

**Five-Year Review Report**  
**Second Five-Year Review Report**  
**for**  
**Monsanto Chemical Co. (Soda Springs Plant)**

**EPA ID: IDD081830994**

**Caribou County, Idaho**

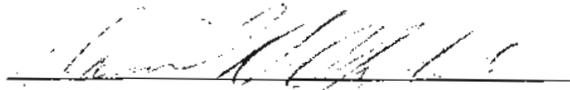
**August 2008**

**PREPARED BY:**

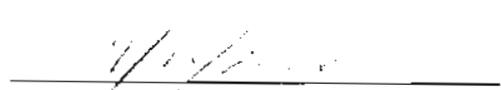
**U.S. EPA Region 10  
Seattle, Washington**

Approved by:

Date:



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



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# List of Acronyms and Terms

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<sup>210</sup> Po	polonium-210
<sup>226</sup> Ra	Radium-226
Ag	silver
As	arsenic
Cd	cadmium
CD	consent decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	chemicals of concern
Cu	copper
E&E	Ecology and Environment, Inc.
EPA	United States Environmental Protection Agency
Golder	Golder Associates
IC	institutional control
IDEQ	Idaho Department of Environmental Quality
Kerr-McGee	Kerr-McGee Chemical Corporation
MCLs	maximum contaminant levels
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
Monsanto site	Monsanto Chemical Co. Soda Springs Plant
mrem	millirem
MWH	Montgomery Watson Harza
NCP	National Contingency Plan
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	no further action
Ni	nickel

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NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OTIS	Online Tracking Information System
OU	operable unit
PCBs	polychlorinated biphenyls
pCi/g	picocuries per gram
POC	point of compliance
PSD	Prevention of Significant Deterioration
RA Start	Remedial Activities Initiated
RAOs	Remedial Action Objectives
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
Se	selenium
SIP	State Implementation Plan
SOP	standard operating procedure
UFS	underflow solids
UECA	Uniform Environmental Covenant Act
V	vanadium

# Executive Summary

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Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP), the U.S. Environmental Protection Agency - Region 10 (EPA) has conducted the second five-year review of the Monsanto Chemical Co. Soda Springs Plant Superfund site (Monsanto site). The Monsanto site is an operating elemental phosphorus plant located north of Soda Springs, in Caribou County Idaho. It was placed on the National Priorities List (NPL) on August 30, 1990 and a Record of Decision (ROD) was issued in April 1997. The chemicals of concern (COCs) identified in the ROD included radium-226 ( $^{226}\text{Ra}$ ) in soil and fluorine, cadmium, selenium, nitrate, and manganese in groundwater.

The ROD selected the following remedies:

1. Monitored natural attenuation (MNA) with institutional controls (ICs) for contaminated groundwater;
2. Either ICs or soil excavation on buffer properties not owned or controlled by Monsanto, at the discretion of the property owner, for contaminated soil;
3. No further action (NFA) for operating area source piles and materials, subject to continued operations and ongoing five-year reviews; and
4. NFA for air, surface water, and Soda Creek sediments.

The main issues identified in this review are a new (2003) State of Idaho standard for selenium in surface water for protection of aquatic life that is more stringent than the remediation goal (MCL) established in the ROD for selenium in groundwater, questions about whether MNA is occurring such that ROD cleanup objectives will be achieved in a reasonable time frame, and concerns about wind dispersal from material piles releasing COCs to surrounding soils above levels that are protective of human health and the environment. The latter is a concern that was raised in the previous Five-year review that has yet to be completely addressed by Monsanto actions; while soil concentrations of  $^{226}\text{Ra}$  generally show no evidence of significant change over time, this still needs to be addressed and monitored in the future. The ROD concluded that pumping of Monsanto's production wells would contain the contaminated groundwater plume and MNA would restore groundwater quality; however, water sampling results show selenium concentrations are increasing in three out of twelve point-of-compliance (POC) wells south of the operating area and some other COCs show increases in some wells though overall trends are decreasing. Selenium does not exceed remedial goals for groundwater (established as the MCL for protection of human health) but may exceed the 2003 Idaho surface water standard in some downgradient wells, creeks and springs.

A protectiveness determination cannot be made at this time for the Monsanto site until further information is obtained. Further information will be obtained by evaluating selenium levels in downgradient surface water, surface water characteristics and aquatic life, the applicability of the standard and, as necessary, the ability of and timeframe for the

current remedy to achieve the standard. It is expected that these actions will take approximately 15 months to complete, at which time a protectiveness determination will be made.

**Human Exposure Environmental Indicator** Status for the Monsanto Site remains “Under Control” because exposures that could pose an unacceptable risk are being controlled through Institutional Controls on surrounding properties and through compliance with OSHA worker health and safety requirements at the operating facility.

**Groundwater Migration Environmental Indicator** Status for the Monsanto site “Under Control” because exposures that could pose an unacceptable risk are being controlled through continued pumping of the four Monsanto production wells and some natural attenuation is occurring.

**Cross Program Revitalization Measure Status:** The Site is considered “protective for people under current conditions” due to Institutional Controls on surrounding properties and through compliance with OSHA worker health and safety requirements at the operating facility, and the site is in continued use as an operating industrial facility.

# Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Monsanto Chemical Co. (Soda Springs Plant)		
EPA ID (from WasteLAN): IDD081830994		
Region: 10	State: Idaho	City/County: Soda Springs, Caribou County
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): Construction Complete		
Multiple OUs? No		Construction completion date: 09/20/2000
Has site been put into reuse? Not Applicable, site is an operating facility.		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
Author name: Mark Ader		
Author title: Remedial Project Manager		Author affiliation: EPA Region 10
Review period:** 10/01/2003 to 09/30/2008		
Date(s) of site inspection: 06/10/2008		
Type of review: Post-SARA statutory		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: Actual RA Onsite Construction at OU # _____ Actual RA Start at OU# _____ Construction Completion <input checked="" type="checkbox"/> First- Five-Year Review Report Other (specify)		
Triggering action date (from WasteLAN): 09/30/2003		
Due date (five years after triggering action date): 09/30/2008		

\* ["OU" refers to operable unit.]

\*\* [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

## Five-Year Review Summary Form cont'd.

### Issues:

- 1) Levels of Selenium measured in area springs (Mormon A, Calf, Southwest, and Homestead) exceed the State of Idaho's recently (2003) established water quality standards for selenium for protection of cold water aquatic life; need more information to determine if applicable and affects protectiveness.
- 2) Selenium and other COC concentrations are increasing in some groundwater wells and springs which calls into question whether the MNA remedy can achieve cleanup goals throughout the Site in a reasonable timeframe.
- 3) Wind dispersal of dust and particulates may be contributing to offsite contamination.

### Recommendations and Follow-up Actions:

- 1 a) To evaluate and determine the applicability and impact of the State of Idaho's recently (2003) established water quality standards for selenium and what, if any, changes need to be made to the cleanup goals and/or the selected remedy, EPA needs further information about selenium levels in downgradient surface water, surface water characteristics and aquatic life, and the requirements of the standard
- 1 b) If after completing action #1a a new standard for surface water needs to be adopted, further evaluation will be needed to determine whether the groundwater remedy can address the selenium in surface water in a reasonable timeframe, to identify and evaluate other remedial alternatives, and identify options to provide protectiveness in the interim.
- 2 MNA effectiveness should continue to be evaluated over the next five years, and if not effective, additional remedial actions need to be evaluated
- 3 Implement EPA - Approved SOP for wind dispersal prevention
- 3 Using soil sampling data from surrounding properties, evaluate effectiveness of wind dispersal prevention plan

### Protectiveness Statement(s):

A protectiveness determination cannot be made at this time for the Monsanto site until further information is obtained. Further information will be obtained by evaluating selenium levels in downgradient surface water, surface water characteristics and aquatic life, the applicability of the standard and, as necessary, the ability of and timeframe for the current remedy to achieve the standard. It is expected that these actions will take approximately 15 months to complete, at which time a protectiveness determination will be made.

### Comments:

None

# 1 Introduction

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## 1.1 Purpose

The purpose of the second five-year review for the Monsanto Chemical Company Soda Springs Plant (Monsanto site) was to assess if the remedy implemented at the site remains protective of human health and the environment. The methods, findings, and conclusions of this second five-year review are documented herein.

## 1.2 Authority for Conducting Five-Year Review

The United States Environmental Protection Agency - Region 10 (EPA) is preparing this second five-year review pursuant to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) § 121 and the National Contingency Plan (NCP). CERCLA § 121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

EPA has interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii), which states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

## 1.3 Who Conducted the Five-Year Review

EPA conducted the second five-year review with a focus on the remedial actions implemented at the Monsanto site from October 2003 to July 2008. This report documents the results of this review. Monsanto retained independent contractors to perform investigations and to provide data as directed and approved by EPA in support of this second five-year review. Montgomery Watson Harza (MWH) performed soil and sediment investigations, and Golder Associates (Golder) performed groundwater monitoring. EPA retained CH2M HILL and its subcontractor, Ecology and Environment, Inc. (E&E), to assist in the preparation of this second five-year review.

The second five-year review team included Mark Ader, from EPA Region 10, EPA's contractor team, Clyde Cody from the Idaho Department of Environmental Quality (IDEQ), Robert Geddes of Monsanto, and other Monsanto staff and contractors mentioned above.

The second five-year review consisted of a site visit on June 10, 2008, attended by Clyde Cody, Lenna Cope of E&E, Robert Geddes and Jim McColloch of Monsanto, and William Wright of MWH. The subsequent teleconference was attended by those who participated in the site visit and Mark Ader, Bruce Pallante and Don Wind of Monsanto, and David Banton of Golder. IDEQ provided assistance to EPA on a number of topics covered in this report, including a review of groundwater data.

EPA notified the public about this second five-year review by publishing notices in the Montpelier News-Examiner and on the EPA's Website (May 2008). Figure 1 is a copy of EPA's notice to the public regarding the second five-year review.

## 1.4 Other Review Characteristics

This is the second five-year review of the Monsanto site. The first five-year review was completed on September 30, 2003. As required by the statute, this review is required due to the fact that hazardous substances, pollutants, or contaminants remain on-site above levels that allow for unrestricted use and unlimited exposure. The site reached construction completion status in 2000, but chemicals of concern (COCs) in groundwater and soil remain elevated above background levels at some locations.

During the first five-year review EPA found that the remedy was protective of human health and the environment, though there were significant issues referenced below in this regard. This review has been conducted to assess whether 1) the institutional controls (ICs) and monitored natural attenuation (MNA) remedy components remain protective and 2) outstanding issues identified during the first five-year review have been resolved. Issues identified in the first five-year review are summarized in Section 5.

Terms applied to the Monsanto site but not included in the Record of Decision (ROD) and Consent Decree (CD), are "operating area" and "buffer area." These terms were first used during the first five-year review. "Operating area" refers to all of Monsanto property inside the fence intended to secure operations. "Buffer area" refers to all Monsanto-owned and other properties outside the fence for which ICs have been recorded with the Caribou County Assessors' Office. The operating area and buffer area constitute the entire Monsanto site subject to this five-year review.

## 2 Site Chronology

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Table 2-1 provides the chronology of site events since the initial discovery of contamination.

**TABLE 2-1**  
Chronology of Site Events

<b>Event</b>	<b>Date</b>
Confirmation of initial discovery of contamination	1985
Site added to the National Priorities List (NPL)	August 30, 1990
Administrative Order on Consent	March 19, 1991
Remedial Investigation/Feasibility Study (RI/FS) completed	April 1996
Record of Decision signed	April 1997
Consent Decree signed	September 1997
Remedial Activities Initiated (RA Start)	October 15, 1998
Construction Completion Date	September 20, 2000
First Five-Year Review Completion Date	September 30, 2003
Second Five-Year Review Completion Date	September 30, 2008

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## 3 Background

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Background information for the P4/Monsanto site, including physical characteristics, land resource use, history of contamination, initial response, and basis for taking action are discussed in sections 3.1 through 3.5. Much of this information was first presented in the first five-year review and has been updated where necessary and appropriate.

