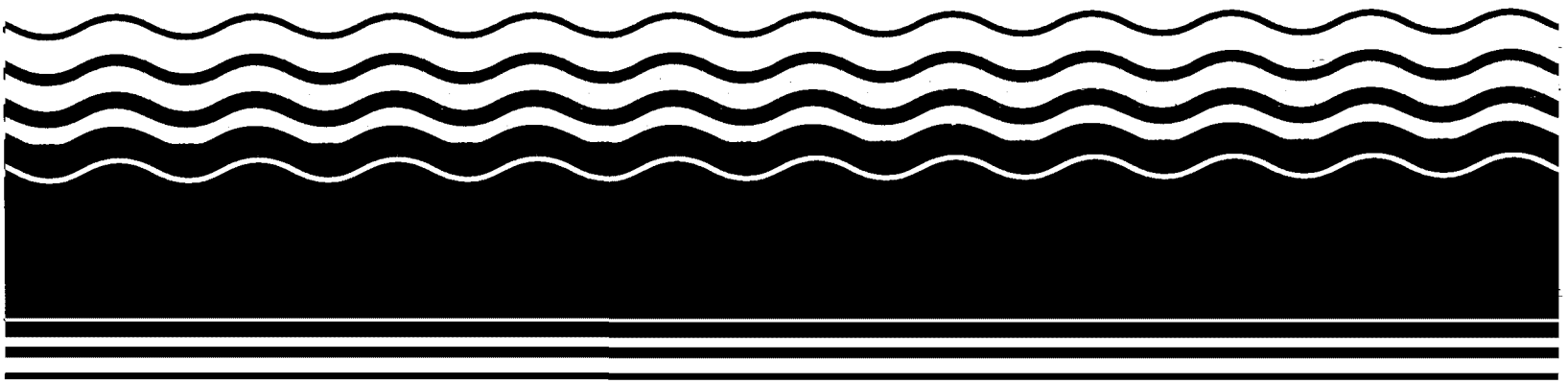
PB95-963104
EPA/ESD/R09-93/124
January 1995

EPA Superfund
Explanation of Significant Difference for the Record of Decision:

Phoenix-Goodyear Airport (Second ESD), AZ
5/5/1993



Phoenix-Goodyear Airport Area Superfund Site

EXPLANATION OF SIGNIFICANT DIFFERENCES #2

for the FINAL REMEDY RECORD OF DECISION

May 1993

I. INTRODUCTION

On September 26, 1989, the United States Environmental Protection Agency (EPA) signed a Record of Decision (ROD) for the final remedy at the Phoenix-Goodyear Airport (PGA) site in Goodyear, Arizona. The State of Arizona concurred with the remedy selected in the 1989 ROD. In January 1991, EPA issued an Explanation of Significant Difference (the 1991 ESD) which modified and clarified the 1989 ROD on five points. EPA now is modifying the ROD a second time to explain the differences between the final remedy originally selected in the 1989 ROD and the final remedy which will be implemented at the site. These changes are not fundamental alterations of the remedy described in the 1989 ROD.

Under Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986, and pursuant to 40 C.F.R. Section 300.435(c)(2)(ii) (55 Fed.Reg. 8666, 8852 (March 8, 1990)), EPA is required to publish an ESD when significant (but not fundamental) changes are being considered to a final remedial action plan as described in a ROD. If the changes fundamentally alter the nature of the selected remedy, an amendment to the ROD would be required [40 C.F.R. Section 300.435(c)(2)(ii)]. In this instance, EPA has selected a number of important changes that modify the ROD requirements, but do not alter the hazardous

waste management approach that EPA selected in the ROD. The purpose for each of these changes is described in detail in Section III of this document.

This document provides a brief background of the site, a summary of the remedy selected in the 1989 ROD and how that remedy was modified by the 1991 ESD, a description of how this ESD affects the remedy originally selected by EPA in the 1989 ROD, and an explanation of why EPA is making these changes to the ROD. EPA is issuing this second ESD to the 1989 ROD in order to take into account information received by EPA after EPA issuance of the 1991 ESD.

This ESD changes the remedy selected in the ROD for both the northern and southern portions of the PGA site. The northern portion of the site consists of the Unidynamics-Phoenix Incorporated (Unidynamics) property and groundwater contamination emanating from the Unidynamics property. The southern portion of the site consists of the Loral Defense Systems-Arizona (Loral) property and the Phoenix-Goodyear Airport property and any groundwater contamination emanating from these areas.

This ESD modifies the remedy selected for the northern portion of the site as follows:

(1) change the emission control technology for the Soil Vapor Extraction System from vapor-phase granular activated carbon (GAC) to treatment by thermal oxidation with wet scrubbing;

(2) change the designated end use for water treated by the Subunit C groundwater remedy from incorporation into the community

potable water supply to reinjection back into the Subunit C section of the aquifer with an option for municipal use after 1994[1];

(3) suspend the remedial design and construction of the liquid-phase GAC treatment requirement (or other similar effective technology) from the Subunit A groundwater remedy until treatment plant influent data quality indicates the presence of a less volatile compound (e.g. ketones) at a concentration of 50% or more of its site groundwater cleanup standard;

This ESD modifies the remedy selected for the southern portion of the site as follows:

(4) change the requirement for a centralized air stripping system for the Subunit B/C groundwater remedy to a decentralized system (e.g. two or more independent liquid-phase GAC treatment systems);

(5) change the designated end use for water treated by the Subunit B/C groundwater remedy from municipal use to reinjection back into the Subunit B/C section of the aquifer with an option to reconsider municipal use after 1994[2];

This ESD modifies the selected remedy for both portions of the site as follows:

(6) add the requirement that should any private or municipal drinking water well in the vicinity of the PGA site, including but not limited to City of Goodyear wells number 1,2,3,7,10,11 and the

---

[1] An explanation of when municipal end-use may still be considered is explained in Section III.E.

[2] same as footnote 1.

Parkshadows drinking water well, have an occurrence of a contaminant listed in Table 2-5 of the ROD in a concentration in excess of its groundwater clean-up standard and such contamination is related to contamination in the Unidynamics or airport areas, such drinking water well(s) shall be treated as soon as possible by wellhead liquid-phase GAC treatment or other similar technology as approved by EPA.

