundwater to potability. However, this is subject to perhaps a greater degree of uncertainty that Alternative 3 because sources in the soil Alternative 3 would remove may recontaminate the groundwater requiring further extraction and treatment. If this occurred, Alternative 4 might not provide long-term effectiveness significantly sooner than Alternative 2.

Based on the foregoing Alternative 3 ranks highest for this criterion because it would reduce the length of the restoration timeframe, at which point all risks considered for this action would be permanently removed. Alternative 4 may similarly reduce the restoration timeframe but likely less reliably due to the stated risks of recontamination. Alternative 2 ranks somewhat below Alternatives 3 and 4 because of its comparatively lengthier restoration timeframe.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Alternative 2 does not employ any treatment of contaminants. It limits exposure and risks to acceptable levels through institutional controls. There is no Principal Threat Waste remaining at the Site, and the preference for treatment as a principal element of the remedy was satisfied by the incineration of pesticide-contaminated soils as part of the remedy implemented pursuant to the 1990 ROD.

Alternative 3 would allow for treatment of contaminated soil if necessary to meet the waste acceptance criteria (including RCRA land disposal restriction treatment requirements) of the off-site landfill. However, the concentrations in the soil are not likely to require treatment for disposal at a hazardous waste landfill, and therefore treatment is not a principal element of this alternative.

Alternative 4 would provide for treatment of contaminated groundwater and landfilling of treatment media (resins). Groundwater contaminant levels are only marginally above risk-based standards for aldrin and dieldrin, and the level of treatment necessary would be limited. For these reasons, Alternative 4 ranks highest for this criterion, followed by Alternatives 3 and 2 in that order.

Short-term Effectiveness

Alternative 2 has no physical short-term impacts on the Site. The covenants could be put in place quickly (within a few months) if this alternative is selected, and the institutional controls would effectively protect workers and Site users in the short term.

Alternative 3 would have short-term impacts to the use of the Site due to the active excavation of soil and the mobilization and then demobilization of excavation and hauling equipment. As happened after the excavations performed in 1992, there may also be near-term increases in groundwater contaminant levels due to a stirring up of contamination from source areas undergoing excavation. This effect should be limited and much less significant than the 1992 excavation increases. There would also be some short-term increases in industrial safety risks to cleanup workers due to the use of heavy machinery for excavation and hauling. There would similarly be the potential for dust emissions during excavation and hauling, but there are standard practices to control fugitive dust that would be applied. Once crews and equipment are mobilized, field work should be completed within 30 days.

Alternative 4 would have short-term impacts to the use of the Site because of the installation, testing, and operation of the groundwater pump and treat system would limit uses on the portion of the Site overlying the groundwater plume. There would be some short-term increases in industrial safety risk to cleanup workers due to drilling activities. The pump and treat system is assumed to run for 30 years to account for the potential influx of contaminants from the soil to groundwater. This duration is also the standard length of time for operations and maintenance (O&M) once a remedy is constructed (in this case, once the pump and treat system is operating and functioning properly).

Alternative 2 ranks highest for this criterion. Alternatives 3 and 4 rank similarly below Alternative 2.

Implementability

Alternative 2 should be readily implementable. A version of the Uniform Environmental Covenant Act has been adopted by the State of Washington making the necessary covenants fully enforceable by both the EPA and the State. FMC would need to purchase the rights to the properties requiring institutional controls from the current owners (see the land use control area shown in Figure 2).

Alternatives 3 and 4 also require UECA covenants, though they could potentially be required for less extensive areas, respectively, and for potentially shorter durations which could make them slightly more implementable in this regard. However, both have active remedial components, and particularly Alternative 3 may be somewhat less readily implementable for this reason. Excavation into the lower portion of the Site involves addressing groundwater intrusion into the bottom of the excavation. Special shoring and potentially short-term pumping of water from the excavation would be necessary. Otherwise, standard proven excavation and waste handling practices would be employed.

Alternative 4's active component should be readily implementable because groundwater pump and treat technology is proven and would involve standard installation, testing and operational practices.

Given that institutional controls are a common element for Alternatives 2 through 4, and all of the foregoing, Alternative 2 ranks highest for this criterion; followed by Alternatives 4 and 3 in that order.

Cost

Table 2 presents a summary of costs for the Alternatives 2-4.