The creation of P4 Productions, LLC (P4) was part of a multi-layered corporate restructuring of Monsanto which included its division into Solutia (as owner/operator or parent corporation for Monsanto's older chemical operations like the P4 plant) and Pharmacia (for Monsanto's newer biotech products). Pharmacia has since somewhat confusingly renamed itself Monsanto (or "new" Monsanto which claims generally that it is not responsible for "old" Monsanto's liabilities). Solutia was under-capitalized at the time of the restructuring to absorb all of Monsanto's chemical operation (particularly environmental) liabilities and went bankrupt a few years later. Monsanto was shielded from Solutia's creditors, including EPA, in the bankruptcy, and competed as a creditor itself in the proceedings. Monsanto agreed with the United States during the bankruptcy not to contest responsibility for certain Solutia Superfund sites including this one (Monsanto's having entered into the CD prior to its restructuring made resisting responsibility more difficult). P4 has implemented the ROD since it assumed control of the plant. EPA continues to view Monsanto, the CD signatory, as the ultimately responsible party. For purposes of this Review, the site is called "the Monsanto site," and the implementing party is referred to as Monsanto.

### 3.1 Physical Characteristics

The Monsanto site is located in Caribou County, Idaho, approximately one mile north of the city of Soda Springs. P4 Productions, LLC was formed by Monsanto to own and operate Monsanto's elemental phosphorus plant at this location after Monsanto entered into the June 1998 Consent Decree with the United States to implement the ROD. The site is comprised of approximately 800 total acres that include the operating area of the Monsanto plant which occupies approximately 540 acres and an additional approximately 260 acres of buffer area, which is owned in part by Monsanto and in part by various farmers. The buffer area contains COCs from plant operations and is therefore part of the Monsanto site (defined by the areal extent of contamination). The site is subject to ICs by the 1997 ROD and 1998 CD. ICs are non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for human exposure to contamination and/or protect the integrity of a remedy. Monsanto must maintain or enforce the ICs for as long as elevated levels of COCs remain in soils or groundwater covered by the IC. Figure 2 (Monsanto Plant Vicinity Map) provides the location of the Monsanto site and surrounding features. Figure 3 (Monsanto Institutional Control Area and Soil Sampling Locations) provides the locations of ICs with respect to soil sampling locations.

The plant lies in a tributary valley to the Bear River that is drained by Soda Creek. The valley is bordered by the Chesterfield Range and the Soda Hills on the west, and by the Aspen Range on the east. The closest surface water body is Soda Creek, located 2,000 feet

west of the facility. Soda Creek flows south until it discharges in Alexander Reservoir just west of the city of Soda Springs. The major river in the vicinity is the Bear River, located approximately two miles south southwest of the site. The Bear River discharges to the Alexander Reservoir. The two primary hydrostratigraphic zones beneath the site are the Upper Basalt Zone (UBZ) and the Lower Basalt Zone (LBZ). Each of the two zones has been broken down into four subsections based on hydrogeological controls and groundwater quality (UBZ 1 through 4 and LBZ 1 through 4). Groundwater contamination plumes are within the UBZ at two to three plant operating area locations, depending on the COC, and generally migrate south. The furthest south a contaminant plume has migrated is approximately 3,900 feet south of the southern fence line bordering the facility. Groundwater contamination is discussed in more detail in Section 6.3.3.

## 3.2 Land and Resource Use

The city of Soda Springs has a population of 3,177 (U.S. Census Bureau, 2008) and is located one mile south of the Monsanto site. Land use within the city limits is mostly residential with some commercial, agriculture, and light industrial zones. A light and heavy industrial zone extends from the north end of the city along State Highway 34 towards the Monsanto site.

Monsanto has approximately 400 employees, plus approximately 200 contract employees, working at this facility. Land use within the fenced operating area was agricultural before the plant was built, has been industrial since, and reasonably anticipated future land use is expected to remain industrial for the foreseeable future. The Monsanto site includes agricultural land to the north, south and southwest of the operating area and is surrounded by open agricultural land and rangelands. Figure 4 (Land Use, Topography, and Soil Sampling Locations) provides graphical representation of land use with respect to soil sampling locations (discussed in Section 6.3.2). Significant groundwater resources lie underneath the broad valley where both the Monsanto site and the city of Soda Springs are located. Groundwater beneath the Monsanto site generally flows southward toward Soda Springs. The Soda Springs residential water supply comes from either Formation Spring to the northeast or Ledger Creek Spring to the southeast. Both of these locations remain unaffected by groundwater flowing beneath the Monsanto site.

One private well, the Lewis well, is located on a property that does not have soil contamination or ICs, but which was above the MCL for cadmium and within the outer contour for the GW plume for molybdenum (which is not a COC) during the first five-year review and was therefore identified as potentially needing an IC. Monsanto has since stated, based on sampling results prior to and subsequent to the first five-year review, that the cadmium result was laboratory error and is not above the MCL. The Lewis residence was connected to the city water supply on August 5, 1991. Since being connected to the city water supply the well use has reportedly been limited to livestock watering, irrigation and as a monitoring well for the Monsanto annual groundwater sampling, but these limitations remain wholly voluntary in the absence of an enforceable IC.

### 3.3 History of Contamination

Monsanto purchased the property in 1952 to utilize local phosphate-rich ore to manufacture elemental phosphorus. It also operates local mines that supply the plant. In 1984, Monsanto hired Golder to characterize groundwater impacts from past and current operations after a landowner immediately south of the plant complained that livestock drinking water from several nearby springs experienced problems related to excess fluoride exposure.

The pre-CERCLA investigation showed that groundwater under the Monsanto site contained elevated levels (above MCLs) of fluoride, cadmium, selenium, and vanadium. Monsanto concluded that the underflow solids pond, northwest pond, hydroclarifier, and intermediate processing steps in the elemental phosphorous production process were leaking the COCs into the subsurface soil and underlying groundwater system.

Tronox LLC operates an industrial facility immediately northeast of the site. The Kerr-McGee Chemical Corporation (Kerr-McGee) formerly owned and operated this vanadium production facility beginning in 1964 (the facility is referred to as the Kerr-McGee site for the purposes of this five-year review report). The Kerr-McGee site was placed on the NPL on October 4, 1989. Groundwater contamination from the Kerr-McGee site extends onto the southeast portion of the Monsanto site. This plume still exists and is subject to investigation and follow-up by EPA including an evaluation to assess whether this plume interferes with the effectiveness of Monsanto's remedial activities. A second five year-review for the Kerr-McGee site recently deferred a protectiveness finding pending further sampling of rising levels of some COCs in the Kerr-McGee plume. Like the Monsanto site, the Kerr-McGee ROD did not select active groundwater remedial treatment.

Groundwater in the Lewis well is affected by both the Kerr-McGee and Monsanto plumes. As stated in the first five-year review, the Lewis well was, and remains, unprotected by an IC. This matter is discussed further in Section 5, 6, and 7.

### 3.4 Initial Response

In 1987, EPA sampled and found elevated levels of fluoride, cadmium, selenium, and sulfate in monitoring and production wells at the Monsanto site. Due largely to potential human health and environmental exposures from contaminated groundwater flowing south from the Monsanto site towards Soda Springs, and due also to documented environmental and likely human exposures to excess fluoride from at least one local well, EPA proposed and listed the site to the NPL as set forth above.

### 3.5 Basis for Taking Action

Pursuant to a March 19, 1991 Administrative Order on Consent issued by EPA, Monsanto completed a remedial investigation/feasibility study (RI/FS) under EPA oversight between March 1991 and April 1996. Investigations covered groundwater, soil, source materials, surface water, air, biota, and sediments. Based on exceedances of EPA risk screening criteria, COCs were identified. Sixty monitoring wells, eighteen spring locations, numerous off-plant soil sites, and sediment locations from Soda Creek and Alexander Reservoir were sampled.

The list of potential exposure concerns identified during the RI/FS included:

- Radionuclide ( $^{226}\text{Ra}$ ) exposures from slag and source materials in the operating area, primarily to Monsanto employees;
- Potential residential exposures to metals (arsenic and beryllium) and radionuclides in groundwater, soil, and air immediately outside the operating area if future residential development were not controlled, specifically along the southern and northern fence-lines;
- Potential elevated exposures to other hazardous substances in soil inside the operating area to current and future workers.
- Groundwater threats to the city of Soda Springs water supply; and
- Surface water discharges to Soda Creek.

At the conclusion of the RI/FS, the first three concerns listed above provided the basis for the remedial action developed for the Monsanto site. The last two concerns were carried through the RI/FS, but EPA concluded in its ROD that remedial action was not necessary to address them.

## 4 Remedial Action

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### 4.1 Remedial Action Objectives

The ROD identified the Monsanto site as a single operable unit (OU). The Remedial Action Objectives (RAOs) presented in the ROD are summarized below:

1. Prevent human ingestion of, inhalation of, or direct contact with groundwater at levels exceeding the following concentrations: cadmium 0.005 mg/L; fluoride 4 mg/L; manganese 0.015 mg/L; nitrate as NO<sub>3</sub> 44 mg/L; selenium 0.05 mg/L.
2. Eliminate groundwater contamination sources and restore the shallow groundwater aquifer underlying the site to levels below applicable MCLs.
3. Prevent external exposure to radionuclides at levels that pose cumulative estimated risks above  $3 \times 10^{-4}$ . Such risk corresponds to a radiation effective dose equivalent to approximately 15 mrem/year for the radionuclides of concern at the site and a <sup>226</sup>Ra concentration of 3.7 pCi/g.
4. Prevent ingestion or inhalation of soils containing radionuclides at levels posing cumulative estimated risks exceeding  $3 \times 10^{-4}$ , or metals (e.g., arsenic, beryllium) at levels posing cumulative estimated carcinogenic risks exceeding  $1 \times 10^{-5}$ .

The ROD also stated the following concerning the on site material piles:

#### RAO for Sources of Soil Contamination - Solid Waste Piles<sup>1</sup>:

Solid waste piles on-Plant have in the past been sources of contaminant migration to off-Plant soils. If workers were frequently exposed to uncontrolled emissions from such piles, risks would be unacceptable. Preliminary RAOs were developed for source piles for use in the FS. However, under conditions at the time of the ROD, migration to off-Plant soils had been significantly reduced and effective worker protection programs were in place, so RAOs were not necessary for source piles as long as those controls remain in place and off-Plant soil concentrations do not increase.

The RAOs were contingent on continued operation of the Monsanto plant. If Monsanto discontinued pumping production wells, converted the site to other industrial uses, or otherwise changed its operations in any substantial way, the RAOs would be reconsidered and/or amended, as needed, by EPA. Monsanto maintains its intention to continue elemental phosphorous manufacturing at the plant for the reasonably foreseeable future.