(7) establish four additional groundwater clean-up standards for Table 2-5 of the ROD as follows:

Benzene - 5 parts per billion (ppb)

Ethylbenzene - 700 ppb

1,1,2,2 Tetrachloroethane - 0.18 ppb

Tetrachloroethene - 5 ppb

This ESD and supporting documentation will become part of the PGA Administrative Record. Copies of the Administrative Record for the PGA site including this ESD have been placed at the following locations:

Avondale Public Library
328 West Western Avenue
Avondale, Arizona 85323
(602) 932-9415

EPA Region 9 Superfund Records Center
75 Hawthorne Street - 9th floor
San Francisco, California 94105
(415) 744-2165

EPA provided a fifteen (15) working day comment period for the State of Arizona in accordance with 40 C.F.R. Section 300.515(h)(3). State of Arizona comments on this ESD are summarized in Section IV of this document and are also included in

the PGA Administrative Record file. Pursuant to 40 C.F.R. Section 300.435(c)(2)(i), a formal public comment period was not required for an ESD. However EPA, at its discretion, established a public comment period of thirty (30) calendar days to obtain written or oral comments on the proposed ESD. This 30 calendar day comment period expired on April 1, 1993. EPA held a public meeting in the City of Avondale on March 10, 1993. A copy of the transcript from the public meeting and copies of all written comments received by EPA have been placed in the administrative record. EPA carefully considered all public comments on the proposed ESD prior to issuance of this final ESD. Community relations activities to support this ESD have been in accordance with 40 C.F.R. Section 300.435(c)(2)(ii) and are further described in Section VI of this document.

II. BACKGROUND

The following provides a brief background of the PGA site, short summaries of the remedy selected in the original 1989 ROD and changes to the 1989 ROD established by the 1991 ESD. Additional background information can be found in the 1989 ROD, the 1991 ESD and in the PGA Administrative Record.

A. Site Background and Description

The PGA site is located primarily in Goodyear, Arizona, approximately seventeen (17) miles west of Phoenix in the western part of the Salt River Valley. A groundwater flow divide splits the site along Yuma Road into northern and southern portions. The northern portion of the site consists of the Unidynamics property,

located at 102 S. Litchfield Road and all areas with groundwater contamination in excess of site clean-up standards related to and emanating from the Unidynamics property. The southern portion of the site consists of the Loral Defense Systems property located at 1300 S. Litchfield Road, the PGA property, and all areas with groundwater contamination in excess of site clean-up standards related to and emanating from the Loral and/or PGA properties. Attachment #1 provides a map indicating the approximate site boundaries of the Phoenix-Goodyear Airport Superfund site. The current land uses on and near the site are agricultural, industrial, and residential.

In 1981, the Arizona Department of Health Services (ADHS) discovered that groundwater in certain areas of the site was contaminated with solvents and chromium. EPA and ADHS conducted additional sampling of wells in 1982 and 1983 which revealed eighteen (18) wells contaminated with trichloroethylene (TCE). As a result, EPA added the PGA site (originally listed as the "Litchfield Airport Area Superfund Site") to the National Priorities List (NPL) on September 8, 1983 (see Federal Register, Vol. 48, No. 175, p. 40671). Other hazardous substances found at the PGA site include acetone, methyl ethyl ketone (MEK), 1,1,1-trichloroethane (TCA), 1,1-dichloroethylene (DCE), other volatile organic compounds (VOCs), and chromium.

Most of the groundwater and soil contamination in the southern portion of the site is located within the Loral and airport properties inside an area of the site designated as Section 16.

Contaminated "shallow groundwater" (hereafter referred to as Subunit A groundwater) within Section 16 was addressed in the first phase of the remedy for the PGA Superfund site and is referred to as the Section 16 Operable Unit. A Record of Decision for the Section 16 Operable Unit was signed on September 29, 1987. The designated remedy of a pump and treat system for Subunit A groundwater has been operating since December 1989. A primary objective of the Section 16 Operable Unit is to protect human health and the environment by preventing the migration of contaminated groundwater and resulting aquifer degradation.

Groundwater currently used for drinking water in the area of the site meets federal and state drinking water standards. However, as municipal water supplies in the area of the site are dependent on groundwater, future population growth in the area could require use of groundwater in contaminated areas and may result in potential exposure to hazardous substances.

The clean-up work in the northern portion of the site is being carried out by Unidynamics, whereas the Goodyear Tire and Rubber Company is the lead party implementing the work in the southern portion of the site. EPA, with the assistance of the Arizona Department of Environmental Quality (ADEQ), authorizes and oversees all clean-up activities at this Superfund site.

B. Remedy Selected in the 1989 ROD

The ROD for the final remedy at the PGA Site was signed by the EPA Regional Administrator on September 26, 1989. In addition to selecting the remedial actions described below, the final remedy

also incorporates the Section 16 Operable Unit. The groundwater clean-up levels for the PGA site are identified in Table 2-5 of the ROD[3]. The groundwater cleanup levels for the Section 16 Operable Unit are identified in Table 2-5 and in Table 1 of the 1987 ROD.

ROD Remedy for Southern Portion of PGA Site

For the southern half of the site, the remedy primarily consists of extraction and treatment of contaminated "deep groundwater" (hereafter referred to as Subunit B/C groundwater) and soil vapor extraction for contaminated soils. The Subunit B/C groundwater remedial action requires a pump and treat system using air stripping to remove VOCs from the groundwater. The ROD states that groundwater remedial action shall consist of three (3) new Subunit B/C groundwater wells for extraction and treatment of Subunit B/C groundwater at a central treatment plant. The ROD states that the central treatment plant may be operated without emissions controls. In addition, the ROD requires that treated water from the central treatment plant will be made available to the City of Goodyear for municipal use. The estimated total present worth cost of the extraction and treatment facilities for the groundwater remedy for the southern portion of the site is $14,500,000.

With respect to VOC soil contamination at the southern portion of the PGA site, the ROD selected a soil vapor extraction (SVE)

---

[3] The groundwater cleanup levels in Table 2-5 of the ROD consist of: a) Federal and State of Arizona legally Applicable or Relevant and Appropriate Requirements (ARARs); and, b) other criteria used to ensure the protectiveness of the remedy (known as To Be Considered (TBCs)).

system with emission controls. The SVE system will be implemented in certain required areas within an area identified as Target Area 2 in Figure 5-2 of the ROD. The total present worth cost of the soil remedy for the southern portion is estimated to be from $3,900,000 for a phased implementation, to $5,400,000 for a single phase implementation.

ROD Remedy for Northern Portion of the PGA Site

The remedial action selected for the northern portion of the site is similar to that chosen for the south and includes a Subunit A groundwater remedy, a Subunit C groundwater remedy, and a soil remedy. The Subunit A groundwater remedy consists of a pump and treat system using air stripping, followed by liquid phase granular activated carbon. Vapor-phase GAC air emission controls are required for the Subunit A groundwater remedy. The ROD requires that the treated water from Subunit A groundwater remedy be reinjected, and the treated water from the Subunit C groundwater remedy be incorporated into the community water supply. The estimated present worth cost of the groundwater remedy for the northern portion of the site is $14,000,000.

