

PROJECT NAME: Tourtelot Property PROJECT NO.: 35734 / 04-02
 CLIENT: ~~Orion~~ ~~Lee's~~ ~~Contract~~ DRILLING CONTRACTOR: LEE'S BACKHOE
 DRILLING EQUIPMENT: Backhoe DRILLER: LEE
 SAMPLING METHOD: N.A. TOTAL DEPTH: 5'
 START DATE: 5-6-99 COMPLETION DATE: 5-6-99
 LOGGED BY: R. Burginski APPROVED BY: RAB R.G. #5674
 LOCATION: SURFACE ELEVATION:

DEPTH	RECOVERY / ROD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPHM)	REMARKS
0-3'					CL	Silty CLAY (CL): dark yellowish brown (10 YR 9/4); damp; firm; low plasticity.		
3-4'					ML	SILT (ML): yellowish brown (10 YR 5/6); dry to damp; firm to soft; non-plastic.		
4-5'					SHALE	SHALE: olive gray (5 YR 4/2); ^{not until} interbedded ; hard.		
						TDH = 5'		

PROJECT NAME: Tourtelot Property

PROJECT NO.: 35734/04.02

CLIENT: ~~Green Bay~~

DRILLING CONTRACTOR: LEE'S BACKHOE

DRILLING EQUIPMENT: Backhoe

DRILLER: LEE

SAMPLING METHOD: N.A.

TOTAL DEPTH: 6'

START DATE: 5-6-99

COMPLETION DATE: 5-6-99

LOGGED BY: R. Burginski

APPROVED BY: RAB R.E. #5674

LOCATION:

SURFACE ELEVATION:

DEPTH	RECOVERY / ROD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
					CL	0'-1' silty CLAY (CL): dark brown (7.5 YR 3/6); dry to damp; hard; non-plastic.		
					CL	1'-6' silty CLAY (CL): strong brown (7.5 YR 4/6); damp; firm; low plasticity.		
5						6' SANDSTONE: dark yellowish brown (10 YR 4/4) on fresh surface; ^{weathered} fine grained; very hard.		
						TDH = 6'		

APPENDIX C
SEISMIC REFRACTION SURVEY REPORT



June 16, 1999

Earth Tech
695 River Oaks Parkway
San Jose, CA 95134

Subject: Seismic Refraction Survey Report
Tourtelot Property
Benicia, California

Attention: Richard Burzinski

Gentlemen:

This letter report presents the findings of a seismic refraction survey performed by NORCAL Geophysical Consultants, Inc. at the project site. The seismic refraction survey was performed during the period June 2 through 9, 1998 by NORCAL geophysicists William J. Henrich and William Black. Mr. Richard Burzinski and Buzz Barton of Earth Tech provided survey orientation, field support and investigated the refraction survey alignments for buried UXO ordnance prior to data acquisition.

PURPOSE AND SCOPE OF WORK

The purpose of the geophysical survey was to estimate the thickness of overburden and highly weathered bedrock overlying more competent and less weathered rock. This information will be used to evaluate the approximate volume of overburden material for potential removal of buried ordnance. Our scope of work consisted of obtaining seismic refraction data along a series of traverses situated perpendicular to the site's major east-west drainage (see Plate 1). The configuration of the seismic coverage was designated by Earth Tech. The scope of work also included computer processing the seismic data to a tabular format and providing a written report with our interpretation of the results.

DATA ACQUISITION

We obtained seismic compressional P-wave refraction data along 6 alignments comprising a total of 35 separate seismic refraction spreads, labeled A through HH on Plate 1. The length of these spreads ranged from 65 to 91 feet. Each seismic spread consisted of 12 geophones spaced 5 to 7 feet apart in a collinear array and shotpoints located at each end of the array. Seismic energy was produced by impacts of a 10-pound hammer striking a metal plate on the ground surface. All seismic refraction spread alignments were scanned with a metal detector prior to data acquisition. If metallic objects were detected, the proposed geophone placement and shot points were relocated. Seismic profiles consisted of a 12-geophone spread and two shot points.

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Earth Tech, Tourtelot Property
June 16, 1999
Page 2

We acquired seismic data using a Geometrics ES-1225 12-channel engineering seismograph and 4.5 Hz Mark Products geophones. Seismograph records showing the travel time of the seismic energy from the shotpoints to the respective geophones in each spread were printed in the field as analog plots as well as downloaded digitally as binary files to a portable computer.

DATA ANALYSIS

Preliminary seismic refraction analysis of each seismic spread consisted of: 1) determining the P-wave arrival time from the shotpoints to the respective geophones; and 2) plotting these various arrival times to each geophone versus the respective distances from each shotpoint. Linear best-fit line slopes to these data provide an initial indication of number of layers and apparent seismic velocities present below the refraction spread. Refraction data consisting of shotpoint and geophone coordinates, geophone arrival times and respective layer assignments were entered into a seismic inverse modeling program *SIP* (Rimrock Geophysics, 1997, Longmont, Colorado). This program calculates the depths to the seismic refractors (layer interfaces) beneath each geophone and determines the average velocity of each seismic layer. This information has been tabulated to summarize the number of layers and average velocities for each seismic spread as well as the thickness of the surficial layer and the depth to the highest velocity layer defined.

RESULTS

The locations of the seismic refraction spreads are shown on the Seismic Refraction Survey Location Map, Plate 1. They are designated as A through Z and AA through HH. This alphabetic designation is according to the sequence in which each spread was obtained and does not necessarily relate to the 6 major north-south trending alignments across the site drainage. For additional reference, at each of the 35 spreads shown, there are also 2 shotpoints (one at each end) shown. The shotpoint designations range from SP-1 to SP-68.

The tabulated results of the data analysis are presented in Table 1, Seismic Refraction Results. Definition of the various parameters shown on the table are as follows:

Line No. - refers to the six major north-south trending alignments across the site drainage.

Spread Symbol - alphabetic spread designation.

Seismic Layer Velocity - indicates the average layer velocities for each spread. Note that some spreads have two velocity layers while others have three layers. The seismic layers are designated as V1 (surficial layer), V2 (intermediate layer) and V3 (deepest layer).



Earth Tech, Tourtelot Property
 June 16, 1999
 Page 3

Interpreted Thickness-Surficial Material (V1) - this is the range in thickness, in feet, of the V1 layer along each seismic spread. We interpret this layer as representing the thickness of the residual soil and possibly colluvium in localized areas. In areas where V2 is absent, the thickness of V1 is the same as the depth of less weathered rock (V3).