Table 2. Cost Summary

Remedial Alternative	Description	Direct and Indirect Capital Costs	Total O&M Costs (Undiscounted)	Net Present Worth of Total O&M Costs	Estimated Total Cost
Alternative 2	Institutional Controls	$26,800	$198,086	$74,479	$117,000
Alternative 3	Soil Excavation with Off-Site Landfilling and Institutional Controls	$3,716,725	$208,378	$78,180	$4,365,000
Alternative 4	Groundwater Extraction and Treatment and Institutional Controls	$803,200	$3,051,218	$1,254,078	$2,366,000

Notes:
Present worth costs calculated using a 7% per year future discount rate.
Cost estimates are estimated with accuracies of -30% and +50%.

Alternative 2 would cost approximately $117,000, which is far less than the other alternatives (except for No Action).

Alternative 3 would cost approximately $4,365,000 and represents the most expensive of the alternatives. This cost is based on meeting the soil to protect groundwater cleanup level for dieldrin and disposing of the estimated 2,900 cubic yards of contaminated soil at an approved offsite hazardous waste landfill. For comparison purposes, the cost to meet MTCA B (based on a 1×10^{-6} excess cancer risk for unrestricted use) soil cleanup levels for dieldrin would be $2,135,000, including disposing of approximately 1,140 cubic yards at an approved offsite hazardous waste landfill.

Alternative 4 would cost approximately $2,366,000, also substantially more than Alternative 2. Alternative 2 ranks highest for this criterion; followed by Alternatives 4 and 3 in that order.

Modifying Criteria

State/Support Agency Acceptance

The State of Washington by the Washington State Department of Ecology (Ecology) concurs with the remedy selected in this ROD Amendment.

Community Acceptance

Only one very brief comment supporting the preferred alternative in the Proposed Plan was received during the thirty-day public comment period. There is therefore no basis to suggest anything other than general community acceptance of the selected remedy which was the preferred alternative in the Proposed Plan. A responsiveness summary, as required by law, is provided with this ROD Amendment.

VI. SELECTED AMENDED REMEDY

The amended remedy adds legally enforceable institutional controls and further groundwater monitoring. The institutional controls are in the form of UECA covenants which are fully enforceable by either EPA or Ecology for all portions of the Site where controls are necessary. These controls will be required over specified surveyed areas to: 1) prevent access to contaminated soils below 2 feet bgs; 2) control future well drilling and protect environmental monitoring wells; and 3) prevent the use of contaminated groundwater as drinking water. These controls will remain in place until EPA determines that Site conditions qualify for UU/UE. FMC will have to purchase the rights to impose these controls upon the land from the current land owners. The UECA covenants embodying these controls will be executed and recorded in compliance with all Washington UECA requirements, subject to prior EPA approval. Future owners will be bound by these covenants which become part of the chain of title as deeds or other instruments of conveyance are executed. This is commonly called “running with the land.” See Figure 2 for the locations affected by implementation of this amended remedy (note that

slightly more detail is provided in Figure 8 of the SFS report). These locations (within the land use control area) are the parcel containing a metal fabrication business at 4 West Washington Avenue, parcel number 19133142402, and small portions of the parcels currently occupied by the hardware store at 6 West Washington Avenue, parcel number 19133142405, and the welding and recreational vehicle accessories businesses at 1909 Longfibre Road, parcel number 19133142407.

Along with institutional controls, the amended remedy requires a program of groundwater monitoring to evaluate groundwater contaminant trends until EPA determines potability has been achieved and the monitoring wells can be abandoned in accordance with State of Washington regulations. The groundwater monitoring plan will include monitoring for all of the original groundwater COCs as well as aldrin and dieldrin. The amended remedy clarifies that aldrin and dieldrin are soil and groundwater COCs for the Site and establishes cleanup levels for them (0.0025 in unsaturated soil, 0.00013 in saturated soil, and 0.0026 in groundwater for aldrin; and 0.0028 in unsaturated soil, 0.00014 in saturated soil, and 0.0055 in groundwater for dieldrin). A provision for protecting the groundwater monitoring network will be included in the institutional controls.

The amended remedy also updates the RAOs to reflect restoration progress to date and to be more tailored to existing conditions. The updated RAOs are provided in Section IV of this ROD Amendment.