The soil remedy consists of a SVE system with vapor-phase GAC air emission controls to be implemented in the target area. The ROD identifies the target area as that area where VOCs were detected in soil samples and the area where soil gas samples exhibited VOCs greater than 1 micrograms per liter. The ROD provides that this area may be expanded or reduced, as necessary, to include removal of 99 percent of the contaminants. In addition,

the ROD states that excavation and treatment may be required to remove residual contamination where soil vapor extraction is not effective. The estimated present worth cost of the SVE system is $3,100,000.

C. The 1991 ESD changes to the 1989 ROD

The ESD issued by EPA in January 1991 clarified and modified portions of EPA's September 1989 ROD. To the extent that the 1991 ESD differed from the ROD, the 1991 ESD supersedes the ROD. The 1991 ESD modified the ROD as follows:

(1) The 1991 ESD revised the clean-up level for methyl ethyl ketone (MEK) in groundwater from 170 parts per billion (ppb) to 350 ppb;

(2) The 1991 ESD set a clean-up level for acetone in groundwater at 700 ppb;

(3) The 1991 ESD clarified the target area for the soil remedy in the northern portion of the site and the criteria for establishing the clean-up levels. On page four of the 1989 ROD, the soil remedy target area is described as "that area where VOCs were detected in soil samples and the area where soil gas samples quantified VOCs greater than 1 microgram per liter. The area may be expanded or reduced to include removal of 99 percent of the contaminant". In the 1991 ESD, EPA defined these statements to identify the soil remedy target area for the northern portion of the PGA site to consist of target areas B and C defined by all four circles in Figure 5-7 of the 1989 ROD;

(4) The 1991 ESD clarified the role of soil excavation as a

remedy option, should the selected soil remedy (soil vapor extraction) at the northern portion of the site prove ineffective. The 1989 ROD states on page four that "excavation and treatment may be required to remove residual contamination where soil vapor extraction is not effective." In the 1991 ESD, EPA interpreted this to mean that excavation and treatment of soil is one, but not the only, remedial alternative EPA will consider for the soil in the northern portion of the site if soil vapor extraction is ineffective;

(5) The 1991 ESD revised the selected remedy for an off-site agricultural well referred to as the "Phillips Well" from wellhead treatment to routine water quality monitoring. The 1991 ESD did not alter EPA authority to reimpose the requirement for wellhead treatment at the Phillips Well should future monitoring indicate that the concentration of any VOC has exceeded the clean-up level identified in Table 2-5 of the 1989 ROD. EPA's decision to reimpose wellhead treatment will be based on the Agency's review of water quality sampling results for the Phillips well.

III. DESCRIPTION OF ESD

This ESD modifies portions of EPA's September 1989 ROD. This ESD does not affect the 1991 ESD. To the extent that this ESD differs from the ROD, this ESD shall supersede the ROD upon EPA signature of this ESD. The modifications to the ROD contained in this ESD are described below. Attachment #2 provides a condensed overview of this ESD.

Modifications to the ROD Remedy for PGA Site-North

A. Vapor Treatment for the Soil Vapor Extraction System at the Northern Portion of the Site

The ROD states that the contaminated soils at the PGA site-north (i.e. the Unidynamics area) will be treated by soil vapor extraction with vapor-phase GAC emission controls. This decision was based on known soil contamination data as of mid-1989.

During 1991 and 1992, Unidynamics proceeded with design work for the soil remedy as described in the ROD. All of Unidynamics' design work plans and field activities were subject to EPA approval and oversight. In late 1991, Unidynamics installed two SVE extraction wells within the soil target area designated by the ROD. These SVE extraction wells were then tested for contaminant concentration and pressure data in order to establish the final specifications needed to build the SVE remedy. During this testing, three (3) soil gas samples were collected from the extracted vapor stream, and analyzed by EPA-approved test methods. The results are summarized below in Table 1.

TABLE 1

PRELIMINARY CHARACTERIZATION OF SOIL VAPOR

Compound	Concentrations (ppm volume)			Average
	Sample SVE A-1	Sample SVE A-2	Sample SVE A-3	
Acetone	286	319	292	299
MEK	1327	1590	1515	1477
TCE	436	549	440	475
Totals	2049	2458	2247	2251

ppm = parts per million

The data shown above were utilized to make preliminary calculations to estimate GAC usage rates and were also supplied to equipment vendors as additional data for their use in evaluating equipment requirements. The preliminary estimates of the vapor-phase GAC usage rates indicated extremely high rates, in excess of 4,000 lbs. of GAC per day, which is much higher than the usage rates estimated at the time of the ROD. A 4,000 lbs. per day GAC usage rate would not only cause a significant increase in the overall cost of this soil remedy but also create safety concerns associated with the transport of large volumes of spent, contaminated GAC canisters and the possible release of contaminated GAC in an accident. In addition, scientists have documented that using vapor-phase GAC for treatment of ketones (including methyl ethyl ketone and acetone) may cause safety concerns in regard to potential spontaneous combustion of GAC canisters[4]. As a result of the above information, EPA directed Unidynamics to re-evaluate GAC in addition to other alternatives for the vapor phase treatment.

In the document Evaluation of Alternatives for Treatment of Extracted Soil Vapor during SVE Pilot Testing, dated January 29, 1992 and revised March 13, 1992, Unidynamics evaluated several emissions control technologies for use during an SVE Pilot Testing

[4] For additional information on this subject, see the administrative record for this ESD, document numbers 1, 2, and 3 . The index of documents for the administrative record for this ESD is provided in Attachment #4.

Program[5]. As a result of this evaluation, Unidynamics recommended: a) continued use of SVE for contaminant vapor extraction; and, b) pilot testing thermal oxidation of the extracted contaminant vapors with wet scrubbing of the combustion by-products. In thermal oxidation, the soil vapor is heated, using natural gas or propane, to burn and destroy the vapor contaminants[6]. Non-catalyzed systems typically operate between 1400°F to 1600°F and destruction efficiency can be in excess of 99%. A wet scrubber unit is connected to the thermal oxidation unit to remove hydrochloric acid in the exhaust gas. The wet scrubber operates by spraying water into the exhaust gas, causing the hydrochloric acid to move from the gaseous phase to the liquid phase. Water from the wet scrubber unit can be discharged to a sanitary sewer as long as the acidity of discharged liquid stream is properly controlled.