Interpreted Depth to Less Weathered Rock (V3) - refers to the range in depth, in feet, of the V3 layer which we have arbitrarily chosen to be any velocity equal to or greater than 3,000 FPS. We interpret this layer as representing less weathered bedrock. The indicated range in depths also refers to the interpreted thickness of the lower velocity overburden (which may include both soil and colluvium) and may also include the bedrock weathered zone that overlies the less weathered and higher velocity bedrock.

The data on Table 1 generally resolves the shallow subsurface into two or three seismic velocity layers. Where there are only two layers, it probably indicates where the residual soil grades into the less weathered bedrock. The presence of three layers probably indicates that there is a thicker bedrock weathered zone and that there may also be additional colluvium such as landslide debris overlying the less weathered rock. Along three of the spreads (Spreads A, W, and Q-1) the V3 layer is not defined. This may indicate that the bedrock weathered zone is thicker than elsewhere and the less weathered rock is at depths greater than the designed depth of investigation.

Table 1., Seismic Refraction Results

LINE NO.	SPREAD SYMBOL	SEISMIC LAYER VELOCITY (FPS)			INTERPRETED THICKNESS-SURFICIAL MATERIAL (FT)	INTERPRETED DEPTH TO LESS WEATHERED ROCK (FT)
		V1	V2	V3		
1	A	700	2350	--	1-2	--
1	B	700	2000	5900	2-8	6-36
1	C	740	2475	8730	2.5-4	14-25.5
1	D	1580	--	7650	--	2-6
1	HH	1300	--	7000	--	0-14
1	GG	950	2700	8000	2.5-3	7-20
1	FF	1000	--	3700	--	1.5-8



Earth Tech, Tourtelot Property

June 16, 1999

Page 4

2	E	750	--	3500	--	1-5
2	F	950	--	4000	--	5-8.5
2	G	800	--	6000	--	5-8.5
2	EE	1600	--	3700	--	3-8.5
2	CC	1600	--	4800	--	4-8
2	DD	950	--	3750	--	2-4.5
3	H	800	2400	5800	1-4	23-32
3	I	700	2100	4050	2.5-4.5	4.5-12
3	BB	1100	2700	5400	3-8	8-13
3	AA	875	2250	6500	0-2.5	16-19
3	Z	900	2300	3800	0.5-3.5	11-23.5
3	Y	900	--	3500	--	2.5-3.5
4	J	900	--	3600	--	3-4
4	K	650	2800	4700	3.5-4	13-16.5
4	L	1300	--	5400	--	8-13.5
4	M	800	--	6300	--	1-10
4	X	950	2300	5200	2.5-5	14-22
4	W	950	2900	--	0.5-7	--
5	N	900	--	3300	--	1-6
5	O	950	2000	4650	3-6	15-18
5	V	850	2400	8000	3-6	15-24
5	U	900	2300	3800	2-5	4-24
5	T	1175	--	4000	--	6-11
6	Q	950	--	3300	--	6-9



Earth Tech, Tourtelot Property

June 16, 1999

Page 5

6	P	1200	--	3500	--	6-13
6	S	950	1800	7050	1-5	11-16
6	R	1000	--	3500	--	2-12
6	Q-1	900	2900	--	2-9	--

STANDARD CARE AND WARRANTY

The scope of services for this project consisted of using seismic refraction to characterize the shallow subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques employed. We performed our services in a manner consistent with the level of skill ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate the opportunity to provide you with this information. If you have any questions or require additional geophysical services, do not hesitate to call us.

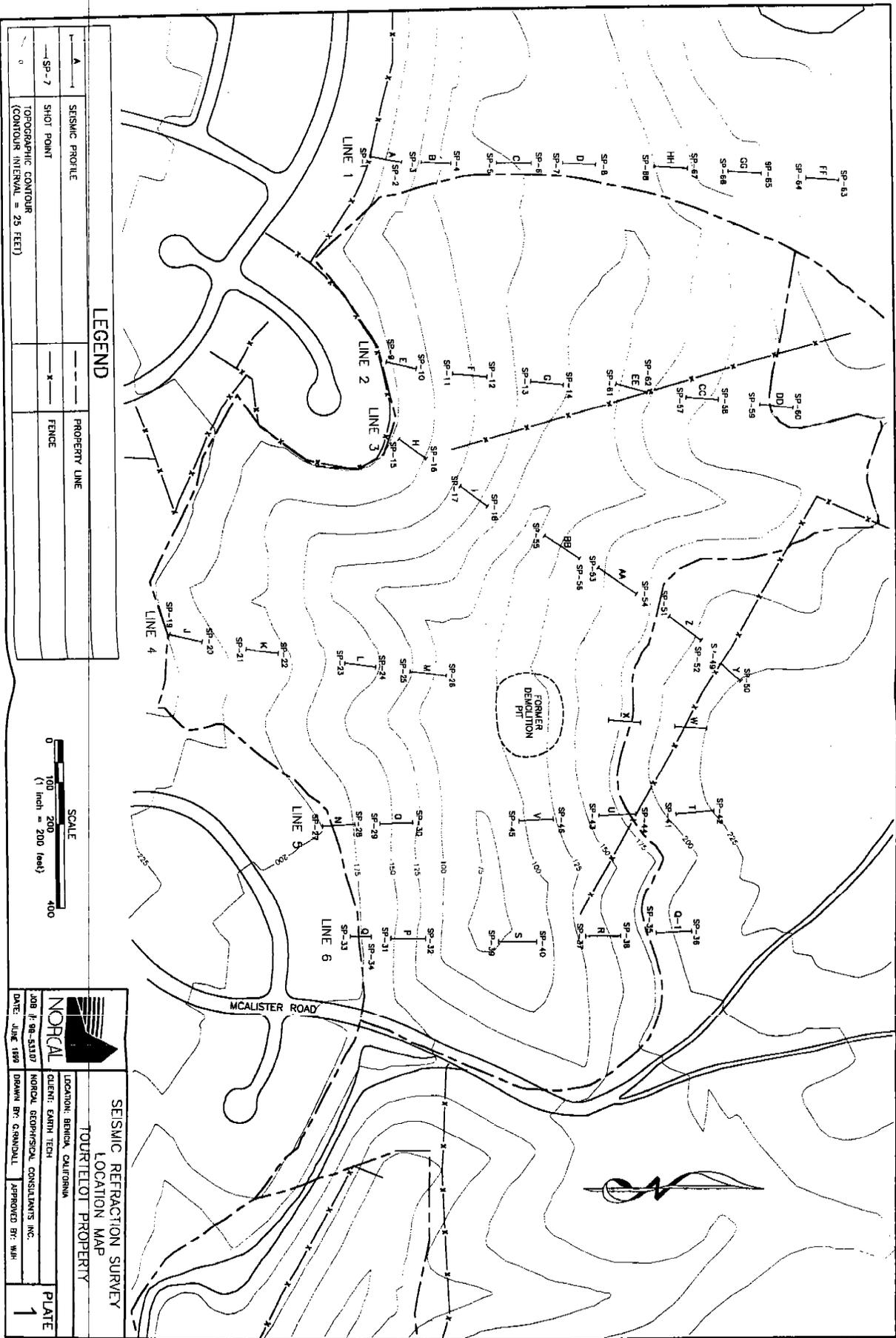
Respectfully,

NORCAL Geophysical Consultants, Inc.