Expected Outcomes for the Amended Remedy

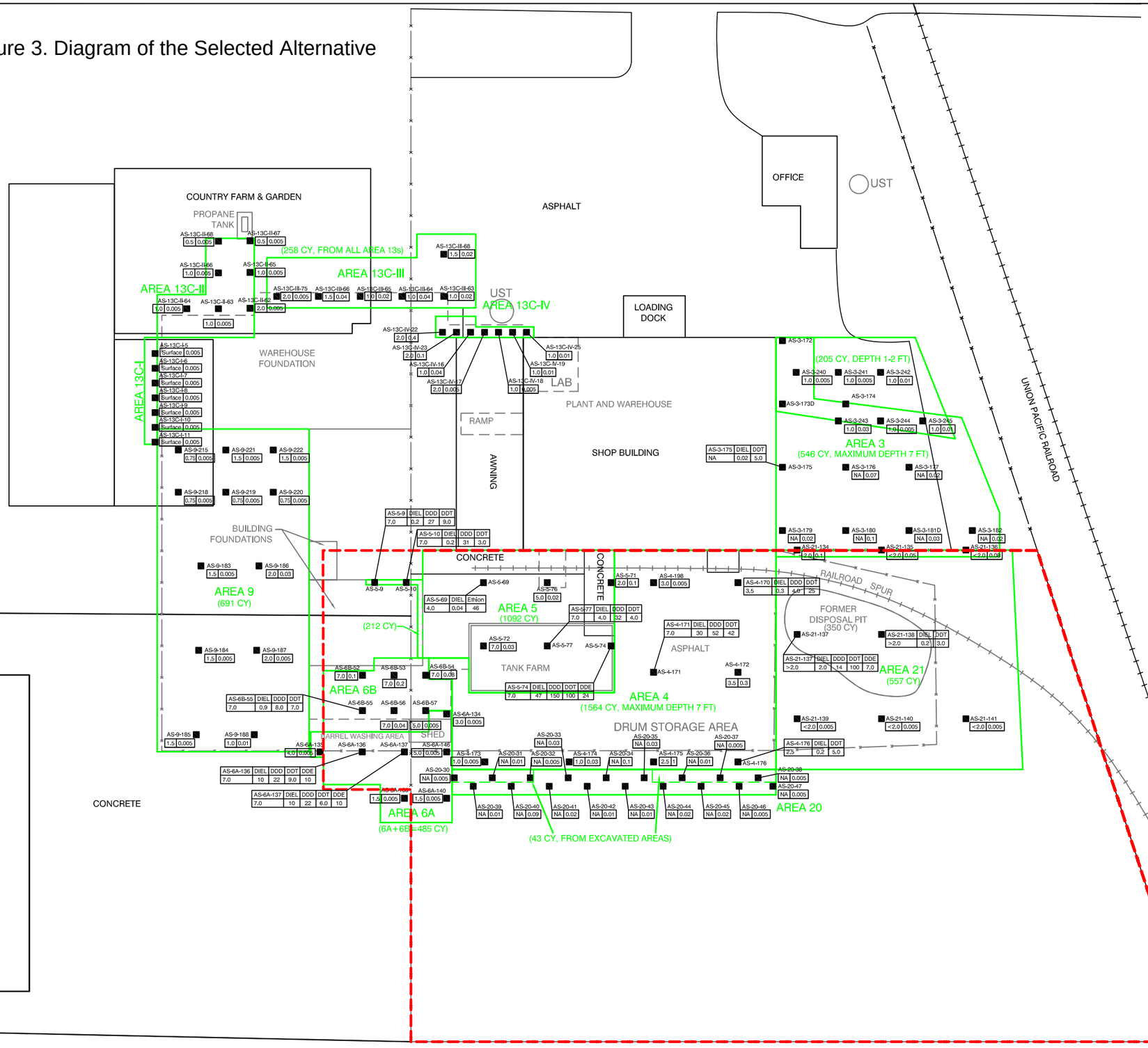
The Site can continue to be used for the current and reasonably anticipated future commercial/industrial purposes without unacceptable exposure to residual buried soil contamination. Groundwater should be restored to support all beneficial uses within a reasonable restoration time frame of 30 years from the issuance of this ROD Amendment. The amended remedy will meet RAOs and protect human health and the environment by limiting exposures to those consistent with current and future uses. See Figure 3 for a diagram of the selected remedy.

VII. STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency (in this case, EPA) must select remedies that are protective of human health and the environment, that comply with or waive ARARs upon completion of remedial action, that are cost effective, and that utilize permanent solutions and alternative technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ, as a principal element, treatment that permanently and significantly reduces the toxicity, mobility, or volume of hazardous wastes. The following sections discuss how the amended remedy meets these statutory requirements.