Thermal oxidation with wet scrubbing was approved by EPA for SVE pilot testing for the following reasons:

- Thermal oxidation is a demonstrated technology for the treatment of soil vapors contaminated by VOCs, and when equipped with a wet scrubber it is accepted by the Maricopa County Bureau of Air Pollution Control as Best Available Control Technology (BACT). With proper operation, destruction efficiencies of greater than 99%

---

[5] To review a copy of this document, see the administrative record for this ESD, document number 12.

[6] For more information on thermal oxidation, see administrative record document number 4.

can be achieved for the types of contaminants found in the soil target area at the Unidynamics facility.

- The disposal or regeneration of large volumes of hazardous waste (i.e. GAC canisters) is eliminated, thereby reducing the potential hazards associated with handling and transport.

In accordance with the document entitled Proposed SVE Pilot Testing Program Description, dated October 1992 and revised November 10, 1992, Unidynamics implemented a successful SVE/Thermal Oxidation pilot study during December 1992[7]. The contaminant concentrations detected in exhaust gas exiting the SVE/Thermal Oxidation equipment during the first phase of this pilot study are provided below in Table 2.

TABLE 2-
SVE-1 EXHAUST SAMPLE ANALYSIS RESULTS

COMPOUND	COND.1 (ppm)	COND.2 (ppm)	COND.3 (ppm)	COND.4 (ppm)	OSHA PEL[1] (ppm)	ACGIH TLV[2] (ppm)
Acetone	0.67	0.18	0.29	ND	750	750
1,1-Dichloroethylene	ND	ND	0.82	ND	1	5
Methyl Ethyl Ketone (MEK)	2.32	0.72	0.93	0.38	300	200
Tetrachloroethylene	ND	ND	ND	0.02	25	---
Trichloroethylene (TCE)	1.07	0.81	0.86	0.45	50	50

NOTES:
ND - Analyte was not detected at concentrations greater than or equal to the quantitation limit.
[1] Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 permissible exposure limit, 8-hour time-weighted average.
[2] American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value, 8-hour time-weighted average.
ppm = parts per million

[7] Administrative Record Document No. 26.

Under conditions 2 and 3 (Cond.2 and Cond.3) the SVE/Thermal Oxidation system was operated at flowrates of approximately 8 cubic feet per minute (cfm) and 15 cfm respectively. Under conditions 1 and 4, the SVE extraction wells were closed[8]. Average destruction efficiencies (calculated from Conditions 1 and 2 inlet and exhaust contaminant concentration data) achieved during this first phase of the pilot study are as follows:

Compound	Average Destruction Efficiency
Acetone	99.8%
Methyl Ethyl Ketone	98.4%
Trichloroethylene	99.3%

In the report entitled SVE Pilot Testing Final Report, dated February 1993, Unidynamics recommended use of the thermal oxidation technology with wet scrubber unit for the vapor treatment portion of a full-scale soil vapor extraction system[9]. Based on the success of the pilot study, EPA approves of this Unidynamics recommendation. Therefore, this ESD changes the ROD requirement for remediation of the PGA site-north soil target area from SVE with vapor-phase GAC emission controls to SVE with thermal oxidation and wet scrubbing on the exhaust emissions. The ROD and

---

[8] The analysis of certain exhaust samples taken during conditions 1 and 4, when the SVE-1 extraction well was closed and no soil vapor was being extracted are likely to be anomalies since no contaminant detections were anticipated under those conditions. Although the levels detected under conditions 1 and 4 were very low and present no significant threat to human health and the environment, these anomalies will be re-tested again when the SVE/Thermal Oxidation system is re-started.

[9] Administrative Record Document No. 29

1991 ESD requirements specifying soil target areas and soil clean-up standards remain unchanged.

B. Subunit A Groundwater Treatment Remedy

The ROD states that the Subunit A Groundwater Treatment Remedy for the PGA site-north consists of pump and treat technology using both air stripping and liquid-phase GAC with vapor-phase GAC treatment of the air emissions. This remedy is scheduled to be implemented in three phases. Phase 1 facilities will be located solely on Unidynamics property and consist of extraction, treatment, and reinjection of Subunit A groundwater contamination plus some limited contribution from Subunit B. Phases 2 and 3 facilities will pump and treat only Subunit A groundwater contamination and will be located generally within the approximate site boundaries north of the Unidynamics property (see Attachment #1).

The liquid-phase GAC component of the treatment remedy was intended to remediate any groundwater contamination consisting of ketones, primarily methyl ethyl ketone (MEK), that was not removed during the air stripping process. Although GAC is not a suitable technology to remove ketones from a contaminated air stream (See Section III.A), GAC can be effective in removing ketones from a liquid stream.

At the issuance of the ROD, EPA determined that the liquid-phase GAC groundwater treatment unit was needed based on two groundwater samples from two different wells at the Unidynamics facility which indicated MEK concentrations of 11,000 ppb and 900

ppb. The MEK clean-up level established by the 1991 ESD is 350 ppb. During 1991 and 1992, EPA directed Unidynamics to implement a special groundwater sampling program to confirm the extent and approximate amount of MEK groundwater contamination. In accordance with the document entitled Special Sampling Event[10] dated February 10, 1992, Unidynamics implemented a focused groundwater testing of the two wells that indicated prior MEK contamination plus a third well which was hydraulically downgradient. As EPA field representatives during this event, the Arizona Department of Environmental Quality (ADEQ) took split samples of the Unidynamics' groundwater samples. The data results of the Special Sampling Event are documented in a Unidynamics' letter report dated March 3, 1992 and an ADEQ letter report[11]. Data results from both the Unidynamics and ADEQ samples indicated non-detectable concentrations of both MEK and acetone.

In April 1992, EPA approved Unidynamics' plan to continue searching for ketone groundwater contamination in the targeted three wells as part of Unidynamics' on-going quarterly well monitoring program. No significant ketone groundwater contamination has been detected to date. Therefore, in the absence of ketone groundwater contamination, this ESD suspends immediate implementation of the liquid-phase GAC unit and requires air stripping alone as the sole Subunit A groundwater remedy treatment

---

[10] Administrative Record Document No. 8

[11] See Administrative Record Document No. 10 for Unidynamics letter and Administrative Record Document No. 9 for ADEQ letter.

technology. Upon construction of the Subunit A groundwater remedy, EPA intends to take extra efforts to monitor and analyze actual air stripping efficiency, especially during the start-up period, to ensure proper operation of this system.