William J. Henrich
Geophysicist GP-893

WJH/jh

Enclosure: Plate 1



—SP-7	SEISMIC PROFILE
—	SHOT POINT
—	TOPOGRAPHIC CONTOUR (CONTOUR INTERVAL = 25 FEET)

LEGEND

—	PROPERTY LINE
—	FENCE



	SEISMIC REFRACTION SURVEY	
	TOURTELOI PROPERTY	
LOCATION: BERKELEY, CALIFORNIA CLIENT: EARTH TECH NORCAL GEOPHYSICAL CONSULTANTS, INC. DRAWN BY: G. RANDALL APPROVED BY: W.H.	JOB #: SR-53107 DATE: JUNE 1989	PLATE 1

APPENDIX D
AERIAL PHOTOGRAPHIC ANALYSIS

TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Methods	1
Brief Site History	1
North Valley	4
Ridge	5
South Valley	5
Summary of the Photographic Analysis	5
Bibliography	67

LIST OF TABLES

Table

1	List of Aerial Photographs Analyzed for the Project Site	3
2	Summary of Chronology	6

LIST OF FIGURES

Figure

1	Regional Map	2
2	Photograph ABO 52-31 (8-20-1937)	8
3	Photograph ABO 52-32 (8-20-1937)	9
4	Photograph 16PSS14782-1:v:101 (1-16-45)	11
5	Photograph 16PS 51M782-1:v:102	12
6	Photograph 16PS 51M782-1:v:114	13
7	Photograph 16PS 51M782-1:v:115	14
8	Photograph VVWZM7AMS 1 Dec 47 43 827	16
9	Photograph VVWZM7AMS 1 Dec 47 43 828	17
10	Photograph ABO-3K 135	20
11	Photograph ABO-3K 144	21
12	Photograph 146 6inv	23
13	Photograph 147 6inv	24
14	Photograph SOL 1-60	27
15	Photograph SOL 1-61	28
16	Photograph YOL 1-59	29
17	Photograph 3594-1-179	32
18	Photograph 3594-1-180	33
19	Photograph 3594-1-181	34
20	Photograph 3594-1-191	35

**LIST OF FIGURES
(Continued)**

<u>Figure</u>	<u>Page</u>
21. Photograph 3594-1-192	36
22. Photograph 83103-1	38
23. Photograph 83103-2	39
24. Photograph WAC-88CA 29-44	41
25. Photograph WAC-88CA 29-45	42
26. Photograph SOL 136 AV 3601 4 19	44
27. Photograph SOL 136 AV 3601 4 20	45
28. Photograph WAC North Bay - 90 6-23	47
29. Photograph WAC North Bay 90 6-24	48
30. Photograph Not labeled with Identification numbers	50
31. Photograph Not labeled with Identification numbers	51
32. Photograph 91000 2 6-3	53
33. Photograph 91000 2 6-4	54
34. Photograph SOL AV-4070 24 49	56
35. Photograph SOL AV-4070 24 48	57
36. Photograph SOL AV-4535 12 17	59
37. Photograph SOL AV-4535 12 18	60
38. Photograph SOLNO AV 5140 33 30	62
39. Photograph SOLNO AV 5140 33 31	63
40. Photograph SOL AV 5461 12 21 (no stereo pair photograph available)	65

Aerial Photographic Analysis Tourtelot Cleanup Project, Benicia, California

Introduction

This report presents a summary of historic features/activities at what is now the Tourtelot Cleanup Project Site (Project Site), in the city of Benicia, Solano County, California, based on a review of historic aerial photographs. This property is approximately 30 miles northeast of San Francisco (Figure 1). The 220-acre property lies partially within the boundaries of the Former Benicia Arsenal, a U.S. Army installation.

This analysis provides individual stereoscopic-based aerial photograph summary evaluations for each set of photographs. These summary evaluations are technical backup for summaries of site history/activities included in the Draft Ordnance and Explosives (OE) Removal Action Work Plan (Earth Tech, Inc., 2000b) and the Remedial Investigation/Feasibility Study (RI/FS) Work Plan (Earth Tech, Inc., 2000a). In addition, this report provides a summary that maps changes in features that have occurred from one vintage of photographs to the next.