Figure 3. Diagram of the Selected Alternative

CAD File: G:\0120748\00\0120748001-11.dwg
Drawn By: R. Olson
Date: 07/27/11
Project No. 0120748.***



LEGEND

- EXCAVATION SOIL SAMPLE
- EXISTING BUILDING
- FORMER SITE FEATURE
- FENCE
- INVESTIGATION AREA
- LAND USE CONTROL AREA

AS-3-175	DIEL	DDT
7.0	0.02	5.0

- SAMPLE ID
- CHEMICAL CONSTITUENT
- CONCENTRATION (mg/kg)
- DEPTH OF SAMPLE IN FEET

3.0	0.005

- DEPTH OF SAMPLE (FEET)
- DIELDRIN CONCENTRATION (mg/kg)

DIEL	DIELDRIN
NA	NOT AVAILABLE
CY	CUBIC YARDS

NOTES:
HISTORICAL FEATURES ARE SHOWN IN GREEN, AND ARE BASED ON FIGURES 1-3 AND 2-3, *IDENTIFICATION AND SCREENING OF REMEDIAL TECHNOLOGIES FOR THE FORMER FMC CORPORATION PESTICIDE FORMULATION FACILITY IN YAKIMA, WASHINGTON*, PREPARED BY BECHTEL ENVIRONMENTAL, INC., SEPTEMBER 1989.

APPROXIMATE EXCAVATION DELINEATION AND EXCAVATION SAMPLE LOCATIONS ARE BASED ON FIGURES FROM *FMC-YAKIMA AREA CLEANUP SUMMARIES, 19088-R-06B, REV. 1.*

Figure
Alternative 2 - Institutional Controls
Former FMC Pesticide Formulation Facility
4 West Washington Avenue
Yakima, Washington

ERM 07/11

Protection of Human Health and the Environment

The amended remedy will protect human health and the environment from residual contamination at the Site by limiting activities to those consistent with industrial land use and preventing consumption of groundwater until the site meets UU/UE conditions. Cleanup levels that must be attained in order to meet UU/UE are included in Table 3.

Table 3. Cleanup Levels That Attain Unlimited Use/Unrestricted Exposure

Compound	**Soil Cleanup Level (mg/kg)[1]**	**Groundwater Cleanup Level (µg/L)[2]**
Aldrin	0.0025/0.00013	0.0026
Cadmium	80	8
Chromium VI	240	48
DDD	4.2	0.36
DDE	2.9	0.26
DDT	2.9	0.26
Dieldrin	0.0028/0.00014	0.0055
DNOC[3]	8.5	-
Endosulfans	480	96
Ethion	40	8
Malathion	1600	320
Ethyl Parathion[4]	480	96
Zinc	24000	4800

Notes:
1 MTCA B Soil concentrations except for aldrin and dieldrin. The aldrin and dieldrin cleanup levels for soil are based on the MTCA Soil To Protect Groundwater levels. The first value is for unsaturated soil and the second value is for soil saturated with water (below the water table).
2 MTCA B Groundwater concentrations.
3 No risk information in IRIS so no MTCA Level B values available. Cleanup level is from the ROD.
4 Called parathion in the MTCA and IRIS tables.

Abbreviations:
DDD = 1,1-dichloro-2,2-bis(p-chlorophenol)ethane
DDE = 1,1-dichloro-2,2-bis(p-chlorophenol)ethylene
DDT = 1,1,1-trichloro-2,2-bis(p-chlorophenol)ethane
DNOC = 4,6-dinitro-o-cresol
IRIS = Integrated Risk Information System
mg/kg = milligrams per kilogram
µg/L = micrograms per liter
MTCA = Model Toxics Control Act
ROD = Record of Decision.

Compliance with ARARs

Implementation of the amended remedy will comply with ARARs. The ARARs are provided in Table 4. They were developed consistent with CERCLA, the NCP, and EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 1988a) and *CERCLA/Superfund Orientation Manual* (EPA 1992). The most significant ARARs are Maximum Contaminant Levels under the federal Safe Drinking Water Act, cleanup standards under MTCA, and hazardous and dangerous waste management requirements respectively under RCRA and the Washington State Dangerous Waste law and regulations.