Furthermore, should a semi-volatile compound, such as methyl ethyl ketone or acetone, be drawn into the Subunit A groundwater remedy in concentrations at or in excess of 50% of a site groundwater clean-up standard, design of a liquid-phase GAC treatment unit or other similar technology as approved by EPA shall be initiated. The treatment technology shall commence operation immediately if the treatment plant influent reaches or exceeds the cleanup standards selected in Table 2-5 of the ROD, as amended. The purpose of initiating such work at a 50% action level is to allow augmentation of the treatment system in a timely fashion in order to maintain continuous compliance with site treatment and rejection requirements without any unnecessary treatment system shut downs. Monitoring efforts for ketone groundwater contamination in the targeted three wells and the influent and effluent streams to and from the Subunit A Groundwater Remedy shall be continued as EPA determines is necessary. Continued monitoring for ketones will facilitate prompt action if such monitoring data indicate that a 50% action level in groundwater has been encountered.

C. Treated Subunit C Groundwater End-use Requirements

The ROD specifies that treated Subunit C groundwater generated by the Subunit C Groundwater Remedy at the northern portion of the

PGA site shall be incorporated into the community potable water supply. This ESD changes the required end use for treated Subunit C groundwater from incorporation into the community potable water supply to reinjection via groundwater injection wells or other similar method, back into the Subunit C section of the aquifer. EPA is making this change to the end use for the treated Subunit C groundwater because it is likely that the costs to the City of Goodyear may be prohibitive based on information provided to EPA by the City for the southern portion of the site (See Section III.E). Reinjection of the treated water back into the Subunit C portion of the aquifer at or near the Unidynamics property still makes this water available to the City of Goodyear for municipal use via extraction by a City of Goodyear municipal well. EPA has determined that reinjection of the treated water at or below the standards established by Table 2-5 of the ROD (as modified by the 1991 ESD and this ESD) is protective of human health and the environment. If conditions allow a municipal end-use to become a cost-effective alternative for a Subunit C groundwater remedy at PGA-north, either the reinjection or a municipal end-use alternative may be submitted for EPA review and approval (see Section III.E for additional explanation).

Modifications to the ROD Remedy for PGA Site-south

D. Treatment Technology for the Subunit B/C Groundwater Remedy.

With respect to the Subunit B/C groundwater remedy for the southern portion of the site, the ROD states that in addition to other requirements, a central treatment plant using the air

stripping technology (without air emission controls) shall be used to treat water from three new extraction wells. This ESD changes the treatment technology for the Subunit B/C groundwater remedy from a centralized air stripping system to two or more independent liquid-phase GAC treatment systems. EPA is making this change to the ROD due to a reduction in the estimated extraction flow rate for the Subunit B/C groundwater remedy and pipeline access difficulties encountered when trying to design a centralized system on Loral and airport properties.

Based on data available at the time of issuance of the ROD, EPA determined that Subunit B/C groundwater contamination emanating from the airport property was substantial and had migrated all the way to the Phillips wells located about two (2) miles west of the airport property. Subsequent to the ROD, EPA directed the Goodyear Tire and Rubber Company to design and implement a detailed Subunit B/C groundwater contamination investigation and delineation program. The work consisted of: (a) investigating and addressing eight old production wells on Loral and airport properties suspected to be conduits of contamination from Subunit A to Subunit B/C groundwater; and, (b) strategically installing seven new Subunit B/C groundwater monitoring wells on the Loral and airport properties.

The results of this investigation are detailed in the report entitled Conceptual (30%) Design Report for the Ground-Water Remedy at the Phoenix-Goodyear Airport Superfund Site in Goodyear,

Arizona, dated November 16, 1992[12]. This report concludes that the Subunit B/C contamination at the Loral/airport facility is much less than the amount identified in the ROD. This reduction in the volume of Subunit B/C contamination has caused the estimated extraction flow rate to decrease from 2200 gallons per minute (gpm) to about 700 gpm. The significantly reduced extraction rate allowed liquid-phase GAC to become a viable treatment alternative. In addition, early in the design process several access problems were identified when attempting to design the extraction and injection well pipeline network for a centralized treatment system. These logistical and access difficulties included locating pipelines around numerous roads, buildings, and railroad tracks as well as Federal Aviation Administration (FAA) requirements which restrict the location and height of an air stripping tower. Use of independent liquid-phase GAC systems reduces the overall length of pipelines necessary for the treatment system and reduces the impact of FAA requirements.

While retaining the pump and treat concept for the remediation of contaminated Subunit B/C groundwater at the southern portion of the PGA site, this ESD changes the treatment technology from a centralized air stripping system (without air emission controls) to two or more independent liquid-phase GAC treatment systems. Although the air stripping remedy described in the ROD was determined EPA to be protective of human health and the

[12] Administrative Record Document No. 27

environment, the liquid-phase GAC systems required by this ESD have an added level of protectiveness since they further reduce the discharge of contaminants into the air.

E. Treated Subunit B/C Groundwater End-use Requirements

The ROD requires that treated water generated by the Subunit B/C Groundwater Remedy for the southern part of the PGA site be provided to the City of Goodyear for municipal use. This ESD changes the ultimate disposition of the treated Subunit B/C groundwater from City of Goodyear municipal use to reinjection (via groundwater injection wells) back into the Subunit B/C section of the aquifer underneath the Loral and/or airport properties. As explained further below, if after 1994 EPA determines that operation and maintenance of Subunit B/C groundwater reinjection wells are not the most cost-effective end-use alternative, plans and specifications for conversion to a municipal end-use may be prepared and submitted for EPA review and approval at that time.

As stated in paragraph D. above, at the writing of the ROD in 1989 EPA estimated that up to 2200 gpm of Subunit B/C groundwater would have to be extracted and treated. Reinjection of the treated water was screened out at that time due to concerns that such a high flow rate of treated water would have necessitated an abundance of costly groundwater injection wells which can be subject to operational difficulties. EPA designated the City of Goodyear as the primary recipient of treated water because of its proximity to the site.

However, as a result of the Subunit B/C investigation

described in paragraph D. above, the extent of Subunit B/C groundwater contamination was decreased, thereby decreasing the extraction flow rate of water to be remediated from about 2200 gpm to about 700 gpm. Because this water is high in naturally occurring total dissolved solids (TDS), TDS levels must be reduced prior to incorporation in a municipal water supply. The City of Goodyear estimated that reduction of TDS to acceptable levels at a 2200 gpm flow rate would cost approximately $13,000,000[13]. EPA is proposing this change to the end use for the treated Subunit B/C groundwater primarily based on the prohibitive cost the City of Goodyear would encounter in accepting this water for municipal use. In addition, the reduced flow rate results in an increased cost-effectiveness of the reinjection alternative by reducing the number of reinjection wells required. Reinjection of the treated water back into the Subunit B/C portion of the aquifer at or near the Loral and/or airport properties still makes this water available to the City of Goodyear for municipal use via extraction by a City of Goodyear municipal well.