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<sup>1</sup> Identified in the ROD as 'solid waste piles, includes the underflow solids pile (UFS pile)

## 4.2 Remedy Selection

As directly quoted from the 1997 ROD, the remedies selected for the site are:

1. The selected remedy for contaminated groundwater is Monitored Natural Attenuation with Institutional Controls (such as legally enforceable prohibitions on drinking water wells in the affected area) to prevent human exposure to groundwater until it recovers. No further action appears necessary, except monitoring of the groundwater and the Plant discharge outfall, because no one is currently using the contaminated groundwater for drinking and because the combination of past actions and natural attenuation is projected to restore groundwater to levels which allow for unrestricted use and exposure within 30 years. Because groundwater exceeds MCLs, and risk-based concentrations, reviews will be necessary no less often than every five years to ensure that the remedy remains protective, confirm that constituent concentration trends in groundwater and sediments are declining as predicted and eventually to confirm the achievement of MCLs.
2. The selected remedy for source piles and materials within the Plant is No Further Action (NFA), because Monsanto's past cleanup actions, ongoing engineering and Institutional Controls and compliance with federal and state (environmental and worker health and safety) regulations have reduced potential sources of worker exposure and contaminant migration to surrounding soils to acceptable levels under current industrial land use. Five-year reviews will be necessary to evaluate land use, compliance status, engineering and institutional controls (including worker health and safety programs and dust control efforts) to ensure the remedy remains protective, since hazardous substances remain on-site above levels that allow for unrestricted use.;
3. The selected remedy for contaminated soils has multiple components:
  - For contaminated soils surrounding the Plant which are owned by a named responsible party (to date, only Monsanto has been named), the selected remedy is Institutional Controls in the form of land use restrictions placed in deeds, and enforceable under an anticipated consent decree.
  - For contaminated soils on non-industrial property owned by individuals who have not caused or contributed to the contamination at the Site (agricultural or residential property owners) the selected remedy is an election by each such property owner to have their property either: a) cleaned up via excavation, containment and replacement of contaminated soils, or b) rendered protective of human health and the environment via land use restrictions in the form of an environmental easement to be held by a named responsible party. If contaminated soils are excavated, they will be replaced with clean soil and the contaminated soils will be contained within the Plant and covered with at least 12 inches of clean soil and vegetation (or some other protective cover) to minimize potential human exposure to, or migration of, the contaminated soil.

A consent decree (CD) was entered in Idaho District Court on June 29, 1998, to implement the selected remedy. The selected remedies did not require any engineered remedial design or active remediation. Monsanto began selected remedy implementation by establishing ICs

and conducting soil and groundwater monitoring. There have been no removal actions implemented at this site.

The ROD did not require engineered remedial construction activities with the exception of optional buffer area excavations that never occurred. Affected property owners sold rights to impose ICs to Monsanto. Monsanto has claimed to have implemented several voluntary environmental operating area improvements including (as discussed in the first five-year review) upgrading equipment, removing underground fuel storage tanks; closing or reclaiming process ponds suspected of groundwater contamination; abandoning monitoring wells to prevent possible conductivity between upper and lower aquifers; paving roads; and eliminating regulated equipment containing polychlorinated biphenyls (PCBs)

### 4.3 Remedy Review

CERCLA five-year review requirements as determined by the ROD include the following:

1. Groundwater – Review and assess groundwater and outfall monitoring data;
2. Groundwater and Surface Water – Compare groundwater and surface water outfall quality and extent of contamination plume(s) to applicable regulatory levels, remediation goals, and groundwater modeling projections. Assess if/when remediation goals have been achieved, and if not, that ICs remain in place and are effective, and groundwater COCs levels are declining at an acceptable rate;
3. If groundwater recovery appears to significantly differ from model projections, the model and the need for additional groundwater remedial actions should be re-evaluated.
4. Sediments – Collect samples to support the five-year review assessment of whether sediment contaminant concentrations are stable or declining as predicted;
5. Soils – Soil sampling should be done no fewer than every five years to: a) assess the concentrations of COCs in soils, and b) verify that source control is effectively preventing further spread of site contaminants and/or recontamination of soils;
6. Institutional Controls – Confirm that ICs are in place for all soil grids surrounding the plant that contain  $^{226}\text{Ra}$  concentrations greater than the remediation goal of 3.7 pCi/g and 15 mrem/year for radionuclides at the site, based on a statistically valid sampling program.
7. Operating Area – Verify that plant operations continue to be in compliance with environmental and worker health and safety requirements so that potential releases and exposures remain adequately controlled, and the remedy remains effective. Evaluate dust control efforts and land-use ICs, and assess if there are plans for plant closure in the foreseeable future.

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# 5 Progress Since the Last Five-Year Review

During the first five-year review, EPA determined that the remedy was protective of human health and the environment. Issues and related technical matters that were identified in the first five-year review are discussed below and summarized in Table 5-1 to demonstrate their current status.

**TABLE 5-1**  
Summary of Issues and Technical Matters from the First Five-year Review and Their Current Status

Issues/Technical Matter	Current Status
Lack of IC on the Lewis Well	Unresolved
Wind dispersal of dust from onsite material piles	Unresolved
MNA may take longer than anticipated in the operating area	Based on current data for most COC and points of compliance wells, MNA appears to be on track; however, there is still some uncertainty for the length of time to meet remedial goals
Increasing molybdenum concentration south of the operating area	Unresolved
Use of total nitrogen and nitrate for compliance with MCL	Resolved
Level of detail for sampling, analyzing and reporting Soda Creek discharge data	Resolved but data indicate exceedances of water quality criterion for selenium

## 5.1 Issue 1: Lack of Institutional Controls on the Lewis Well and Evaluation of Groundwater for Domestic Use

### 5.1.1 Lewis Well

The first five-year review indicated that: "Groundwater samples from the Lewis well have revealed elevated cadmium and other hazardous constituent concentrations during the past five years, and the property where this well is located does not have institutional controls." EPA requested that Monsanto submit a plan by February 1, 2004 to cover the Lewis well under an IC.

Monsanto's written response to the first five-year review regarding the Lewis well was as follows:

*During the RI, Monsanto and Kerr-McGee learned that this (Lewis) well was contaminated. Water quality and flow paths seemed to indicate that joint responsibility for the contamination was likely. Both companies immediately cooperated to tie the residence in to*

*the municipal water system. The well is currently used only for stock watering and pasture irrigation (city regulations prohibit municipal water from being used for this purpose). Thus, the well, for more than a decade, no longer serves as a source of human drinking water.*

Since the first review, the Lewis well is still not covered by an IC. Despite that results from the 2007 annual groundwater monitoring do not indicate any exceedances of MCLs, EPA is concerned that the property could transfer ownership without any notice to the transferee, EPA, or IDEQ and groundwater could be used as a drinking water source.

During the June 10, 2008, site inspection and interviews, Monsanto stated it believes it is not responsible for implementing an IC for the Lewis well since the Kerr-McGee site also contributed to the contamination. EPA may require Monsanto to implement an IC as a covenant under the state-adopted Uniform Environmental Covenant Act (UECA) or a functional equivalent.

### **5.1.2 Domestic Water Well Survey**

EPA requested that Monsanto also evaluate whether other domestic wells are present south of the site and may require ICs for protection. In June of 2005 Monsanto conducted a water well survey to evaluate whether other domestic wells may be present in the non-buffer area immediately south of the Monsanto site. Results of the survey were reported to EPA in late 2006. A January 23, 2007 EPA letter to Monsanto stated that Monsanto had fulfilled the requirement to locate other potential domestic wells in the area of concern and none were found.

## **5.2 Issue 2: Wind Dispersal of Dust from Onsite Material Piles**

The issue as stated in the first five-year review was: "Wind dispersal is occurring from the Monsanto site, and this may be contributing to increasing off-site contamination. EPA has determined this component of the Monsanto site remedy was not working as intended in the decision document." EPA requested that Monsanto submit a plan by February 1, 2004 to control wind dispersal from onsite material piles. This request directed Monsanto to include a sampling program to investigate areas offsite where <sup>226</sup>Ra soil concentrations were found to have increased prior to the first five-year review. The request also directed Monsanto to conduct the sampling portion of this plan no later than sixty days following EPA approval of the plan, and to promptly report all sampling results to affected property owners.

Multiple correspondences regarding the need to control dust dispersal from onsite piles have transpired between Monsanto and EPA since the first five-year review. The primary source-pile of concern to EPA is the UFS pile. In a series of letters and emails, Monsanto provided summaries of its efforts to limit fugitive dust and provided updates regarding what type of dust suppressant was being applied at the site and when those applications were occurring. EPA responses to Monsanto stated that both EPA and IDEQ expected more be done to control fugitive dust and indicated that both agencies would maintain greater involvement in Monsanto's development of a dust control plan. A SOP was submitted by Monsanto on July 3, 2008 describing how it will prevent wind dispersal of solids from the UFS pile, which must be finalized, approved by EPA, and prove over time to be effective.

During the site inspection on June 10, 2008, it was apparent that Monsanto had taken several steps towards achieving better control of dust emissions. The current UFS pile configuration consists of an active and inactive section. The active section is kept low to the ground and its size is minimized to maximize the inactive area which can be covered with dust suppressant. The top of the inactive section has been shaped into windrows to minimize dispersal, the top and non-road areas of the inactive section are covered with a dust suppressant consisting of Portland Type II cement, wood mulch, and water. Road areas of the inactive section are covered with magnesium chloride. During the 2008 site visit precipitation prevented visual observations regarding the effectiveness of the new dust suppressant measures.

A work plan to investigate  $^{226}\text{Ra}$  in soil was submitted to EPA on October 5, 2004. Monsanto increased the number of sampling stations from 59 (39 sample locations and 20 background locations) to 208 stations (188 sample locations and 20 background stations) and used geostatistical analyses to contour the 3.7pCi/g limit. Sample results were submitted to EPA on August 3, 2005. Results were transmitted to an affected property owner via a letter dated December 8, 2006 and EPA acknowledged Monsanto's fulfillment of the notification requirement in a letter dated January 23, 2007. Results of the 2004 sampling event are discussed in Section 6.3.2 and taken into consideration in Section 7.2 and 7.3.

### **5.3 Issue 3: MNA May Take Longer Underneath the Operating Area than Anticipated**

The issue as stated in the first five-year review was: "MNA for groundwater underneath the operating area may take longer than anticipated during the RI/FS, though this observation needs to be reevaluated during the next five-year review." However, at the time of this writing, and based on the second five-year review of groundwater prepared by Golder for Monsanto, MNA for most constituents in groundwater appears to be working as planned. Concentrations of constituents of concern in groundwater are either generally stable or decreasing and projected to meet remedial goals within about 20 years for most constituents. MNA for constituents in groundwater will continue to be monitored over the next five years to assess whether the timeline for MNA completion remains on schedule.

### **5.4 Related Technical Matters**

The follow-up action for each of the three related technical matters discussed below was for Monsanto, EPA, and IDEQ to engage in technical dialogue to resolve questions and concerns regarding the issues.

#### **5.4.1 Increasing Molybdenum Concentrations south of the Operating Area**

During the first five-year review molybdenum concentrations were noted to be increasing based on the general trend from 1991 to 2002, in TW-53 and Harris Well. As a result of technical dialogue with EPA, Monsanto agreed to include an assessment of molybdenum in wells and to evaluate trends and potential sources in the annual groundwater report. Results of these assessments are discussed in Sections 6 and 7. Increasing molybdenum concentrations continue to be a concern.

#### **5.4.2 Use of Total Nitrogen as Nitrate for Demonstrating Compliance with MCL**

At the time of the ROD, the MCL for nitrate was 44 mg/L. During the first five year-review nitrate was reported both as nitrate and as total nitrogen (N) (which has an equivalent remedial goal of 10 mg/L). Following the first five-year review EPA requested, and Monsanto agreed, to report nitrate only as NO<sub>3</sub>, rather than total nitrogen. Monsanto continues to report nitrate as total nitrogen in their annual reports. Monsanto has also adopted the use of 10 mg/L for nitrate as total nitrogen as the remedial goal for nitrate.

#### **5.4.3 Level of Detail for Sampling, Analyzing and Reporting Soda Creek Discharge Data**

EPA requested that Monsanto analyze surface water discharges to Soda Creek for hazardous substances at a level of detail consistent with ongoing groundwater data reporting. Effluent samples at the outfall to Soda Creek have been sampled since 2000. Upstream and downstream sample locations were added in 2001. Mormon Creek, which discharges into Soda Creek downstream of the outfall, was added in 2002. During the first five-year review insufficient data was collected to perform reliable statistical analysis. This analysis has since been added and is reported in the second five-year review. The results indicate that selenium exceeds the Idaho water quality criterion for aquatic life (IDAPA 58.01.02).