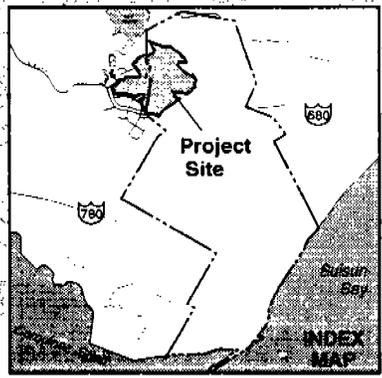
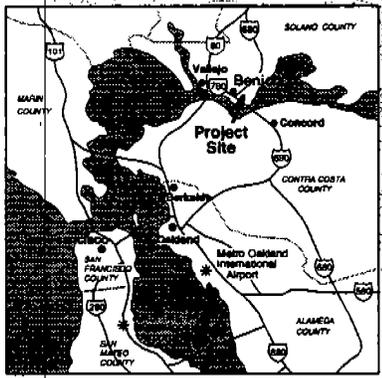
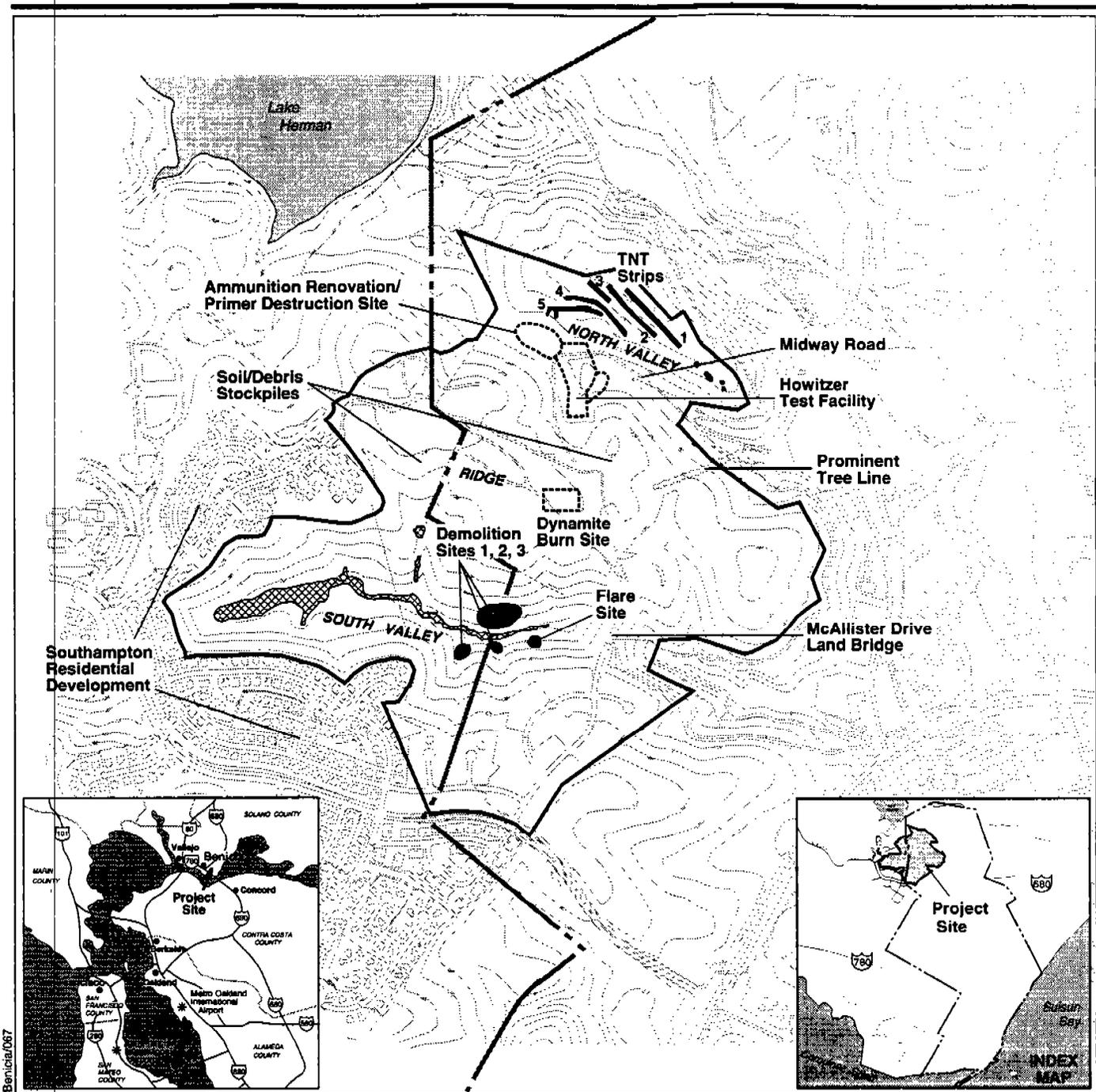
For descriptive purposes, the Project Site has been divided into three geographic areas: the "North Valley," the "Ridge," and the "South Valley." Currently, the Project Site is bordered by the Southampton residential development to the west and south, the Exxon refinery to the south, industrial and commercial facilities to the east, and open space to the north and east. The elevation of the site varies from 75 feet above mean sea level (msl) in the southern region to 250 feet above msl in the northern region.

Methods

Earth Tech conducted an analysis of aerial photographs for the Project Site in December 1999. A total of 39 photographs, comprising 17 vintages or sets of photographs (Table 1) were reviewed with a stereoscope equipped with 10-power magnifying binoculars. These photographs were taken between 1937 and 1997. Two or more images were available for all but one (1997) to enable stereographic analysis. The analysis focused on evidence of features seen or not seen in each photographic set. These features included construction (buildings), earth-moving (grading), roads, and other ground-disturbing activities (e.g., possible past agricultural and demolition activities) in the Project Site. Additionally, the Benicia and Vine Hill, California, 7.5-minute U.S. Geological Survey (USGS) quadrangle maps were used as a reference for the photography. The Records Research Report (Jacobs Engineering, 1999) and the Archives Search Report (U.S. Army Corps of Engineers, 1994) were reviewed for information on the types of activities known or suspected to have occurred within the Project Site. Based upon this analysis, the following descriptions/interpretations of land use were completed. Photographs showing the detailed changes of the Project Site through time have been scanned and are included in this report.

Brief Site History

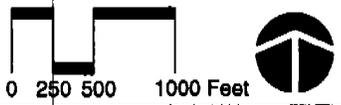
The U.S. Army acquired approximately 2,700 acres of land in the city of Benicia between 1849 and 1958. The U.S. Army established the Benicia Arsenal on this land and used it as an ordnance depot. A 110-acre portion of the Project Site, formerly owned by the Tourtelot family was leased by the U.S. Army from 1944 to 1960. The U.S. Army developed the Project Site and used various portions for military operations such



EXPLANATION

- Project Site Boundary
- ▨ South Valley Wetlands

Tourtelot Property Project Site Map



Notes: Contour interval equals 25 feet.
 Topographic information compiled from aerial photography, September 1998.

Figure 1

Benicia/067

Table 1. List of Aerial Photographs Analyzed for the Project Site
Page 1 of 2

Photograph/Set Number	Date	Scale	Source
ABO 52-31 and ABO 52-32	8-20-1937	1:20,000	National Archives Stereo Pairs from SECOR International Incorporated; U.S. Department of Agriculture
16PS51M4782-1:v:101, 16PS51M782-1:v:102, 16PS51M782-1:v:114, and 16PS51M782-1:v:115	1-16-1945	1:20,000	Eastman Topographic Safety; DIA Archive II, Benicia CA, Can No. 3A927
VVWZM7AMS 827 and VVWZM7AMS 828	12-1-1947	1:27,000	DIA
ABO-3K 135 and ABO-3K 144	8-3-1952	1:20,000	US Department of Agriculture
146 6inv and 147 6inv	5-5-1960	unknown	unknown
SOL 1-60, SOL 1-61, and YOL 1-59	7-2-1962	1:24,000	Geonex
3594-1-179, 3594-1-180, 3594-1-181, 3594-1-191, and 3594-1-192	7-10-1973	1:24,000	Geonex
83103-1 and 83103-2	5-12-1983	1:14,400	unknown
WAC-88CA 29-44 and WAC-88CA 29-45	9-12-1988	unknown	Geonex
SOL 136 AV 3601 4 19 and SOL 136 AV 3601 4 20	7-18-1989	1:36,000	Pacific Aerial Surveys
WAC-North Bay 90 6-23 and WAC-North Bay 90 6-24	5-13-1990	unknown	WAC Corporation
not labeled with ID numbers (2 photos)	9-??-1990	1:15,600	unknown
91000 2 6-3 and 91000 2 6-4	2-17-1991	1:24,000	Geonex
SOL AV-4070 24 48 and SOL AV-4070 24 49	6-21-1991	1:12,000	Pacific Aerial Surveys
SOL AV-4535 12 17 and SOL AV-4535 12 18	9-3-1993	1:12,000	Pacific Aerial Surveys