Based on comments on the proposed ESD received from the City of Goodyear, EPA is allowing certain limited opportunities for a municipal end-use alternative for treated Subunit B/C groundwater. For Subunit B/C groundwater remedial action planned pursuant to the document Final Design Report for the Subunit B/C Ground-Water Remedy at the Phoenix-Goodyear Airport Superfund Site in Goodyear,

---

[13] Administrative Record Document No. 5

Arizona and scheduled for construction during 1993 and 1994, the required end-use requirement for treated Subunit B/C groundwater shall be reinjection back into the Subunit B/C portion of the aquifer. If after 1994, EPA determines that operation and maintenance of Subunit B/C groundwater reinjection wells for Subunit B/C groundwater remedial actions are not a cost-effective end-use alternative, plans and specifications for a modified reinjection system or for conversion to a municipal end-use may be prepared and submitted for EPA review and approval at that time. Conversion of end-use alternatives shall not provide an opportunity to delay or suspend remedial action work.

For other Subunit B/C groundwater remedial actions that are not constructed during 1993-94 pursuant to the Goodyear Tire and Rubber Company document entitled Final Design Report for the Subunit B/C Ground-Water Remedy at the Phoenix-Goodyear Airport Superfund Site in Goodyear, Arizona, this ESD requires that either of the following two end-use alternatives to be submitted for EPA review and approval: a) reinjection back into the Subunit B/C portion of the aquifer; or, b) municipal use. This requirement applies to post-1994 Subunit B/C groundwater remedial actions at both PGA-south and PGA-north.

EPA has determined that either alternative, municipal use or reinjection of the treated water, is protective of human health and the environment if such water is treat to a quality at or below the standards established by Table 2-5 of the ROD (as modified by the 1991 ESD and this ESD). It must be noted here that any end use

alternative must be consistent with state laws and may be subject state permitting requirements. The State of Arizona has determined that the reinjection alternative required by this ESD is consistent with state law and not subject to a state permit. However, any attempts to design and implement a municipal end use alternative shall be subject to state and local law including permitting requirements, if any.

Site-wide Modifications

F. Drinking Water Well Protection. This ESD adds the following requirement to the ROD: In the event that any private or municipal drinking water well, including, but not limited to, City of Goodyear wells number 1,2,3,7,10,11, and Parkshadows drinking water well, has an occurrence of a contaminant listed in Table 2-5 of the ROD (as revised by the 1991 ESD and this ESD) at a concentration equal to or in excess of its groundwater clean-up standard, and such contamination is related to releases of contamination at the PGA site north or south, such private or municipal drinking water well(s) shall be treated by wellhead liquid-phase GAC treatment (or other similar technology approved by EPA) as soon as possible. It must be noted here that in order to implement wellhead treatment in a timely fashion, appropriate actions (i.e. remedial design, procurement, and construction activities) should be taken before water quality in a drinking water well attains a contaminant concentration at its groundwater cleanup standard. The immediacy of such proper design, procurement, and construction activities shall be based on EPA assessment of trends in drinking water well

water quality.

Water quality information obtained by or for EPA since 1982 for City of Goodyear municipal wells and the private Parkshadows drinking water wells are provided in the Administrative Record for this ESD[14]. These data indicate, that, with some exceptions to date, no City of Goodyear or Parkshadows drinking water wells has had or currently has contamination in excess of the groundwater clean-up standards specified for this site during the times and dates such wells were sampled[15]. These exceptions were each minor in nature. Moreover, EPA does not anticipate that groundwater contamination will in the future be detected at significant levels in the Parkshadows or City of Goodyear municipal drinking water wells at or near the PGA site. However, in order to establish a

---

[14] Administrative Record Document No. 31

[15] For the last five years, TCE concentrations in City of Goodyear drinking water wells and the Parkshadows drinking water well have remained at levels less than 1 ppb. Two documented occurrences of TCE concentrations found to be in excess of the 5 ppb TCE site cleanup level are: 1) Well COG#2 had a single occurrence (sample date 4/14/87) indicating 8.0 ppb TCE; and 2) Well COG#1 had a single occurrence (sample date 5/17/84) indicating 6.8 ppb TCE. Other single exceedences of the TCE cleanup level in well COG#3 (sample date 10/09/87) and the Parkshadows drinking water well (sample date 7/19/88) appear to be erroneous since these particular sample results are not consistent with historical sampling data for these wells which have consistently shown TCE levels at less than 1 ppb TCE. City of Goodyear wells numbers 4 and 5 have had documented TCE concentrations above the TCE clean-up standard (see Administrative Record Document No. 31). However, well number 4 had been used primarily for fire protection and not for drinking water. Well number 4 was appropriately abandoned by filling the well with cement to the land surface. TCE concentrations above 5 ppb were first detected in well COG#5 in July 1985, but this well had been permanently disconnected from the City's service system in September 1983. Therefore, COG#5 was not being used for drinking water purposes at times when TCE concentrations above 5 ppb was present in water generated by this well.

clear directive for protection of public health in the case of this unlikely event, EPA has decided to add the wellhead treatment requirement as described above. It must be noted that this drinking water wellhead treatment requirement may not be determined by EPA to be an adequate long-term response action for groundwater contamination of a drinking water well. The purpose of this well-head treatment requirement is to protect public heath in a timely fashion by ensuring the quality of drinking water being extracted from drinking water wells in or near the PGA site.

G. Groundwater Clean-up Levels for Benzene, Ethylbenzene, 1,1,2,2 Tetrachloroethane, and Tetrachloroethene. Table 2-5 of the ROD provides the groundwater clean-up standards for the PGA site. The 1991 ESD revised the MEK groundwater clean-up standard to be 350 ppb and adopted 700 ppb as the groundwater clean-up standard for acetone. During the 1992 soil gas testing in the soil target area at the Unidynamics facility, four contaminants were detected that were not detected at the writing of the ROD or the 1991 ESD. These four new contaminants are benzene, ethylbenzene, 1,1,2,2-tetrachloroethane, and tetrachloroethene (also known as perchloroethene or PCE). Because migration of these contaminants to groundwater is possible, EPA has added clean-up levels for these contaminants to Table 2-5 of the ROD. In addition, groundwater clean-up levels for these four contaminants are needed to determine their corresponding clean-up levels in the soil upon applying the EPA-approved contaminant transport model. As with all other Table 2-5 contaminants, the soil clean-up levels for these four new

contaminants shall be determined based upon a decision-tree described in the ROD and are related to their clean-up levels in groundwater.