## 6 Five-Year Review Process

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### 6.1 Administrative Components of the Five-Year Review Process

The team for this five-year review effort included representatives from EPA, IDEQ, and Monsanto (see section 1.3 for identification of team members). As discussed in Section 1.3, potentially interested parties were notified of the five-year review with the intent of soliciting input on their concerns and observations that could inform the five-year review process. EPA did not receive any comments from the public.

EPA requested and approved a Monsanto work plan during October 2007 to provide EPA with the technical data necessary to complete the analyses required for this Report. The work plan consisted of a memorandum update of the 2002 work plan developed for the first five-year review. Sampling in support of this five-year review was conducted by Monsanto.

### 6.2 Document Review

The ROD, Consent Decree, annual groundwater monitoring data, soil sampling data, sediment sampling data, the first EPA five-year review, and the Monsanto second five-year review of sediment soils and groundwater were reviewed in support of this second five-year review.

### 6.3 Data Review

#### 6.3.1 Sediment Investigation

Sediment samples collected from Soda Creek and the Alexander Reservoir were evaluated for the second five-year review. The results were presented in the *Second CERCLA Five-Year Review Sediment Report – Final - Rev.0* (MWH, 2008b) and are included in Appendix A. These samples were located in approximately the same locations as sediments collected during the RI/FS and the first five-year review. They were analyzed for arsenic (As), cadmium (Cd), copper (Cu), nickel (Ni), selenium (Se), silver (Ag), vanadium (V), and polonium-210 (<sup>210</sup>Po). The ROD does not establish regulatory levels for the eight analytes but states that “Sediment samples should be collected to support the five year review assessment of whether contaminant concentrations are remaining stable or declining as predicted.”

##### 6.3.1.1 Alexander Reservoir

Table 6-1 summarizes analytical results as median concentrations from Alexander Reservoir sediments from the RI and the first and second five-year reviews (2002 and 2007, respectively). Nine sediment samples were collected from Alexander reservoir at the inlet of Soda Creek (the “affected sample” location as this is the water body into which Monsanto discharges its National Pollutant Discharge Elimination System (NPDES) permitted

discharge). The NPDES permit was written to control thermal loading to Soda Creek.; as such, only flow and temperature are regulated under the permit. EPA's Clean Water Act program has indicated that it has no plans to revise this permit in the foreseeable future. An additional nine samples were collected from the inlet of the Bear River for control purposes (Bear River is not affected by site releases).

**TABLE 6-1**  
Sediment Quality Summary in Alexander Reservoir

Analysis (mg/kg dw)	Control RI	Control 2002	Control 2007	Affected RI	Affected 2002	Affected 2007
As	2.4	1.9	2.9	5.9	3.6	9.6
Cd	0.30	0.46	0.60	8.9	2.8	4.8
Cu	6.7	5.1	7.3	6.4	5.9	7.5
Ni	8.0	7.2	9.0	20	11	17
Se	0.70	0.29	0.42	2.3	0.66	1.1
Ag	0.040	0.077	0.090	0.10	0.087	0.10
V	18	7.8	15	25	11	21
<sup>210</sup> Po	-	1.1	0.93	-	1.2	1.2

**Notes:**

Sample results presented are median values. All sediment results for the 2007 sampling event are found in Appendix A.

mg/kg dw = milligrams per kilogram dry weight

With the exception of <sup>210</sup>Po, median concentrations for each analyte appear to have increased to varying degrees since 2002. Statistical analyses involved the Kruskal-Wallis and Fisher's Least Significant Difference (LSD) tests. Based on these tests, MWH concluded that in the case of As, Cd, Se, Ag, and V the affected area remains elevated but these constituents are not increasing significantly. In the case of Ni and <sup>210</sup>Po, the affected area is not statistically elevated.

### 6.3.1.2 Soda Creek

Table 6-2 summarizes the sediment analytical results as median concentrations for Soda Creek from the RI and the first and second five-year reviews (2002 and 2007, respectively). Seven sediment samples were collected from the downstream reach of Soda Creek (the "affected sample" location as this is the water body into which Monsanto discharges its NPDES permitted discharge. An additional three samples were collected from the upstream and unaffected reach of Soda Creek for control purposes.

The median concentrations for most analytes (Cd, Cu, Ni, Ni, Se, Ag, V, and <sup>210</sup>Po) are generally less than the RI values or are comparable as in the case of Se. The 2007 arsenic results appear to have increased since the RI and 2002 results; however, using the Kruskal-Wallis and Fisher's Least Significant Difference (LSD) tests, MWH concluded these analytes including arsenic are not elevated or are not increasing.

TABLE 6-2  
Sediment Quality Summary in Soda Creek

Analysis (mg/kg dw)	Control RI	Control 2002	Control 2007	Affected RI	Affected 2002	Affected 2007
As	6.2	24	12	33	9.2	62
Cd	11	0.38	0.65	22	10	15
Cu	2.7	6.4	4.5	17	5.1	9.1
Ni	55	30	22	35	12	30
Se	0.60	0.79	0.60	3.5	3.3	4.0
Ag	0.10	0.14	0.049	1.6	0.11	0.22
V	23	50	41	100	41	87
<sup>210</sup> Po	0.67	0.96	0.92	1.2	2.0	1.2

Note: Sample results presented are median values. All sediment results for the 2007 sampling event are found in Appendix A.

### 6.3.2 Soil Investigation

A 10-year investigation was completed on surface soil by Monsanto in 2007 (MWH, 2007) and was reviewed by EPA as part of the second five-year review. The summary data presented in this section are detailed in Appendix B, *Second CERCLA Five-Year Review Soil Report – Rev. 1- Final*. Prior to this investigation, surface soil samples were collected from the site during the RI, the first five-year review, and in response to EPA's comments on Monsanto's first Five-Year Review Report. Soil samples collected in 1996 and 2002 were collected from 59 stations (39 and 20 background locations). In 2004, this monitoring network was expanded to 208 stations (188 and 20 background locations) to support geostatistical analyses for estimating contaminant extent over the 11-square mile project area. In 2007, it was determined that the number of stations could be reduced without affecting statistical results resulting in a total of 166 stations (146 and 20 background locations). Figure 3 (Monsanto Institutional Control Area and Soil Sampling Locations) and Figure 4 (Land Use, Topography, and Soil Sampling Locations) provides the distribution of soil sampling locations with respect to ICs and land usage, respectively.

Geostatistical modeling was applied by Monsanto to plot a contour of the remediation threshold (3.7 pCi/g) from which it can make time comparisons of <sup>226</sup>Ra concentrations over the affected area. Table 6-3 presents the percentage of the sampling results which exceeded the threshold for all sample results and investigations. The table provides data set statistics and grid estimate statistics. Grid estimates are included because sampling information is not spread uniformly over the study area causing clustering of the data. Grid estimates are a strategy for avoiding uneven weighting of sample information. Additional information about these methods is provided in Appendix B.

**TABLE 6-3**  
Summary Statistics for Soil Sampling

Exceedance Level = 3.7 pCi/g	Data Sets			Grid Estimates		
	Average Value	Average Value Above 3.7 pCi/g	Percentage of Samples above 3.7 pCi/g	Average Value	Average Value Above 3.7 pCi/g	Percentage of Samples above 3.7 pCi/g
1996 39 stations	3.96	9.77	26.3	3.15	5.19	19.0
2002 39 stations	2.87	7.95	21.1	2.08	4.35	1.4
2004 39 stations	3.35	6.57	30.8	2.69	4.14	6.5
2007 39 stations	2.63	7.2	21.1	2.08	4.38	1.8
2004 188 stations	2.90	6.29	20.1	2.52	4.47	9.7
2004 188 stations and land use boundaries				2.61	4.51	13.8
2007 146 stations	2.09	7.16	9.6	1.80	4.29	2.4
2007 146 stations and land use boundaries				1.92	4.30	3.5

A review of the data sets shows the average value of samples collected in 2007 is 25 to 30 percent lower than samples collected in 2004, and the percentage of samples that exceeded 3.7 pCi/g (the remediation goal) in 2007 is 45 to 50 percent lower than 2004.

During the first five-year review EPA noted that two locations (MS2-24 and S-01) outside the site exceeded 3.7 pCi/g. In 2004, there were 20 locations outside the site that exceeded 3.7 pCi/g; one to the northwest; seven to the northeast; and 12 to the east and southeast of the site. In 2007 six locations outside the site exceeded 3.7 pCi/g; two to the northeast and four to the east and southeast.

Using geostatistics, 3.7 pCi/g <sup>226</sup>Ra contours were predicted for the 2004 and 2007 sampling data. Data collected in 2004 predicted two areas of <sup>226</sup>Ra concentrations above 3.7 pCi/g. In 2004, the area located to the north of the Monsanto site was not fully delineated by the number and location of samples collected. The area to the south and southeast of the Monsanto site was located primarily in the Soda Springs City Industrial Park and the Kerr-McGee site. The ROD determined no action was necessary for the City Industrial Park. Data collected in 2007 was used to develop contour lines of predicted <sup>226</sup>Ra concentrations in excess of 3.7 pCi/g. Two are located to the northwest and northeast of the Monsanto site; one is located south of the Monsanto site, on the City Industrial Park property. Although there are a few individual sampling locations that exceed 3.7 pCi/g outside the IC-covered properties, looking at the data geostatistically, the contour lines suggest that concentrations greater than 3.7 pCi/g are consistent with the current IC boundaries. The values of the parameters noted above for 1996 to 2007 are similar to the values of those parameters for

1996 to 2002, suggesting actions taken by Monsanto since the last five year review appear to be effective at preventing soil concentrations from increasing.

EPA has concluded from these results that the IC boundaries continue to be protective, but that the status of the areas to the northeast, south, and northwest of the site should continue to be addressed as part of future five-year reviews. In response, EPA has required Monsanto to prepare a wind dispersal prevention plan. A draft was submitted to EPA on July 3, 2008. This plan must be finalized, approved by EPA, and prove over time to be effective.

### **6.3.3 Groundwater Investigation**

The ROD established the points of compliance (POC) for annual and five-year review monitoring. The POC wells subject to annual and five-year review monitoring are as follows:

- Production Wells: PW-01, 02 and 03
- South Plant Fence Line: TW-20, 34, 35 and 39
- Southern Plant Boundary: TW-53, 54, 55 and Harris well
- Soda Creek

The ROD also required the following activities:

- Review and assess groundwater and outfall monitoring data (collected and evaluated at least annually), and
- Compare groundwater and outfall quality and extent of constituent plumes to regulatory levels, remediation goals, and groundwater modeling projections. Assess if/when remediation goals have been achieved, and, if not, that institutional controls are still in place and effectively preventing human exposure, and whether trends warrant continuing MNA without additional remediation or source investigation.

#### **6.3.3.1 Groundwater POC & Institutional Controls**

Based on the June 2007 sampling results, most POC wells are below remediation goals for the COCs. For fluoride, all POC wells are below remediation goals. However, cadmium exceeded the remediation goal of 0.005 mg/L at three POC wells (PW-01, TW-20, and TW-39), manganese at TW-34, selenium at five POC wells (TW-20, 39, 53, 54 and Harris well), and nitrate, as N at TW-20. Increasing concentrations of sulfate were observed in samples collected at TW-35, TW-53 and from the Harris well based on constituent trends from 1991 to 2007.

EPA concludes from this groundwater data that institutional controls necessary to prevent potential groundwater exposures in the southern portion of the Monsanto site are effective at this time, except for the Lewis well that lacks an IC; however, this well currently does not exceed MCLs.