Table 1. List of Aerial Photographs Analyzed for the Project Site
Page 2 of 2

Photograph Number	Date	Scale	Source
SOLNO AV 5140 33 30 and SOLNO AV 5140 33 31	4-26-1996	1:24,000	Pacific Aerial Surveys
SOL AV 5461 12 21 (no stereo pair available)	7-28-1997	1:12,000	Pacific Aerial Surveys

as demolition and demilitarization activities. In 1962, the Department of Defense declared the entire Benecia Arsenal excess.

Descriptions of known activities in the North Valley, Ridge, and South Valley areas are provided below. In each of these three areas, a series of features known to occur or that have occurred is defined; the presence/absence of these features is tracked throughout this analysis.

North Valley

An area of ground scarring, identified as the Trinitrotoluene (TNT) Strips, is situated on the hillside along the northern slope boundary of the North Valley. It was assumed that explosives were burned in this area, resulting in the strips. The only known activity to occur within the TNT Strips is the burning of TNT; when the organic materials were burned in this area, TNT, its breakdown products, and polyaromatic hydrocarbons (PAHs) were generated (Earth Tech, 2000a).

Midway Road is south of the TNT Strips. This road is an east-west-trending road running from a tree line that is prominent on many aerial photographs of the Howitzer Test Facility.

The Howitzer Test Facility included three permanent structures and various other support structures/areas. Among these structures were the Test Firing Tunnels (two parallel tunnels, known as Building 181); the Test Firing Butts (Building 182); and a concrete Powder Loading Room (Building 183). Between 1957 and 1958, a Cement Test Block (also known as the Nike Test Cells, as well as the Calibration Facility, and hereafter referred to as Buildings 540 and 542) was constructed between the tunnels and the Test Firing Butts. All of these facilities were dismantled by 1996, prior to development.

The North Valley Military Landfill was situated to the east of Buildings 540, 542, 181, and the Howitzer Test Facility.

Adjacent to the Howitzer Test Facility was the Ammunition Renovation/Primer Destruction Site. Two wooden buildings, two canvas shelters, and "squirrel cages," or metal tanks, were constructed in this area in 1950 (the building numbers are unknown). The Primer Destruction Site was used from 1945 to 1947 (Earth Tech, 2000a).

Ridge

The Dynamite Burn Site, approximately one-half the size of a football field, was situated along the Ridge, just south of the North Valley. In this area, out-of-service dynamite was disposed of through burning between 1947 and 1948. A road (described hereafter as a "J"-shaped road) leads southeast from the Howitzer Test Facility (North Valley) to the Dynamite Burn Site in the Ridge area. Once grading commenced on the Ridge, a series of soil/debris piles was noted.

South Valley

South of the Ridge is the South Valley. The Flare Site and three demolition sites have been identified in this area; these sites were locations where flares and other OE scraps/fragmentation were destroyed. No buildings were observed in the aerial photographs in these areas (Earth Tech, 2000a). An access road to these sites was also traced through the South Valley's history.

Summary of the Photographic Analysis

The photographic analysis is presented in two ways. Table 2 presents a brief summary that tracks the chronology of activity at each of the major features identified previously. Following that summary, a more detailed analysis is included for each vintage of photographs. In this detailed analysis, scanned images of each set of photographs (vintage) are provided; a text description of the features seen for that vintage follows.

Table 2. Summary of Site Chronology									
Feature	1	2	3	4	5	6	7	8	9
North Valley TNT Strips	08/20/1937	01/16/1945	12/07/1947	08/04/1952	03/05/1960	07/02/1962	07/10/1973	05/12/1983	09/12/1988
Horizontal Test Facility	Not Visible	Not Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
[Test Firing Trains (2 each) (Blg 181)]	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Visible	Not Visible	Visible	Visible
Post Firing Bins (Blg 182)	Not Visible	Not Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
General Test Bldg, 3A & 3B (Blg 183)	Not Visible	Not Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
General Test Bldg, 3A & 3B (Blg 183)	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Visible	Not Visible	Not Visible	Not Visible
Facility 4, Ka. Vike Test Cells (Blg. 540 and 542)	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Visible	Visible	Visible	Visible
Ammunition Renovation/Primer Destruction Area	Not Visible	Not Visible	Visible	Visible	Not Visible	Visible	Not Visible	Not Visible	Not Visible
2 Woodson Buildings	Not Visible	Not Visible	Visible	Not Visible	Not Visible	Visible	Not Visible	Not Visible	Not Visible
Two Temporary Canvas Shelters	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Visible	Not Visible	Not Visible	Not Visible
Squadral Capes (Metal Tanks)	Not Visible	Not Visible	Visible	Not Visible	Not Visible	Visible	Not Visible	Not Visible	Not Visible
North Valley Military Landfill	Not Visible	Not Visible	Visible	Not Visible	Not Visible	Visible	Not Visible	Not Visible	Not Visible
Midway Road	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
Fence Line	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
Grading/Ground Disturbance	None	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
Other	Approximate NE of property (plowed); prominent E-W tree line	Prominent E-W tree line from rail spurs	Prominent E-W tree line from rail spurs	Prominent E-W tree line from rail spurs	Prominent E-W tree line from rail spurs	Prominent E-W tree line from rail spurs	One unidentified building south of TNT strips along Midway Road	Road to the east and SE of Blg 181	Prominent E-W tree line from rail spurs
Ridge	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Dynamite Burn Area	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Scrub/Docks Piles	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
J-Shape Road	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Grading/Ground Disturbance	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Other	None	None	Vehicle tracks	Increased number of dirt roads throughout the area	New roads and/or extension of "J" shaped Road	Dark area of contrast at east end of the Ridge	None	None	A number of dirt roads present
South Valley Flare Area	Not Visible	Not Visible	Visible	Not Visible	Visible	Visible	Not Visible	Not Visible	Visible
Demolition Sites	Not Visible	Not Visible	Visible	Not Visible	Visible	Visible	Not Visible	Not Visible	Visible
Road leading to Flare/Dance Areas	Not Visible	Not Visible	Visible	Not Visible	Visible	Visible	Not Visible	Not Visible	Visible
McAllister Drive Land Bridge	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Housing Tracts	None	None	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Grading/Ground Disturbance	Small Stand of Trees	Road E-W trending	None	None	New roads	None	None	None	None
Other	Number of Railroad Tracks east of property	Number of Railroad Tracks east of property	None	None	None	None	None	None	None