It must be noted here that consistent with the "petroleum exclusion" allowed by CERCLA, the groundwater cleanup standards for benzene and ethylbenzene are not applicable to actions related to the clean up of petroleum products released from a petroleum underground storage tank.

EPA has added clean-up levels for these four new contaminants to Table 2-5 of the ROD as follows:

Benzene : 5 micrograms per liter or 5 ppb[16]

Ethylbenzene: 700 micrograms per liter or 700 ppb[17]

Tetrachloroethene: 5 micrograms per liter or 5 ppb[18]

1,1,2,2-tetrachloroethane: 0.18 micrograms per liter or 0.18 ppb[19]

The above groundwater clean-up standards for benzene, tetrachloroethene, and ethylbenzene are the maximum concentrations levels (MCLs) for these contaminants established by the Safe Drinking Water Act. Therefore, the clean-up standards for benzene,

---

[16] Reference: Region 9 Environmental Protection Agency Drinking Water Standards and Health Advisories Table, December 1992 (see Administrative Record Document No. 30).

[17] same as 13.

[18] same as 13.

[19] Reference: Human Health-based Guidance Levels for the Ingestion of Contaminants in Drinking Water and Soil, Arizona Department of Environmental Quality, June 1992. (see Administrative Record Document No. 16).

tetrachloroethene and ethylbenzene are ARARs.

Since the MCL for tetrachloroethene had not been established in 1987, EPA set its groundwater clean-up level to be 3 ppb in Table 1 of the 1987 ROD. Therefore, this action hereby modifies the tetrachloroethene groundwater clean-up level listed in Table 1 of the 1987 ROD to be 5 ppb in addition to adding this same level to Table 2-5 of the 1989 ROD.

In the absence of an MCL and EPA risk reference dose data, the groundwater clean-up standard for 1,1,2,2-tetrachloroethane is based on the ADEQ action level for groundwater found in the ADEQ document Human Health-Based Guidance Levels for the Ingestion of Contaminants in Drinking Water and Soil, dated June 1992. Since ADEQ does not promulgate their action levels, the clean-up standard for 1,1,2,2-tetrachloroethane is a "to-be-considered" (TBC) clean-up level and not an ARAR.

Attachment #3 provides an updated version of Table 2-5 after incorporating modifications established by the 1991 ESD and by this ESD.

IV. SUPPORT AGENCY COMMENTS

The Arizona Department of Environmental Quality (ADEQ) and the Arizona Department of Water Resources (ADWR) reviewed, concurred and provided comments on the proposed ESD dated March 1993. Comments regarding this proposed ESD submitted to EPA by these two state of Arizona agencies are summarized below.

ADWR concurred with the proposed ESD and submitted the following three comments:

1) The beneficial use of treated groundwater (re-injection) is consistent with Arizona Revised Statues Title 45 (Pages 21-23). ADWR strongly encourages re-injection of treated water at Superfund sites. If there are any future changes in end use, the new end uses(s) must be consistent with state laws.

2) Pursuant to A.R.S. 45-454.01, no permit is required to withdraw groundwater in the case of re-injection. Because withdrawal of groundwater will take place within a Superfund site and because all water will be re-injected, no Poor Quality Groundwater Withdrawal Permit will be needed from ADWR. Again, if end use changes from re-injection, a permit may be required.

3) Any groundwater withdrawn by the City of Goodyear as "recovered" re-injected water (Page 23) will be considered to be withdrawn pursuant to the city's service area right and will count against the city's gallons per capita per day (GPCD).

ADEQ considered the proposed ESD to be an adequate document and submitted the following four comments:

1) ADEQ still recommends that EPA include a reference in the ESD to the phased groundwater remedy and the proposed Subunit B groundwater remedy for PGA-north.

2) ADEQ appreciates the fact that EPA has described the "trigger level" for ketone concentrations as 50% of the compounds' clean-up standards. ADEQ would, however, like the assurance that adequate testing will be conducted on the efficiency of the groundwater air stripping system, since liquid-phase granular activated carbon (GAC) may not be required.

3) Conditions 1-4 of Table 2 on page 15 of the ESD should be explained in the text of the ESD. Also, the system's destruction efficiency for acetone, methyl ethyl ketone, and trichloroethylene, as determined during the pilot testing period, should be provided in the table.

4) The ESD should state that "ppm" is an abbreviation for "parts per million" (also applicable to Table 1).

Comments numbers one and two from ADWR have been incorporated into this ESD. ADWR's comment number three required no action with respect to this ESD but is provided for informational purposes. All four of the above ADEQ comments have been addressed and incorporated in this ESD.

V. STATUTORY DETERMINATIONS

Considering the new information that has been developed and the changes made to the selected remedy upon implementation of this ESD, EPA believes that the remedy for the PGA site will remain protective of human health and the environment, will continue to comply with federal and state requirements that are applicable or relevant and appropriate to this remedial action, and will continue to be cost-effective. In addition, the revised remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. One or more of the changes and clarifications contained in this ESD are significant, but none of the proposed changes fundamentally change the remedy.

VI. PUBLIC PARTICIPATION ACTIVITIES

EPA has presented these changes to the remedy in the form of

an ESD because the changes are of a significant but not fundamental nature. However, in order to promote public participation, EPA provided the public with a thirty (30) day comment period on a proposed ESD dated March 1993. In accordance with Section 117(c) of CERCLA, 42 U.S.C. Section 9617(c), EPA published in the West Valley View newspaper and the Arizona Republic newspaper a notice that describes the proposed ESD and identified the final due date for public comments as April 1, 1993. In order to collect additional public comment, EPA held a public meeting in the City of Avondale during the public comment period on March 10, 1993. EPA will again publish in the West Valley View and Arizona Republic newspapers a notice that describes this final ESD and announces its availability for review. In accordance with 40 C.F.R. Section 300.435(c)(2)(ii), this final ESD and all documents that support the changes and clarifications herein will be contained in the Administrative Record for the PGA site prior to the commencement of the remedial actions affected by the final ESD.