#### **6.3.3.2 Groundwater Observations in the Operating area and Non-POC Wells and Springs**

Appendix C presents Monsanto's second five-year groundwater report that provides a detailed presentation of all groundwater results. In addition to the COCs listed in the ROD, chloride, molybdenum, and sulfate were analyzed and documented in this report. The

following non-POC wells and springs were also monitored for the purpose of determining trends:

- Production well: PW-04
- Northwest Pond area wells: TW-16, 17, and 18
- Old Underflow Solids Ponds Area Wells: TW-22, 24, 37, and 45
- Old Hydroclarifier Area Wells: TW-40 and 44
- UBZ-2 springs: Mormon A Spring
- Wells and springs south of Plant: Calf Spring, Lewis well, and Homestead Spring

Wells in the operating area have experienced both an increase and decrease in COC concentrations over the past five years depending on location and COC. The general trend appears to be decreasing and or stable concentrations. Increases in some COC concentrations have been observed in the some wells and springs, many of which are located near closed waste handling areas or refitted production units. Table 6-4 presents these COC concentrations showing changes over the years 1991, 2001, and 2007.

**TABLE 6-4**  
COC Increases in Operating Area and Non-POC Wells and Springs for Years 1991, 2001, and 2007

Location	1991	2001	2007	Remedial Goal (mg/L)
<b>Manganese (mg/l)</b>				<b>0.18</b>
TW-17 (NW Pond Well) <sup>a</sup>	1.365	2.15	2.55	
TW-18 (NW Pond Well)	0.29	0.38	0.4	
<b>Nitrate (mg/l)</b>				<b>10.0</b>
TW-37 (UFS Pond Well)	5.5	7.1	10.8	
Mormon A Spring	2.8	5.95	9.22	
Homestead Spring	5.5	5.87	14.3	
<b>Selenium (mg/l)</b>				<b>0.05</b>
Mormon A Spring	0	0.2	0.27	

<sup>a</sup> No Mn data are available for TW-17 for 1991. Mn concentration shown for TW-17 for 1991 was collected in 1992.

As discussed in Section 5.1, since the first five-year review no IC has been implemented at the Lewis well. The Lewis well has exceeded one MCL, selenium in 2005. Since the first five-year review, no COCs have been detected above MCLs. The well is reportedly used exclusively for irrigation purposes and not for drinking. However, these limitations remain wholly voluntary, and in the absence of an enforceable IC, EPA may require Monsanto to implement an IC, presumably a covenant under the UECA recently adopted by Idaho, or a functional equivalent if future monitoring of the Lewis well begins to exceed the remedial goals.

Selenium concentrations remain above the remediation goal and state water quality standards in Mormon Creek. Concentration trends for molybdenum and sulfate are stable or declining in most non-POC wells with some exceptions including increasing concentrations of sulfate in samples collected at TW-35 based on constituent trends from 1991 to 2007, and the discovery of increasing molybdenum concentrations in groundwater samples collected from TW-53 and from PW-04.

As discussed previously, groundwater contamination plumes are within the UBZ at two to three plant operating area locations, depending on the COC. Based on Monsanto's second five-year groundwater report, the following can be said of these plume areas:

#### **UBZ-4**

Selenium in the UBZ-4 source area (NW ponds) appears to be attenuating. The Monsanto production wells appear to control the leading edge and prevent additional spreading of the selenium plume. Molybdenum in the UBZ-4 area is possibly caused by the Kerr-McGee site. It is also possible that the molybdenum plume in UBZ-4 is from Monsanto's hydroclarifier and/or the Kerr-McGee site.

#### **UBZ-3**

Molybdenum in the UBZ-3 area is possibly caused by the Kerr-McGee site, assuming there are no hydraulic barriers between Kerr-McGee site and the UBZ-3 plume.

#### **UBZ-2**

Selenium concentrations in the source areas appear to be attenuating but in UBZ-2 selenium may be spreading at the leading edge of the plume. Examples of possible selenium increases include the Harris Well, Mormon A spring, south boundary well TW-54, TW-55, and south fence line well TW-20. The degree to which the concentrations are increasing in the area of the leading edge are unclear given the sharp declines in selenium observed in 2007 at several locations. This decrease was correlated to a drop in rainfall in 2007 compared to preceding years. MNA still appears to be an appropriate remedy, but special attention should be paid to the southwest portion of the UBZ-2 plume. The source of molybdenum in the UBZ-2 plume appears to be in the vicinity of the old UFS Ponds. Similar to selenium, the molybdenum plume appears to be spreading at the leading edge, but all of its concentrations are below the risk based concentration of 0.18 mg/l. As with selenium, MNA still appears appropriate remedy for molybdenum.

### **6.3.4 Plant Compliance Review**

For this second five-year review, EPA conducted a search of the Monsanto plant through its Online Tracking Information System (OTIS). OTIS is a collection of search engines which enables EPA to access a wide range of data relating to enforcement and compliance. OTIS reported that during the last five years, the Monsanto site has been in compliance with its existing air operating permit (Title V, PSD, NESHAP, and SIP), with the conditions of its NPDES water discharge permit (Base Program and storm water),<sup>2</sup> with RCRA large generator requirements, and with Toxic Release Reporting requirements. Figure 5 (Monsanto Facility Map) provides the facility layout and locations of material piles and ponds regulated under the above listed permits.

## **6.4 Site Inspection and Interviews**

Representatives for EPA Region 10 and IDEQ visited the Monsanto site on June 10, 2008, for the second five-year review site visit. Monsanto and several of its consultants participated in the site visit and were interviewed. Attendees of the site visit and subsequent conference

<sup>2</sup> Monsanto's NPDES has expired. This permit will be renewed at a future date. However, the facility complies with the existing permit requirements (temperature and flow).

call/interview are listed in Section 1.3. The site inspection lasted approximately two hours. The temperature was in the high 40s to low 50s and it was raining.

During the inspection the following areas were observed: underflow solids pile; a new landfill for lime used in SO<sub>2</sub> removal process; active ponds (water for transport and processing); municipal landfill; treater dust stockpile and nodule stockpiles; recycling operations; plant operations; slag pile; settling pond to Soda Creek; portions of Soda Creek between the site and Soda Springs; the Soda Creek and Bear River discharges into Alexander Reservoir; and the Lewis well and four new monitoring wells installed south of the site. The post-inspection conference call/interview began immediately after the inspection and lasted 90 minutes. During the interview Monsanto responded to questions regarding the sediment, soil, and groundwater reports; handling of the UFS pile; site environmental issues since the first five-year review; documentation of compliance with environmental requirements; and ICs for the Lewis well.

## 6.5 Institutional Control Review

IC's for both groundwater and soil have been recorded with the State of Idaho's Caribou County. The documents, Environmental Protection Easements and Declaration of Restrictive Covenants, were recorded with the County in 1998, 1999, and 2002. The documents have been signed by the property owners and officers of the various Monsanto entities. Figures 2 and 3 and 5 depict the area where these ICs are recorded. The restrictive covenant states the property shall not be used or developed for any residential use, including but not limited to single and multiple family dwelling units and other facilities used for living quarters. Additionally, affected ground water underlying the property shall not be consumed until EPA certifies that ground water beneath the property meets the performance standards. The environmental protection easement states that the Grantor grants to the Grantee, the United States, the State of Idaho and their representatives, including, but not limited to, EPA and its contractors a continuing right of access to the property to enforce the land use restrictions and conduct any related activity required by the RD/RA CD entered on June 29, 1998.

The ROD required a review of land use and institutional controls for all soil grids surrounding the plant which contain <sup>226</sup>Ra concentrations greater than the remediation goal of 3.7 pCi/g based on a statistically valid sampling program. As a result of the review, Monsanto purchased either the property or an environmental easement for agricultural lands that exhibited elevated concentrations of <sup>226</sup>Ra and established recorded land use ICs to prevent residential use of contaminated areas and so prevent exposures that could pose unacceptable risks. Although a few individual sample points have exceeded the remediation goal 3.7 pCi/g outside the IC boundary, EPA has determined that the ICs continue to be protective. The locations of individual sample points that have exceeded the remediation goal outside the IC boundary have varied during the four sampling events (1996, 2002, 2004, and 2007), but generally occurred to the north northeast and to the west southwest of the IC boundary. Many of the exceedances to the west southwest are located on the Kerr-McGee property or within the City Industrial Park property. There has been no significant change of land use (e.g., agricultural land being developed for residential use) within the Monsanto buffer area since the first five-year review.

A search for domestic wells in the non-buffer area immediately south of the Monsanto site has been conducted since the first five-year review. The search potentially located three wells; the Lewis well, the Fan Corp. well, and the Ref Chem well. Subsequent research concluded that although Fan Corp. was identified as holding water rights contact with the property owner indicated that the well has never been installed at this site. The Ref Chem well was decommissioned. Based on these findings, EPA notified Monsanto, in a letter dated January 23, 2007, that it had fulfilled the requirement to locate other (aside from the Lewis well) offsite domestic wells and did not require additional ICs to be implemented. Discussions for bringing the Lewis well under ICs are ongoing, and EPA may require Monsanto to bring the well under an IC to more effectively ensure the elimination of potential human drinking exposure.

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# 7 Technical Assessment

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This section provides information regarding the protectiveness of the remedy selected by the ROD for the Monsanto site. The selected remedy consisted of the following actions:

1. MNA with ICs for contaminated groundwater;
2. Either ICs or soil excavation on buffer properties not owned or controlled by Monsanto, at the discretion of the property owner, for contaminated soil;
3. No further action (NFA) for operating area source piles and materials subject to continued operations and ongoing five-year reviews; and
4. NFA for air, surface water, and Soda Creek sediments.

The following technical assessment of the remedy examines the following three questions:

- **Question A:** Is the remedy functioning as intended by the decision documents?
- **Question B:** Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection still valid?
- **Question C:** Has any other information come to light that could call into question the protectiveness of the remedy?

## 7.1 Question A: Is the remedy functioning as intended by the decision documents?

Yes, review of documents, data, and the results of site inspection indicates the remedy is generally functioning as intended by the ROD although there are some uncertainties that warrant continued attention.

### 7.1.1 MNA with ICs for Contaminated Groundwater

The chosen remedy for groundwater is MNA with institutional controls. EPA has determined the MNA with IC for contaminated groundwater is generally functioning as intended. Continued annual groundwater monitoring is required by EPA during the next five-year review to confirm that COCs continue to decline at the predicted rate.

#### 7.1.1.1 UBZ-2 Plume

Monsanto monitors groundwater quality annually in the POC wells and springs in this region, and also monitors water quality in several other wells and springs in the UBZ-2 zone. According to Monsanto's second five-year groundwater report:

- Nitrate concentrations are generally stable or decreasing at the POC wells, except for TW-20, TW-54, and the Harris Well.

- Fluoride concentrations in the downgradient wells are generally stable or decreasing, with the exception of TW-20, Fluoride remains below the remedial goal in all downgradient wells.
- Manganese meets the remedial goals at all point of compliance wells and has generally stable or decreasing concentrations in the wells in the UBZ-2 zone. Manganese in TW-34 is the result of the upwelling of sodic water from the LBZ.
- Selenium concentrations exceed the remedial goal in several of the fence line wells and southern boundary wells (TW-20, TW-39, TW-53, and TW-54)
- Cadmium meets the remedial goals at all POC wells except for TW-20 and TW-39. Exceedances at these wells are believed to be temporary as a result of cadmium-chloride or cadmium sulfate complexes related to elevated chloride and sulfate concentrations from the Old UFS Ponds. Cadmium is generally stable or decreasing in the remaining wells in the UBZ-2 zone.

Based on the results of the annual groundwater sampling and modeling, Monsanto has concluded that concentrations of the COCs that are not retarded (manganese and cadmium) either currently meet the groundwater remedial goals or are anticipated to meet them within the next 20 years. While generally agreeing with Monsanto's conclusions, EPA notes that selenium (and molybdenum) concentrations have recently increased in several of the POC wells, which taken together with other COC level fluctuations raise some questions about MNA and MNA rates that warrant continued attention and detailed evaluation in the next five year review. With those caveats, EPA generally concludes the remedy is functioning as intended in the UBZ-2 zone.