Table 4
Applicable or Relevant and Appropriate Requirements
Former FMC Pesticide Formulation Facility
Yakima, Washington

		Regulatory Citation		
Topic	**Standard or Requirement**	**Federal**	**State**	**Comment**
Discharges to surface waters including wetlands	Effluent limits and related requirements for point source discharges to regulated surface waters; prohibitions against fills to wetlands where there are practicable alternatives	NPDES permit program under Section 402 of the Clean Water Act, 33 USC §1342; 40 CFR Parts 122 and 125; Dredged and Fill Material permit program under Section 404 of the Clean Water Act, 33 U.S.C. §1344; 40 CFR Part 231; 33 CFR Parts 320 and 323	Discharge Permit Program, RCW 90.48; WAC 173-216; WAC 173-220; WAC 173-226	Discharges to surface waters including wetlands that are a component of CERCLA response actions are exempt under CERCLA §121(e) from the procedural requirement to obtain an NPDES, Section 404 or state permit, but are subject to substantive permit requirements such as effluent limits.
Surface water quality	Surface water quality standards	Ambient Water Quality Criteria under Section 304(a) of the Clean Water Act, 33 USC §1314(a); 40 CFR Part 131	Surface Water Quality Standards, RCW 90.48; WAC 173-201A	Discharges to surface waters must meet state water quality standards that have been approved by EPA, and any more stringent federal water quality criteria that are relevant and appropriate.
Discharges to publicly-owned treatment works (POTWs)	Discharges to POTWs must meet pretreatment standards	Section 402 of the Clean Water Act, 33 U.S.C. §1342; 40 CFR Part 403	City of Yakima Municipal Code 7.65	Discharges of water from CERCLA response actions to POTWs must meet POTW-specific pretreatment standards. Because only Federal and State standards constitute ARARs under CERCLA Section 121, 42 U.S.C. §9621, City of Yakima requirements constitute "to be considered" standards (TBCs).
Groundwater quality	Releases to groundwater may be subject to federal drinking water standards and state groundwater quality standards	Maximum Contaminant Limits (MCLs) and Maximum Contaminant Level Goals (MCLGs) under the Safe Drinking Water Act, 42 USC §300ff et seq.; 40 CFR Part 141	RCW 43.20A.165; RCW 90.48; WAC 173-200	MCLs are applicable to groundwater that is an actual or designated source of potable water. MCLs and non-zero MCLGs may be relevant and appropriate depending on the circumstances of the release. State groundwater standards are applicable to state groundwater at site-specific enforcement limits set in accordance with WAC 173-200-050.
Releases to air	Air emissions are subject to EPA-approved State Implementation Plans, including prevention of significant deterioration (PSD) requirements; and major and area sources that release hazardous air pollutants (HAPs) must meet specified emission limits	Clean Air Act Sections 110, 112, and Sections 160-169, 42 USC §§7410, 7412 and §§7470-7479; 40 CFR Parts 52 and 61	RCW 70.94; WAC 173-400	Air emissions resulting from CERCLA response actions must meet applicable emission requirements.
Hazardous substance releases	Releases of hazardous substances are subject to Washington Model Toxics Control Act (MTCA)		RCW 70.105D; MTCA Cleanup Regulation, WAC 173-340	MTCA cleanup standards, consisting of cleanup levels at designated points of compliance, are applicable to CERCLA response actions conducted in the State of Washington
Hazardous and dangerous waste management	Management requirements for materials classified as hazardous or dangerous wastes.	Resource Conservation and Recovery Act (RCRA), 42 USC §9601 et seq.; 40 CFR Parts 260-270	Hazardous Waste Management Act, RCW 70.105; Dangerous Waste Regulations, WAC 173-303	Wastes generated from CERCLA response actions must be characterized to determine if they constitute hazardous or dangerous wastes, and if so they must be stored, transported, treated, disposed of and otherwise managed in accordance with applicable federal and state requirements. This includes meeting the RCRA Land Disposal Restrictions (LDRs) specified at 40 CFR Part 268 for any land placement of wastes that are hazardous at their point of generation.
Solid waste management	Management requirements for non-hazardous and non-dangerous solid waste.	Resource Conservation and Recovery Act (RCRA), 42 USC §9601 et seq.; 40 CFR Parts 257-258	Solid Waste Management Program, RCW 70.95 and WAC 173-350	Non-hazardous and non-dangerous waste generated from CERCLA response actions must be managed in accordance with applicable federal and state solid waste standards.