Table 2. Summary of Site Chronology		10	11	12	13	14	15	16	17
Feature	North Valley	07/15/1989	05/13/1990	09/01/1990	02/11/1991	06/21/1991	09/03/1993	04/28/1996	07/28/1997
TNT Ships	Visible	Visible	Not visible	Visible	Visible	Visible	Visible	Visible	Visible
Howitzer Test Facility	Visible	Portions visible	Not visible	Visible	Visible	Visible	Visible	Visible	Visible
Test Firing Tunnels (2 each) (Bldg 181)	Visible	Visible	Not visible	Visible	Visible	Visible	Visible	Visible	Visible
Test Firing Buns (Bldg 182)	Visible	Visible	Not visible	Visible	Visible	Visible	Visible	Visible	Visible
Powder Loading Room (Bldg 183)	Visible	Visible	Not visible	Visible	Visible	Visible	Visible	Visible	Visible
Command Test Block, a.k.a. Calibration Facility, a.k.a. Nike Test Cells (Bldg 540 and 540)	Not visible	Not visible	Not visible	Visible	Visible	Visible	Visible	Visible	Visible
Ammunition Renovation/Primer Destruction Area	Not visible	Visible	Portions visible	Visible	Visible	Visible	Visible	Visible	Visible
2 Wooden Buildings	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible
Two temporary Canvas Shelters	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible
"Square Cages" (Metal Tanks)	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible
North Valley Military Laundry	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
Howitzer Road	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
Finance Lines	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
Grading/Ground Disturbance	Graded disturbance at the Howitzer Test Facility	Visible ground disturbance from off-highway recreational vehicles in the North Valley Military Landfill area	Grading along the distance from off-highway recreational vehicles in the North Valley Military Landfill area	There is evidence of ground-disturbing activity associated with former structures	Grading seen west and southwest of Howitzer Test Facility	Grading seen west and southwest of Howitzer Test Facility	Grading seen southeast of TNT Ships, south, and west of property	Grading activities seem to the southeast, south and west of the site	Extensive: the two kinds associated with the Renovation/Primer Destruction Area are gone
Other	Prominent E-W tree line from tall pines	Prominent E-W tree line from tall pines	Tree Line is prominent	Soil/ditch pits on west side of property	Soil/ditch pits on west and south-central parts of property; number of dirt trails evident	A number of dirt trails appear throughout the site	Prominent tree line; clearly defined E-W-EE road from housing areas to Howitzer Test Facility	Tree line is prominent	Tree line is prominent
Ridge	Visible	Not visible	Not visible	Visible	Visible	Visible	Visible	Visible	Visible
Dynamic Burn Area	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible
Soil/Ditches Pits	Visible	Not visible	Visible	Visible	Visible	Visible	Visible	Visible	Visible
"J"-Shaped Road	Visible	Visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible
Grading/Ground Disturbance	Visible ground disturbance in the area of the previously observed soil/ditches pits	Grading of Dynamic Burn Area has begun and includes a major dirt road from the western edge of the Ridge toward Kearney Street	Grading throughout the Ridge area with wider and straighter dirt roads than seen previously	Grading along the ridge expanded since September 1990; graded areas are lighter in color, not pass noted	Grading along west edge of Ridge and southwest toward South Valley	There is a small square area that appears the western portion of the Ridge	Grading throughout the Ridge; the square area is visible	Less new grading apparent; previous vegetation cover; there are a number of soil/ditches pits associated with grading	Less new grading apparent; previous vegetation cover; there are a number of soil/ditches pits associated with grading
Other	A number of dirt roads present	Property Fence Road is visible	More dirt trails/roads observed	Many dirt roads/trails	None	Dark, contrasting circular area seen south of the square area; in a gully leading into the South Valley	Dark, contrasting circular area seen south of the square area; in a gully leading into the South Valley	Dark, contrasting circular area seen south of the square area; in a gully leading into the South Valley	None
Soil/Ditches Pits	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible
Fire Area	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible
Demolition Sites	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible
Roads leading to Hangar/Demo Areas	Not visible	Visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible
McAlister Drive and Bridges	Not visible	Construction begun	Construction complete	None within property	None within property	None within property	None within property	None within property	None within property
Housing Tracts	Not visible	Grading south of property and at McAlister Land Bridge	Grading activities in south, southwest, and west edges of property	Grading activities in south, southwest, and west edges of property	Final grading completed south and west	Extensive grading throughout much of the South Valley	Less new grading apparent; previous grading has more vegetation cover	Less new grading apparent; previous grading has more vegetation cover	Less new grading apparent; previous grading has more vegetation cover
Grading/Ground Disturbance	Not visible	These are a number of off-highway recreational vehicle roads and trails	South side of the South Valley; equipment to the west; development has EW trending runoff control ditch	EW trending runoff control ditch visible	EW trending runoff control ditch visible	EW trending runoff control ditch visible	EW trending runoff control ditch visible	EW trending runoff control ditch visible	EW trending runoff control ditch visible
Other	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible	Not visible