#### 7.1.1.2 UBZ-4 Plume

Monitored natural attenuation is also the chosen remedy for UBZ-4. Monsanto monitors groundwater quality annually in the POC wells (plant production wells), and also monitors water quality in several other wells in the UBZ-4 zone. According to Monsanto's second five-year groundwater report:

- Fluoride and nitrate meet the remedial goals in the POC wells.
- Selenium concentrations meet the remedial goal in all production wells
- Manganese concentrations meet the remedial goals in all of the plant production wells
- Cadmium concentrations meet the remedial goals in PW-02 and PW-03. Cadmium concentrations exceed the remedial goal in PW-01; however, cadmium concentrations have a significant decreasing concentration trend. Cadmium is highly retarded and may take tens of years to meet the remedial goal.

Based on the results of the annual groundwater sampling Monsanto concluded, concentrations of fluoride, nitrate, and selenium that are not retarded and manganese currently meet the remedial goals. The concentrations of cadmium, a highly retarded constituent, may take years to meet remedial goals. The continuous pumping of the plant production wells contains affected groundwater and prevents off-site migration. Monsanto

has committed to continue the annual monitoring of the POC wells and other wells and springs in the UBZ-4 region.

EPA concurs the selected remedy of that MNA in conjunction with containment by the plant production wells and ICs is functioning as intended for the UBZ-4 zone.

Institutional controls are in place in the UBZ-2 and UBZ-4 zones to restrict the use of groundwater that may not meet the remedial goals. The ICs in place include the following:

- Monsanto has purchased property downgradient of the plant site, including properties with wells that were impacted by the site releases in UBZ-2. Access to these properties is controlled and the properties will not be developed. No wells will be developed on these properties and access to the springs on these properties is restricted.
- Monsanto supplied drinking water from the Soda Spring's municipal system to the one downgradient residence with a domestic well that was impacted by the Monsanto site (the Lewis well). Reportedly the well is no longer used for consumption. Regardless, if COC concentrations increase or the plume expands, EPA will require Monsanto to implement an additional IC at the Lewis well, presumably as a covenant under the Uniform Environmental Covenant Act (UECA) recently adopted by Idaho.

EPA concludes that ICs in place south of the plant are an appropriate remedy and are functioning as intended. Affected groundwater from this area is not being used for domestic purposes, and controls are in place to prevent future development of groundwater in this area, however, if COC levels increase, or the plume of impacted groundwater expands additional action such as ICs over a wider area may be necessary.

### **7.1.2 ICs or Soil Excavation on Buffer Properties Not Owned or Controlled by Monsanto**

This remedy has functioned as intended and Monsanto has addressed contaminated soils on non-industrial property. As required by EPA, properties were cleaned up via excavation or subjected to ICs.

### **7.1.3 No Further Action (NFA) for Operating Area Source Piles and Materials Subject to Continued Operations and Ongoing Five-Year Reviews**

Wind dispersal of dust from onsite material piles was an issue from the first five year review that had not been fully addressed at the time this second review was begun. However, during the site inspection on June 10, 2008, it was apparent that Monsanto had implemented several steps towards achieving better control of dust emissions from source piles. The current UFS pile configuration consists of an active and inactive section. The active section is kept low to the ground and its size is minimized to maximize the inactive area which can be covered with dust suppressant. The top of the inactive section has been shaped into windrows to minimize dispersal, the top and non-road areas of the inactive section are covered with a dust suppressant consisting of Portland Type II cement, wood mulch, and water. Road areas of the inactive section are covered with magnesium chloride.

EPA concludes that this remedial action should continue to be evaluated as part of future five-year reviews. EPA has also required Monsanto to prepare a wind dispersal prevention plan. A draft was submitted to EPA on July 3, 2008. This plan must be finalized, approved by EPA, and prove over time to be effective.

#### **7.1.4 NFA for Air, Surface Water, and Soda Creek Sediments**

The ROD eliminated surface water from remedial action since no COC exceeded RBCs. This issue is discussed further in response to Question "B"

## **7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection still valid?**

This question cannot be fully answered pending further information regarding the applicability of a new (2003) State water quality standard for selenium for protection of aquatic life, which is lower than the ROD cleanup goal for selenium in groundwater and is exceeded in several downgradient surface water sampling locations.

### **7.2.1 Exposure Assumptions**

The land use of the operating facility and surrounding areas has not changed. With the potential exception of the Lewis Well, ICs are in place and functioning as intended. Molybdenum, which in the RI/FS and ROD was attributed to releases from the nearby Kerr-McGee facility, has been detected at increasing concentrations in some wells, and as mentioned in Section 6, there could be a source at Monsanto. If concentrations do not decrease soon, additional work with respect to molybdenum may be required. There are no additional sources of contamination or physical features of the property that would change the existing exposure assumptions.

### **7.2.2 Toxicity Data**

There have been no changes in the toxicity of COCs associated with this site.

### **7.2.3 Cleanup Levels**

There has been one change to cleanup levels which indicates the remedy is not be currently protective of aquatic life in surface water. The ROD eliminated surface water from remedial action since no COC exceeded RBCs. As it said in the ROD *"Except for nitrate, none of the elevated contaminants found in Soda Creek downstream of the effluent discharge exceeded preliminary human health or ecological risk-based screening criteria."*

However, in April 2000, the state of Idaho established water quality criteria under Sections 39-105 and 39-3601 of the Idaho Code. The implementing regulations are IDAPA 58.01.02. In 2003, Idaho established water quality standards for selenium that includes a limit of 5 ppb for protection of cold water aquatic life. Levels of selenium measured in area creeks and springs (Mormon A, Calf, Southwest, and Homestead) exceed this standard. The only ROD cleanup goal for selenium is for groundwater and based on a much higher MCL for protection of human health

EPA requested that Monsanto analyze surface water discharges to Soda Creek for hazardous substances at a level of detail consistent with ongoing groundwater data reporting. Effluent samples at the outfall to Soda Creek have been sampled since 2000. Upstream and downstream sample locations were added in 2001. Mormon Creek, which discharges into Soda Creek downstream of the outfall, was added in 2002. During the first five-year review insufficient data was collected to perform reliable statistical analysis. This analysis has since been added and is reported in the second five-year review. The results indicate that selenium exceeds the Idaho water quality criterion for protection of aquatic life and that Monsanto is comparing the selenium result to the groundwater remediation goal of 50 ppb instead of the surface water criterion of 5 ppb.

To evaluate and determine the applicability and impact of the standard and what, if any, changes need to be made to the cleanup goals and/or the selected remedy, EPA needs further information about selenium levels in downgradient surface water, surface water characteristics and aquatic life, and the requirements of the standard. After that, if the new standard for surface water needs to be adopted, further evaluation will be needed to determine whether the groundwater remedy can address the selenium in surface water in a reasonable timeframe, to identify and evaluate other remedial alternatives, and identify options to provide protectiveness in the interim.

Otherwise, the remedial goals for COCs in groundwater are MCLs for cadmium, fluoride, nitrate, and selenium and a risk-based concentration for manganese. MCLs have not changed and are still valid for groundwater at the site for protection of human health. Similarly, the risk-based goal for manganese has not changed and is still valid.

### **7.2.3 Remedial Action Objectives**

The ROD eliminated surface water from remedial action since at the time it was prepared no COC exceeded RBCs and the state selenium standard did not exist. Pending the results of the evaluation discussed in the previous section, this objective may need to be reconsidered.

## **7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

There is no other information that has been reviewed for this second five-year review that calls into question the protectiveness of the remedy.

## **7.4 Technical Assessment Summary**

The State of Idaho's recently (2003) established water quality standards for selenium that includes a limit of 5 ppb for protection of cold water aquatic life. Levels of Selenium measured in area springs (Mormon A, Calf, Southwest, and Homestead) exceed this standard and the only ROD cleanup goal for selenium is for groundwater and based on a much higher MCL for protection of human health. The ROD selected NFA for surface water because all COCs were below the MCLs and ecological screening levels available at the time. To evaluate and determine the applicability and impact of the standard and what, if any, changes need to be made to the cleanup goals and/or the selected remedy, EPA needs

further information about selenium levels in downgradient surface water, surface water characteristics and aquatic life, and the requirements of the standard. After that, if the new standard for surface water needs to be adopted, further evaluation will be needed to determine whether the groundwater remedy can address the selenium in surface water in a reasonable timeframe, to identify and evaluate other remedial alternatives, and identify options to provide protectiveness in the interim. There is also some concern for increasing molybdenum concentrations in some wells; however, molybdenum was not identified as a COC at the time of the ROD, and may be migrating from the adjacent Kerr McGee site. Molybdenum is a COC at the Kerr McGee site.

Review of documents, data, and the results of site inspection indicates that, subject to the water quality standard evaluation, the remedy is generally functioning as intended by the ROD, although there are some uncertainties that warrant continued attention, including: whether the MNA remedy can achieve cleanup goals in a reasonable timeframe, and wind-blown migration from on-site material piles to surrounding soils. Furthermore, if COC levels increase or the plume of impacted groundwater expands additional action such as ICs over a wider area may be necessary.

There is no other new information that could call into question the protectiveness of the remedy.

## 8 Issues

Outstanding issues identified by the second five-year review have been described in detail elsewhere in this report and are summarized below:

- Levels of Selenium measured in area springs (Mormon A, Calf, Southwest, and Homestead) exceed the State of Idaho's recently (2003) established water quality standards for selenium for protection of cold water aquatic life. The only ROD cleanup goal for selenium is for groundwater and based on a much higher MCL for protection of human health. The ROD selected NFA for surface water because all COCs were below the MCLs and ecological screening levels available at the time. To evaluate and determine the applicability and impact of the standard and what, if any, changes need to be made to the cleanup goals and/or the selected remedy, EPA needs further information about selenium levels in downgradient surface water, surface water characteristics and aquatic life, and the requirements of the standard.
- Selenium and other COC concentrations are increasing in some groundwater wells and springs which calls into question whether the MNA remedy can achieve cleanup goals throughout the Site in a reasonable timeframe.
- Wind dispersal of dust and particulates may be contributing to offsite contamination. While Monsanto has made some changes at the facility and submitted to EPA a SOP to control wind dispersal of dust and particulates originating from the on-site material piles to EPA, the plan must be finalized, approved by EPA, and prove over time to be effective.

Table 8-1 summarizes the issues identified during this second five-year review and indicates whether the issue currently affects the protectiveness or could affect the protectiveness in the future.

**TABLE 8-1**  
Summary of Issues

Issues	Affects Current Protectiveness	Affects Future Protectiveness
1) Levels of Selenium measured in area springs (Mormon A, Calf, Southwest, and Homestead) exceed the State of Idaho's recently (2003) established water quality standards for selenium for protection of cold water aquatic life; need more information to determine if applicable and affects protectiveness.	To Be Determined	To Be Determined
2) Selenium and other COC concentrations are increasing in some groundwater wells and springs which calls into question whether the MNA remedy can achieve cleanup goals throughout the Site in a reasonable timeframe.	No	Yes
3) Wind dispersal of dust and particulates may be contributing to offsite contamination.	No	Yes

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## 9 Recommendations and Follow-Up Actions

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The following recommendations and follow-up actions are based on the findings of the second five-year review:

- To evaluate and determine the applicability and impact of the State of Idaho's recently (2003) established water quality standards for selenium and what, if any, changes need to be made to the cleanup goals and/or the selected remedy, EPA needs further information about selenium levels in downgradient surface water, surface water characteristics and aquatic life, and the requirements of the standard. After that, if the new standard for surface water needs to be adopted, further evaluation will be needed to determine whether the groundwater remedy can address the selenium in surface water in a reasonable timeframe, to identify and evaluate other remedial alternatives, and identify options to provide protectiveness in the interim.
- Annual groundwater and surface water monitoring should continue and MNA effectiveness should continue to be evaluated over the next five years, and if not effective, additional remedial actions need to be evaluated;
- Monsanto's wind dispersal prevention plan was submitted to EPA on July 3, 2008. The plan must be finalized, approved by EPA, and prove over time to be effective.