		Regulatory Citation		
Topic	**Standard or Requirement**	**Federal**	**State**	**Comment**
PCB wastes	PCB wastes must be managed in accordance with federal and state requirements	Toxic Substances Control Act, 15 USC §2601 et seq.; 40 CFR Part 761	Hazardous Waste Management Act, RCW 70.105; Dangerous Waste Regulations, WAC 173-303	Any PCB wastes generated from CERCLA response actions must be managed and disposed of in accordance with federal and state standards.
Protection of migratory birds	Prohibits unauthorized killing and other "takings" of migratory birds	Migratory Bird Treaty Act, 16 USC §§703-712		CERCLA response actions must be conducted to prevent takings of migratory birds

Acronyms:
NPDES - National Pollutant Discharge Elimination System.
CFR - Code of Rederal Regulations.
U.S.C. - United States Code.
RCW - Revised Code of Washington.
WAC - Washington Administrative Code.
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act.
EPA - Environmental Protection Agency.
POTWS - Publicly-Owned Treatment Works.
ARAR - Applicable or Relevant and Appropriate Requirements.
MCL - Maximum Contaminant Level.
MCLG - Maximum Contaminant Level Goals.
PSD - Prevention of Significant Deterioration.
HAP - Hazardous Air Pollutant.
RCRA - Resource Conservation and Recovery Act.
PCB - Polychlorinated biphenyl.

Cost Effectiveness

The amended remedy is cost effective, a reasonable value for the projected cost, particularly as compared to the Alternatives developed in the SFS. In making this determination, the EPA used the following definition from NCP Section 300.430(f)(1)(ii)(D): "A remedy shall be cost effective if its costs are proportional to its overall effectiveness."

Utilization of Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

The amended remedy does not result in additional treatment of contaminants. It limits exposure and risks to acceptable levels through institutional controls. The Site has already been cleaned up to meet industrial cleanup levels, and the shallow aquifer is only marginally contaminated above drinking water levels. There is no Principal Threat Waste remaining at the Site. Treatment was already implemented to the maximum extent practicable by the incineration of pesticide-contaminated soils as part of the remedy implemented pursuant to the 1990 ROD.

Preference for Treatment as a Principal Element

The preference for further treatment as a principal element of the amended remedy was carefully evaluated. Principal threat waste was addressed in the implementation of the remedy selected in 1990. The preference for treatment was met through the incineration of contaminated soil. This Amendment does not address principal threat waste.

Five-Year Review Requirements

Under the amended remedy, soil and groundwater remain above levels that allow for UU/UE. As long as contaminant levels that would support UU/UE are not met, CERCLA Five Year Reviews must be conducted. These statutorily mandated reviews will therefore continue to be conducted every five years (the next review is due to be completed in September 2013). These reviews will ensure that the amended remedy continues to protect human health and the environment. This review requirement does not preclude more frequent reviews by EPA.

VIII. DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant or minor changes to the amended remedy from the description provided in the Proposed Plan.

IX. REFERENCES

40 CFR 141, "National Primary Drinking Water Regulations," Code of Federal Regulations.

40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan," Code of Federal Regulations.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq.

FMC 1994. *Groundwater Monitoring Plan for the FMC Pesticide Formulation Facility, Yakima, Washington*, FMC Corporation.

FMC 1994. *FMC - Yakima Site Remediation Project, Yakima Washington – Remedial Action Completion Report*, Document 19088-R-002 (Revision 2), FMC Corporation.

FMC 2011. *Supplemental Feasibility Study – Former FMC Pesticide Formulation Facility, Yakima, Washington*, FMC/ 0120748 (Revision 0), FMC Corporation.

FMC, 2008. *Five-Year Report: Fall 2007 Groundwater Monitoring Activities, Former FMC Pesticide Formulation Facility, 4 West Washington Avenue, Yakima, Washington*, FMC Corporation.

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq.

EPA, 1990. *Record of Decision – Declaration, Decision Summary, and Responsiveness Survey for Remedial Action at FMC Corporation, Yakima, Washington*, U.S. Environmental Protection Agency.

EPA, 1993. *EPA Superfund Explanation of Significant Differences: FMC Corp. (Yakima Pit), EPA ID: WAD0000643577, OU 01, Yakima, WA*, U.S. Environmental Protection Agency.

EPA, 2008. *Third Five-Year Review Report for FMC Yakima Superfund Site, Yakima, Washington*, U.S. Environmental Protection Agency.

WAC 173-340, "Model Toxics Control Act – Cleanup," Washington Administrative Code.

RESPONSIVENESS SUMMARY

Comments and Responses

Comment #1:

(b)(6)

"Dear Mr. Cameron, I have received and read the Institutional Controls Proposed for FMC Yakima cleanup. I'm writing to support the Institutional Controls Proposal. Sincerely, (b) (6)
(b) (6)

Response to Comment #1. Thank you for taking the time to comment on the proposed amendment to the FMC Yakima cleanup plan. The EPA recognizes that your comment is supportive of the preferred alternative presented in the Proposed Plan. EPA has selected this alternative (Institutional Controls) with this Amendment to the Record of Decision.