Figure 2. Photo Number ABO-52-31
Estimated Scale: 1:30,000



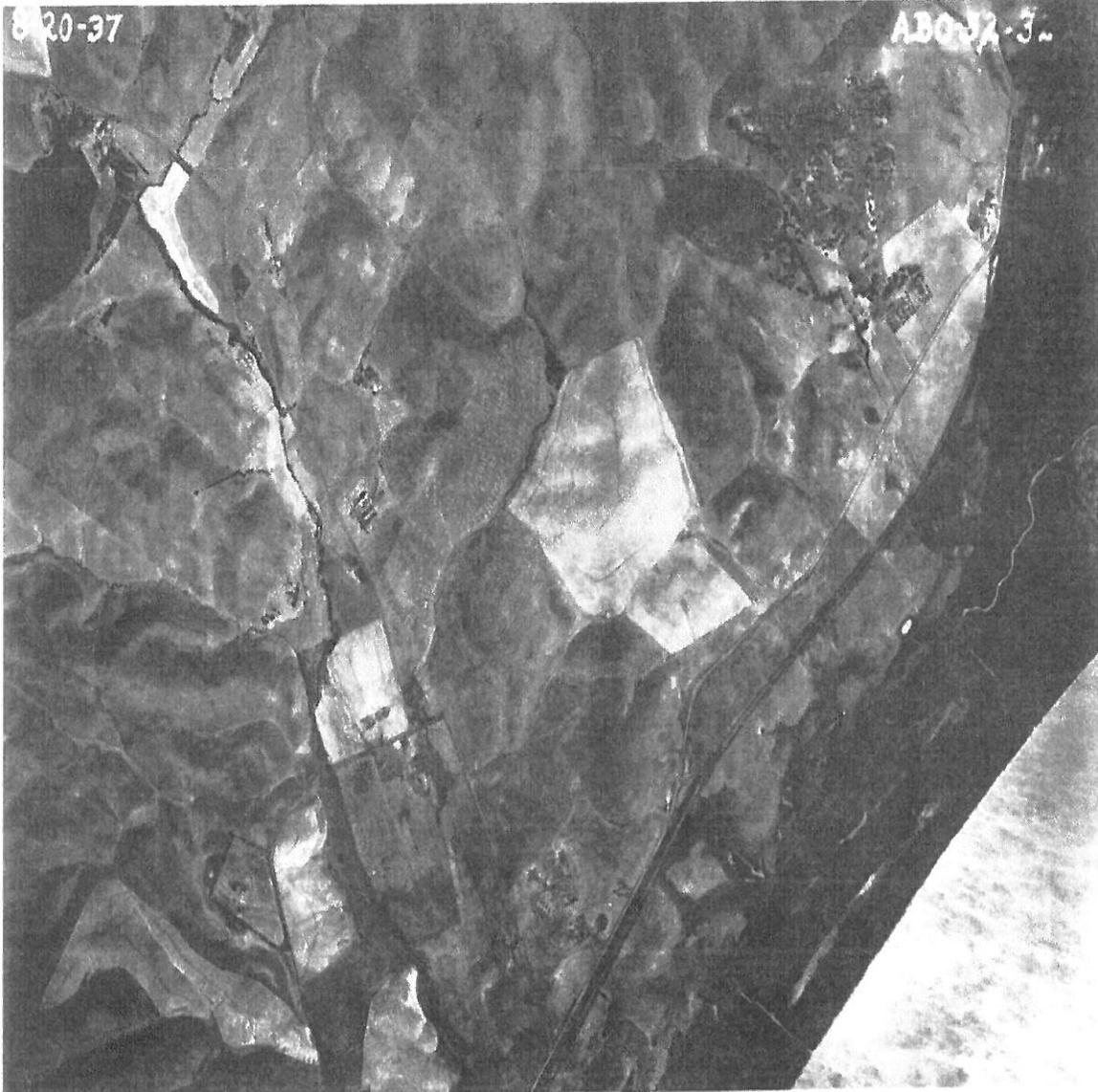


Figure 3. Photo Number ABO-52-32
Estimated Scale: 1:30,000



Photographs: ABO 52-31 (Figure 2) and ABO 52-32 (Figure 3)

Source: National Archives Stereo Pairs from SECOR International Incorporated; U.S. Department of Agriculture

Photo Scale: 1:20,000

Date of Photograph: 8-20-1937

General Description of Photographs:

Portions of the Project Site are in the northwestern corner of Photograph ABO 52-31 and on the western edge of Photograph ABO 52-32. Lake Herman is not visible on Photograph ABO-52-31, but is visible to the northwest of the Project Site on Photograph ABO-52-31. Railroad tracks, including a number of spurs, are to the east of the property. The tanks in the Exxon Oil Company property (southeast of the Project Site) have not been constructed in 1937. No evidence of the Benicia Arsenal is present in the photographs; these photographs pre-date the government's lease of the Project Site in 1944. The Suisun Bay is in the southwestern corner of both photographs. The original topography noted in these photographs shows rolling hills, knolls, and gullies throughout the Project Site.

Project Site Description:

These photographs appear to pre-date any construction on the Project Site.

- **North Valley:** There is very little to be seen in terms of man-made features in the North Valley. A dirt road (possibly Midway Road) and a small structure appear at the base of the slope running northwest from the prominent east-west tree line on the southeastern boundary of the North Valley. An area of agriculture is noted northeast of the property; this field appears to be plowed. Neither the TNT Strips nor any buildings associated with the Howitzer Test Facility or Ammunition Renovation/Primer Destruction Site are visible within the North Valley, although the Project Site fence line is (faintly) visible. The North Valley Military Landfill is not visible. No evidence of grading activities is noted within the North Valley.
- **Ridge:** None of the features known to occur in the Ridge area, including the Dynamite Burn Site, roads, grading activities, and soil piles, were observed on the photographs.
- **South Valley:** A small stand of trees is noted to the southeast in the South Valley. Neither the Flare Site nor the Demolition Sites are visible in this photograph. Neither the McAllister Drive Land Bridge nor the housing tracts have been constructed in 1937. No grading activity is observed.