TABLE 9-1

## Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Milestone Dates (Responsibility)	Affects Protectiveness	
			Current	Future
1	a) To evaluate and determine the applicability and impact of the State of Idaho's recently (2003) established water quality standards for selenium and what, if any, changes need to be made to the cleanup goals and/or the selected remedy, EPA needs further information about selenium levels in downgradient surface water, surface water characteristics and aquatic life, and the requirements of the standard	June 2009 (Monsanto with EPA Oversight)	To Be Determined	To Be Determined
1	b) If after completing action #1a new standard for surface water needs to be adopted, further evaluation will be needed to determine whether the groundwater remedy can address the selenium in surface water in a reasonable timeframe, to identify and evaluate other remedial alternatives, and identify options to provide protectiveness in the interim.	If necessary, December 2009 (Monsanto with EPA Oversight)	To Be Determined	To Be Determined
2	MNA effectiveness should continue to be evaluated over the next five years, and if not effective, additional remedial actions need to be evaluated	2012 (during next 5 year-review sampling event) (Monsanto with EPA Oversight)	No	Yes
3	Implement EPA-Approved SOP for wind dispersal prevention	June 2009 (Monsanto with EPA Oversight)	No	Yes
3	Using soil sampling data from surrounding properties, evaluate effectiveness of wind dispersal prevention plan	September 2013 (Monsanto with EPA Oversight)	No	Yes

# 10 Protectiveness Statement

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A protectiveness determination cannot be made at this time for the Monsanto site until further information is obtained. Further information will be obtained by evaluating selenium levels in downgradient surface water, surface water characteristics and aquatic life, the applicability of the standard and, as necessary, the ability of and timeframe for the current remedy to achieve the standard. It is expected that these actions will take approximately 15 months to complete, at which time a protectiveness determination will be made.

**Human Exposure Environmental Indicator** Status for the Monsanto Site remains “Under Control” because exposures that could pose an unacceptable risk are being controlled through Institutional Controls on surrounding properties and through compliance with OSHA worker health and safety requirements at the operating facility.

**Groundwater Migration Environmental Indicator** Status for the Monsanto site “Under Control” because exposures that could pose an unacceptable risk are being controlled through continued pumping of the four Monsanto production wells and some natural attenuation is occurring.

**Cross Program Revitalization Measure Status:** The Site is considered “protective for people under current conditions” due to Institutional Controls on surrounding properties and through compliance with OSHA worker health and safety requirements at the operating facility, and the site is in continued use as an operating industrial facility.

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# 11 Next Review

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The next Five-Year Review for the Monsanto site is required by September 2013.

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## 12 References

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- Golder Associates. 1995. *Phase II Remedial Investigation Memorandum on Fate and Transport Modeling, Monsanto Elemental Phosphorus Plant, Soda Springs, Idaho*. Prepared for Monsanto Chemical Company by Golder Associates, Inc., Redmond, Washington. October 5.
- \_\_\_\_\_. 2007. *2007 Summary Report, Groundwater Conditions at the Soda Springs Plant, Soda Springs, Idaho*. Prepared for Monsanto Chemical Company by Golder Associates, Inc., Redmond, Washington.
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- Montgomery Watson Harza (MWH). 2007. *P4 Production Monsanto Elemental Phosphorus Plant Second CERCLA Five-year Review Soil Report – Rev. 1- Final* Prepared for Monsanto.
- \_\_\_\_\_. 2008a. *Second CERCLA Five-Year Review Soil Report – Rev. 1- Final*. Prepared for P4 Production Monsanto Elemental Phosphorus Plant. July 2008.
- \_\_\_\_\_. 2008b. *Second CERCLA Five-Year Review Sediment Report – Final – Rev. 0*. Prepared for P4 Production Monsanto Elemental Phosphorus Plant. United States Census Bureau. 2008. <http://factfinder.census.gov>. Accessed June 2008.
- United States Environmental Protection Agency. 1997. *EPA Superfund Record of Decision: Monsanto Chemical Co. (Soda Springs Plant)*. EPA ID IDD081830994. EPA/ROD/R10-97/049.
- \_\_\_\_\_. 2003. *First Five-Year Review Report for Monsanto Chemical Co. (Soda Springs Plant), Caribou County, Idaho*. September 2003.

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**EPA to Review Cleanup at Monsanto  
Superfund Site in Soda Springs, Idaho  
Your Input Invited Through June 2, 2008**

The U.S. Environmental Protection Agency (EPA) is planning the second five-year review of the Monsanto Superfund site to make sure the cleanup continues to protect people and the environment. We welcome your participation during our review.

The last five-year review of the Monsanto cleanup found the remedy protects human health and the environment. Prohibitions on well drilling and land use restrictions have prevented people from contacting groundwater and soil contaminants. However, for the remedy to stay protective for many years, the review directed EPA to study whether the migration of groundwater contamination is being controlled by using the on-site production wells. The review also directed Monsanto to submit a plan to upgrade its wind dispersal program, and to evaluate whether concentrations of radium 226 have increased in surrounding off-site soils.

**How You Can Help**

Living near the site, you may see things helpful to EPA's review team. We would like to learn of any problems that could be related to the site. For example, you may have observed unusual windblown dust clouds from the plant, human or animal sickness from drinking groundwater or eating grasses and plants close to the site, or new houses or wells built next to the plant. EPA is not aware of such reports, but we want to make sure our review is thorough. To provide input, contact **Mark Ader**, Project Manager, by **June 2** at 800-424-4372, x1849; e-mail: [ader.mark@epa.gov](mailto:ader.mark@epa.gov).

**For More Information**

If you have questions or want your name added to EPA's mailing list, contact **Mark Ader**, or **Debra Sherbina**, Community Involvement Coordinator, at 800-424-4372, x0247; e-mail: [sherbina.debra@epa.gov](mailto:sherbina.debra@epa.gov). Documents associated with the cleanup are at the Soda Springs Public Library, 149 S. Main St.; 208-547-2606.

To learn more about Monsanto, visit [www.epa.gov/r10earth](http://www.epa.gov/r10earth), click on *A to Z Subject Index*, then *M*. TTY users may call the Federal Relay Service at 800-877-8339 and give the operator Mark Ader's phone number.



Figure 1

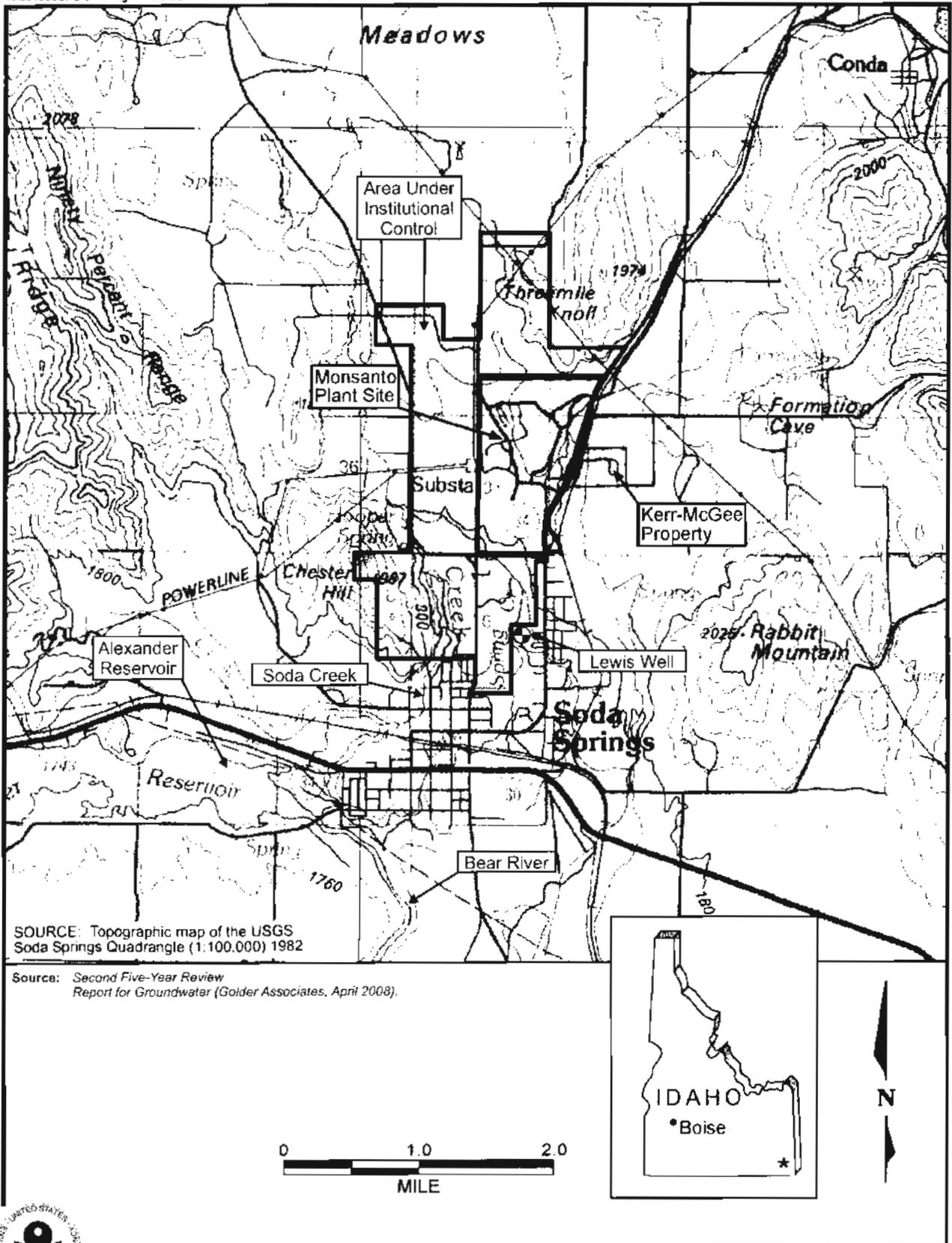
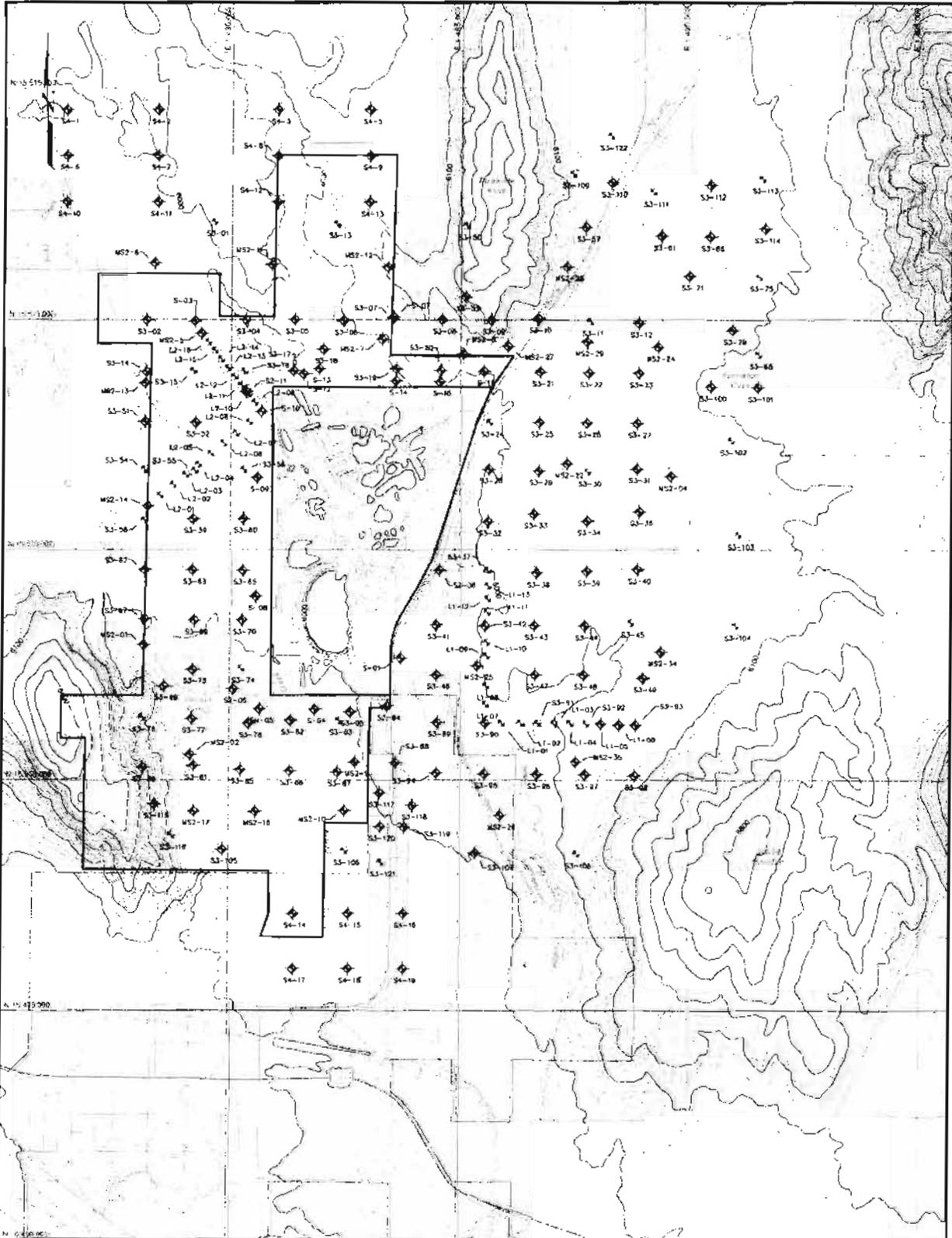