Appendix: Administrative Record Index

HEADING: 0.0 Index/Table of Contents

HEADING: 2.0 Remedial Investigation/Feasibility Study

SUB-HEAD: 2.3 Vol. 1 Phase II

SUB-HEAD: 2.3.4 Vol. 1 Site Investigation/Field Reports

Date: 4/1/1990
DOCID: 1335467
Pages: 156
Releasable
PAPER DOCUMENT

Phase II Remedial Investigation Report for a Former Pesticide Formulation Facility in Yakima, Washington, Volume 1.

Authors:
unknown unknown / Bechtel Environmental, Inc.

Addressee(s):
FMC Corporation

Date: 4/1/1990
DOCID: 1335468
Pages: 360
Releasable
PAPER DOCUMENT

Phase II Remedial Investigation Report for a Former Pesticide Formulation Facility in Yakima, Washington, Volume 2.

Authors:
unknown unknown / Bechtel Environmental, Inc.

Addressee(s):
FMC Corporation

SUB-HEAD: 2.4 Vol. 1 Supplemental Feasibility Study

Date: 6/1/2011
DOCID: 18001
Pages: 0
Releasable
ELECTRONIC RECORD

Supplemental Feasibility Study Report. .

Authors:
FMC Corporation

Addressee(s):
EPA Region 10

SUB-HEAD: 2.4.1 Vol. 1 Correspondence

Date: 7/27/2011
DOCID: 18002
Pages: 0
Releasable
ELECTRONIC RECORD

Acceptance letter regarding comments for Supplemental Feasibility Study Report. .

Authors:
Craig Cameron / EPA

Addressee(s):
FMC Corporation

SUB-HEAD: 2.4.1 Vol. 1 Correspondence

HEADING: 4.0 Record of Decision

SUB-HEAD: 4.1 Vol. 1 ROD

Date: 9/1/1990
DOCID: 1335483
Pages: 89
Releasable
PAPER DOCUMENT

Record of Decision: Declaration, Decision Summary, and Responsiveness Summary for Remedial Action at FMC Corporation, Yakima, Washington.

Authors:
EPA

Addressee(s):
Unknown

Date: 8/11/2011
DOCID: 18000
Pages: 29
Releasable
ELECTRONIC RECORD

Proposed Plan for ROD Amendment for FMC Corporation (Yakima) Superfund Site.

Authors:
EPA Region 10

Addressee(s):
Unknown

SUB-HEAD: 4.2 Vol. 1 Explanation of Significant Differences

Date: 4/19/1993
DOCID: 1351782
Pages: 7
Releasable
PAPER DOCUMENT

Explanation of Significant Differences for FMC Corporation, Yakima, Washington.

Authors:
Kevin Rochlin / EPA

Randall Smith / EPA

Addressee(s):
Unknown

HEADING: 11.0 Public Participation

SUB-HEAD: 11.3 Vol. 1 Fact Sheets/Press Releases

Date: No Date on
DOCID: 632902
Pages: 1
Releasable
ELECTRONIC RECORD

Fact Sheet: EPA Invites Your Comments Through June 6, 2008 on a Checkup on the Cleanup of the FMC Yakima Site, Yakima, Washington.

Authors:
EPA Region 10

Date: 10/1/2008
DOCID: 632903
Pages: 1
Releasable
ELECTRONIC RECORD

Press Release: EPA Completes Checkup on the FMC Yakima Superfund Site Cleanup, Yakima, Washington.

Authors:
EPA Region 10

Addressee(s):
Unknown

Date: 11/10/2008
DOCID: 1395980
Pages: 2
Releasable
ELECTRONIC RECORD

Fact Sheet: EPA Completes Checkup on the FMC Yakima Superfund Site Cleanup, Yakima, Washington.

Authors:
EPA Region 10

Addressee(s):
Unknown

Date: 8/1/2011
DOCID: 639761
Pages: 4
Releasable
ELECTRONIC RECORD

Fact Sheet: Institutional Controls Proposed for FMC Yakima Cleanup, Public Comment August 15 to September 14, 2011.

Authors:
EPA Region 10

Addressee(s):
Unknown

Date: 8/9/2011
DOCID: 639762
Pages: 1
Releasable
ELECTRONIC RECORD

Press Release: Public Comment Opportunity for FMC Yakima Cleanup Plan, August 15 to September 14, 2011.