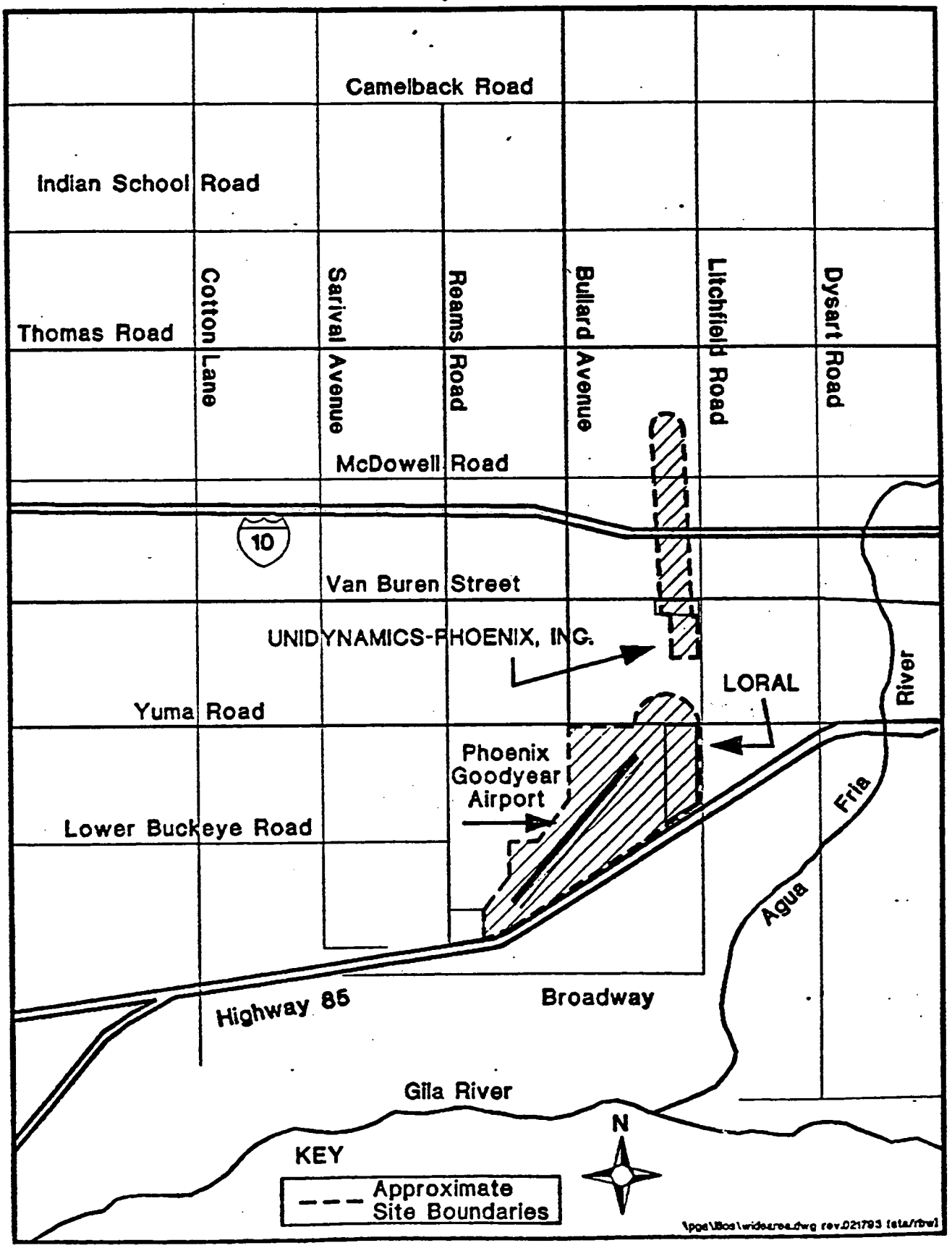
John Wise

John Wise
Acting Regional Administrator

5.5.93

Date

Approximate Boundaries of Phoenix Goodyear Airport Area Superfund Site



ATTACHMENT #2

Overview of the modifications made by Explanation of Significant Differences (ESD#2) to the Phoenix-Goodyear Airport (PGA) Area Superfund site September 1989 Record of Decision (ROD). See Attachment #3 for a listing of modifications to the groundwater clean-up standards at the PGA Superfund site.

The Original 1989 ROD Site Clean-up Plan	The Site Clean-up Plan as modified by ESD#2
Airport Area	Airport Area
- Soils: Soil vapor extraction with vapor-phase carbon emission controls.	- Soils: same as 1989 ROD.
- Deep Groundwater: Pump and treat at a centralized air stripping plant. Provide treated water to City of Goodyear.	- Deep Groundwater: Pump and treat at decentralized liquid-phase GAC treatment units and reinject treated water back into deep groundwater zone.
- Shallow Groundwater: Incorporatated 1987 Record of Decision requirement for pump and treat at a centralized air stripping plant with vapor-phase carbon emission controls. Reinject treated water.	- Shallow Groundwater: same as 1989 ROD.
Unidynamics Area	Unidynamics Area
- Soils: Soil vapor extraction with vapor-phase carbon emission controls.	- Soils: same as the 1989 ROD except treat extracted contaminant vapors by thermal oxidation and wet scrubbing.
- Deep Groundwater: Pump and treat at a centralized air stripping/liquid-phase carbon treatment plant with vapor-phase carbon emission controls. Provide treated water to City of Goodyear.	- Deep Groundwater: same as the 1989 ROD except reinject treated water back into deep groundwater zone.
- Shallow Groundwater: Pump and treat at a centralized air stripping/ liquid-phase carbon treatment plant with vapor-phase carbon emission controls. Reinject treated water.	- Shallow Groundwater: same as the 1989 ROD except suspend implementation of the liquid-phase carbon unit until warranted.
Additional Site-wide Requirements	Additional Site-Wide Requirements
- none.	- Liquid-phase carbon treatment at the well-head for drinking water wells contaminated by Airport or Unidynamics areas.
	- Add 4 new groundwater standards.

ATTACHMENT #3

A summary of the legally applicable state and federal requirements and other criteria for groundwater clean-up levels as reported in Table 2-5 of the September 1989 Record of Decision for Phoenix-Goodyear Airport Area Superfund Site including modifications established by the January 1991 Explanation of Significant Differences (1991 ESD) and modifications established by ESD#2.

All Concentrations are in micrograms per liter.

Compound	Cleanup Level
1,1-Dichloroethylene	7
1,2-Dichloropropane	1
Chloroform	100
Toluene	340
Trichloroethylene	5
Trichlorofluoromethane	1
Carbon Tetrachloride	5
Methylene Chloride	1
Methyl Ethyl Ketone *	350
Xylenes	440
Antimony	1.46
Arsenic	50
Barium	1,000
Beryllium	0.0039
Cadmium	10
Chromium	50
Lead	50
Mercury	2
Nickel	15.4
Selenium	10
Silver	50
Zinc	5,000
Acetone **	700
Benzene ***	5
Ethylbenzene ***	700
Tetrachloroethene ***	5
1,1,2,2-tetrachloroethane ***	0.18

* Revised groundwater cleanup level established by the 1991 ESD
** New groundwater cleanup level established by the 1991 ESD
*** New groundwater cleanup levels established by ESD#2