Figure 2

MONSANTO PLANT VICINITY MAP  
SECOND FIVE-YEAR REVIEW





Source: Revised CERCLA Five-Year Review  
Soil Report - Rev. 1 - Final (dWH, July 2008)



**LEGEND**

- CONTOURS
- MAJOR ROADS
- SECONDARY ROADS
- ◆ OCTOBER 2007 SAMPLING STATIONS
- ◇ DISCONTINUED SAMPLING STATIONS
- - - MUNICIPAL BOUNDARY
- SITE BOUNDARY
- RAIL ROADS
- LAND UNDER INSTITUTIONAL CONTROL BY MONSANTO

**NOTES:**

- 1 TOPOGRAPHY IS FROM USGS DIGITAL ELEVATION MODELS (DEM) 24K FOR SODA SPRINGS, ID.
- 2 TOPOGRAPHY PROJECTION IS UTM ZONE 12 NAD 27, U.S. FEET



Figure 3

MONSANTO INSTITUTIONAL CONTROL AREA AND SOIL SAMPLING LOCATIONS

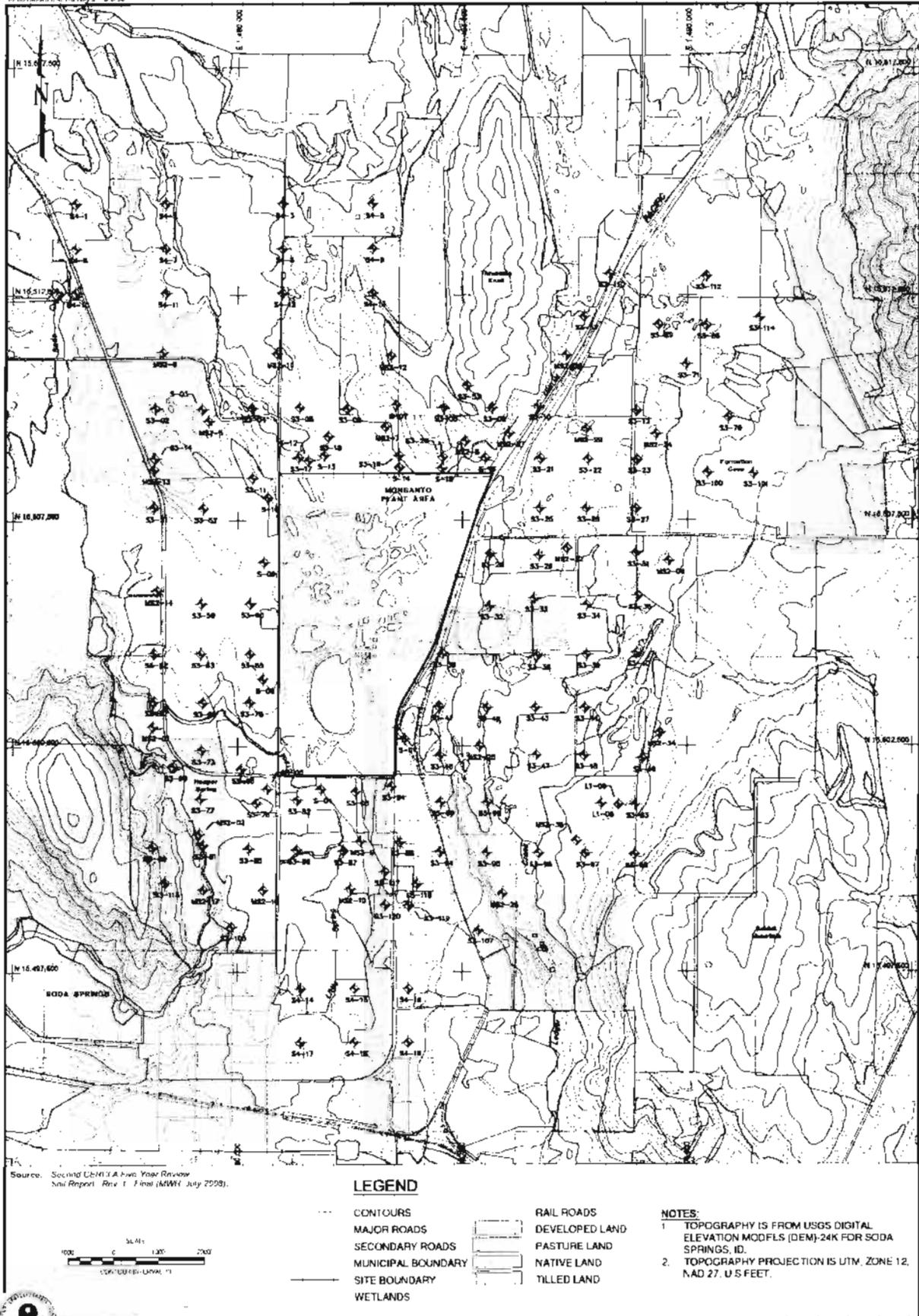


Figure 4

LAND USE, TOPOGRAPHY, AND SOIL SAMPLING LOCATIONS  
SECOND FIVE-YEAR REVIEW

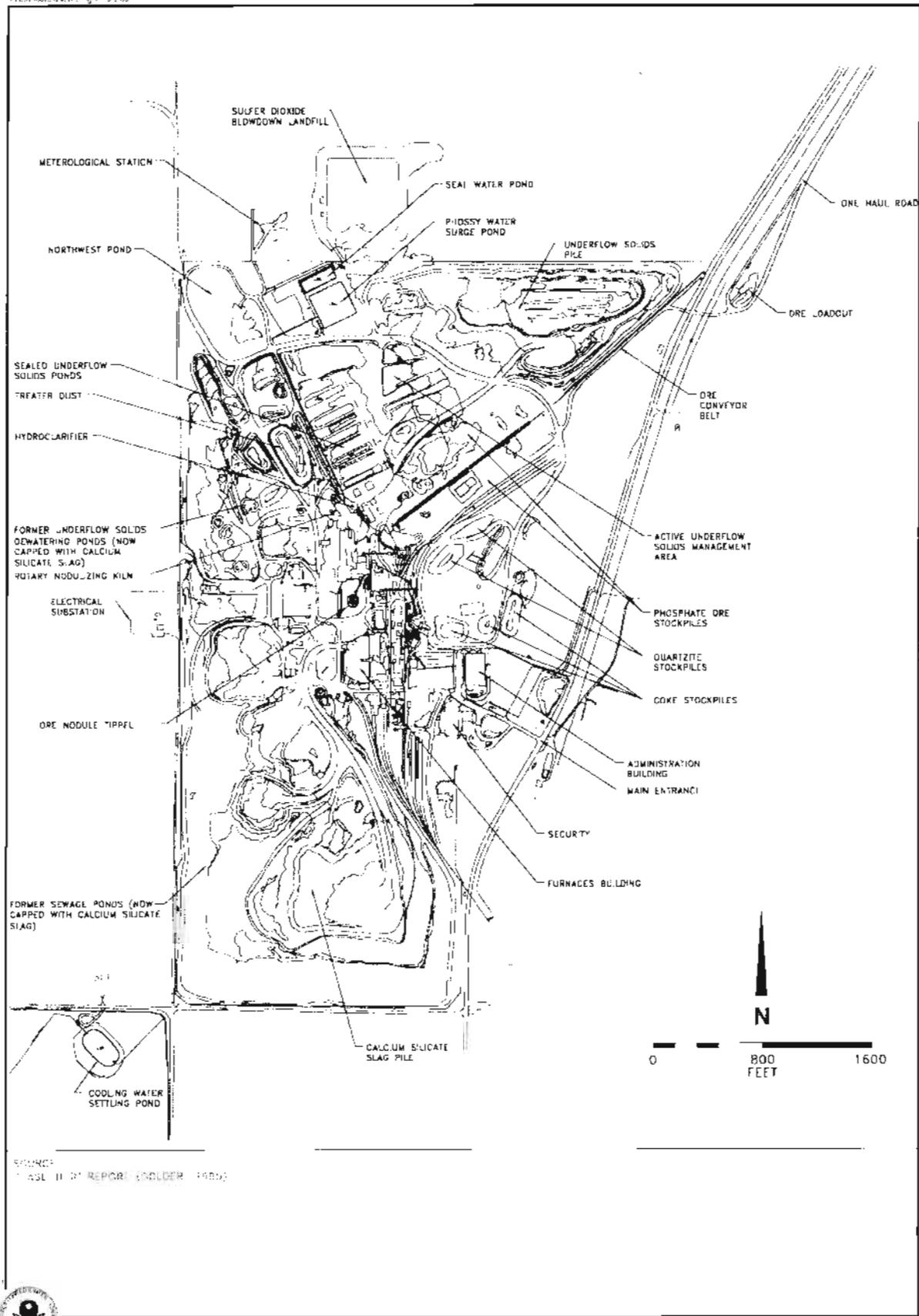


Figure 5  
MONSANTO FACILITY MAP  
SECOND FIVE-YEAR REVIEW

APPENDIX A

# **Second CERCLA Five-Year Review Sediment Report – Final - Rev. 0**

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APPENDIX C

# **Second Five-Year Review Report for Groundwater Conditions at the Monsanto Soda Springs Plant, Soda Springs, ID**

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APPENDIX A

# **Second CERCLA Five-Year Review Sediment Report – Final - Rev. 0**

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APPENDIX C

# **Second Five-Year Review Report for Groundwater Conditions at the Monsanto Soda Springs Plant, Soda Springs, ID**

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