Authors:
EPA Region 10

Addressee(s):
Unknown

SUB-HEAD: 11.6 Vol. 1 Newspaper/Journal Articles

Date: 5/7/2008
DOCID: 1395978
Pages: 2
Releasable
PAPER DOCUMENT

Public voucher for advertising and announcement: EPA Invites Your Comments Through June 6, 2008 on a Checkup on the Cleanup of the FMC Yakima Site, Yakima, Washington.

Authors:
EPA Region 10

Addressee(s):
unknown unknown / Yakima Herald-Republic

Date: 10/31/2008
DOCID: 1395979
Pages: 2
Releasable
PAPER DOCUMENT

Public voucher for advertising and announcement: EPA Completes Checkup on the FMC Yakima Superfund Site Cleanup, Yakima, Washington.

Authors:
EPA Region 10

Addressee(s):
unknown unknown / Yakima Herald-Republic

HEADING: 17.0 Remedial Action

SUB-HEAD: 17.4 Vol. 1 Work Plans

Date: 11/13/1992
DOCID: 1390467
Pages: 145
Releasable
PAPER DOCUMENT

Remedial Action Project Schedule & Work Plan for FMC - Yakima, Washington On-Site Incineration.

Authors:
Vesta Technologies, Ltd.

Addressee(s):
Bechtel Environmental, Inc.

SUB-HEAD: 17.6 Vol. 1 RA Completion Report

Date: 5/16/1994
DOCID: 1390465
Pages: 55
Releasable
PAPER DOCUMENT

Remedial Action Completion Report for FMC - Yakima Site Remediation Project, Yakima, Washington.

Authors:
Bechtel Environmental, Inc.

Addressee(s):
unknown unknown / FMC Agricultural Chemical Group

Date: 5/16/1994
DOCID: 1390466
Pages: 102
Releasable
PAPER DOCUMENT

Appendix B: Cleanup Summaries for Remedial Action Completion Report, FMC - Yakima Site Remediation Project, Yakima, Washington.

Authors:
Bechtel Environmental, Inc.

Addressee(s):
unknown unknown / FMC Agricultural Chemical Group

Date: 6/28/2011
DOCID: 1390547
Pages: 1
Releasable
PAPER DOCUMENT

Memorandum regarding Availability of Remedial Action Completion Report Appendices for the FMC Yakima Administrative Record File.

Authors:
Craig Cameron / EPA

Addressee(s):
Administrative Record File

HEADING: 19.0 Site Completion

SUB-HEAD: 19.3 Vol. 1 Long Term Response

SUB-HEAD: 19.3.2 Vol. 1 Five-Year Reviews

Date: 9/1/1998 Five-Year Data Evaluation Report for FMC Corporation, Former FMC Pesticide Formulation Facility.
DOCID: 1395982
Pages: 131
Releasable
PAPER DOCUMENT

Authors:
unknown unknown / ERM-West, Inc.

Addressee(s):
unknown unknown / FMC Corporation

Date: 9/29/1998 Five-Year Review Report for FMC Corp. (Yakima) Superfund Site.
DOCID: 1231633
Pages: 19
Releasable
PAPER DOCUMENT

Authors:
EPA Region 10

Addressee(s):
Unknown

Date: 9/29/2003 Second Five-Year Review Report for FMC Corp. (Yakima) Superfund Site.
DOCID: 1231634
Pages: 53
Releasable
PAPER DOCUMENT

Authors:
EPA Region 10

Addressee(s):
Unknown

Date: 9/14/2008 Third Five-Year Review Report for FMC Corp. (Yakima) Superfund Site.
DOCID: 860681
Pages: 67
Releasable
ELECTRONIC RECORD

Authors:
EPA Region 10

Addressee(s):
Unknown

HEADING: 20.0 Post-Remedial Action Groundwater Monitoring

SUB-HEAD: 20.1 Vol. 1 Monitoring Plan

Date: 6/1/1994
DOCID: 1238440
Pages: 21
Releasable
PAPER DOCUMENT

Groundwater Monitoring Plan for the FMC Pesticide Formulation Facility, Yakima, Washington.

Authors:
unknown unknown / FMC Corporation

Addressee(s):
Unknown

SUB-HEAD: 20.2 Vol. 1 Data Reports

Date: 5/15/2008
DOCID: 1263869
Pages: 126
Releasable
PAPER DOCUMENT

Five-Year Report: Fall 2007 Groundwater Monitoring Activities - Former FMC Pesticide Fourmulation Facility.

Authors:
unknown unknown / Parsons Infrastructure & Technology Group, Inc.

Addressee(s):
unknown unknown / FMC Corporation