Figure 4. Photo Number 16PS514782-1:v:101
Estimated Scale: 1:30,000





Figure 5. Photo Number 16PS514782-1:v:102
Estimated Scale: 1:30,000



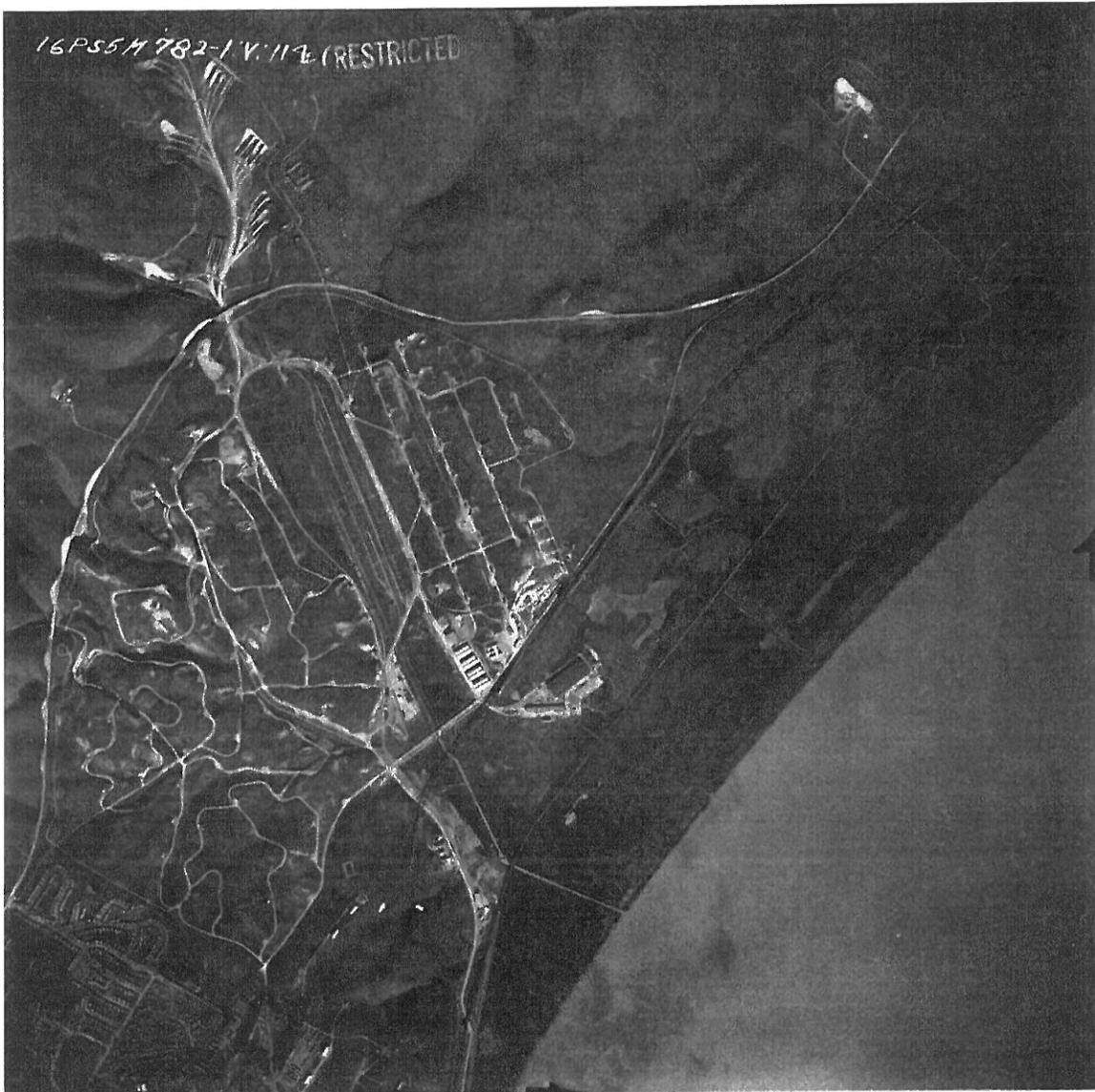


Figure 6. Photo Number 16 PS514782-1:v:114
Estimated Scale: 1:30,000



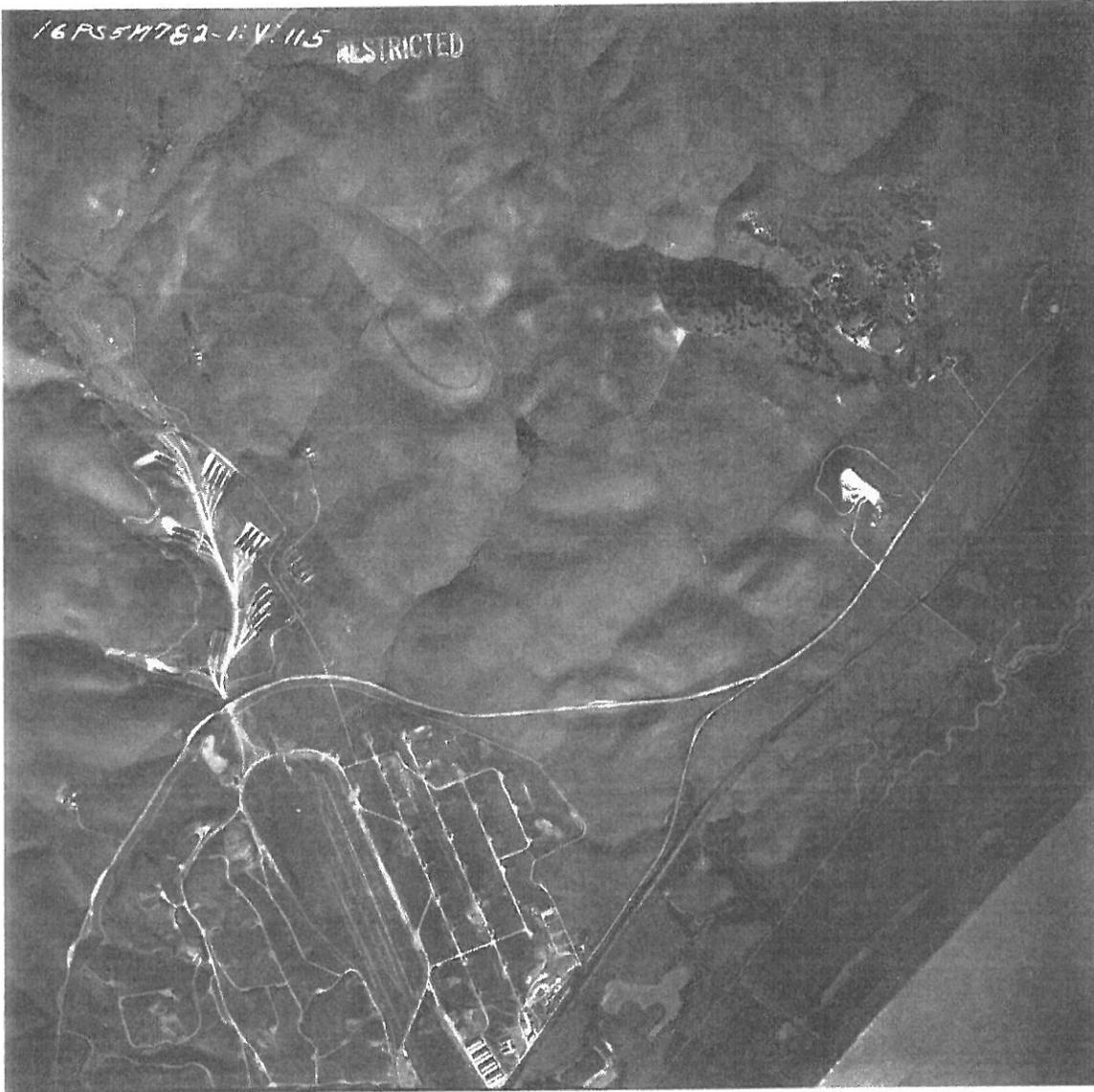


Figure 7. Photo Number 16PS514782-1:v:115
Estimated Scale: 1:30,000



Photographs: 16PS 51M782-1:v:101 (Figure 4) and 16PS 51M782-1:v:102 (Figure 5)
16PS 51M782-1:v:114 (Figure 6) and 16PS 51M782-1:v:115 (Figure 7)

Source: DIA, Archive II, Benicia, CA, Can No. 3A927

Photo Scale: 1:20,000

Date: 1-16-1945

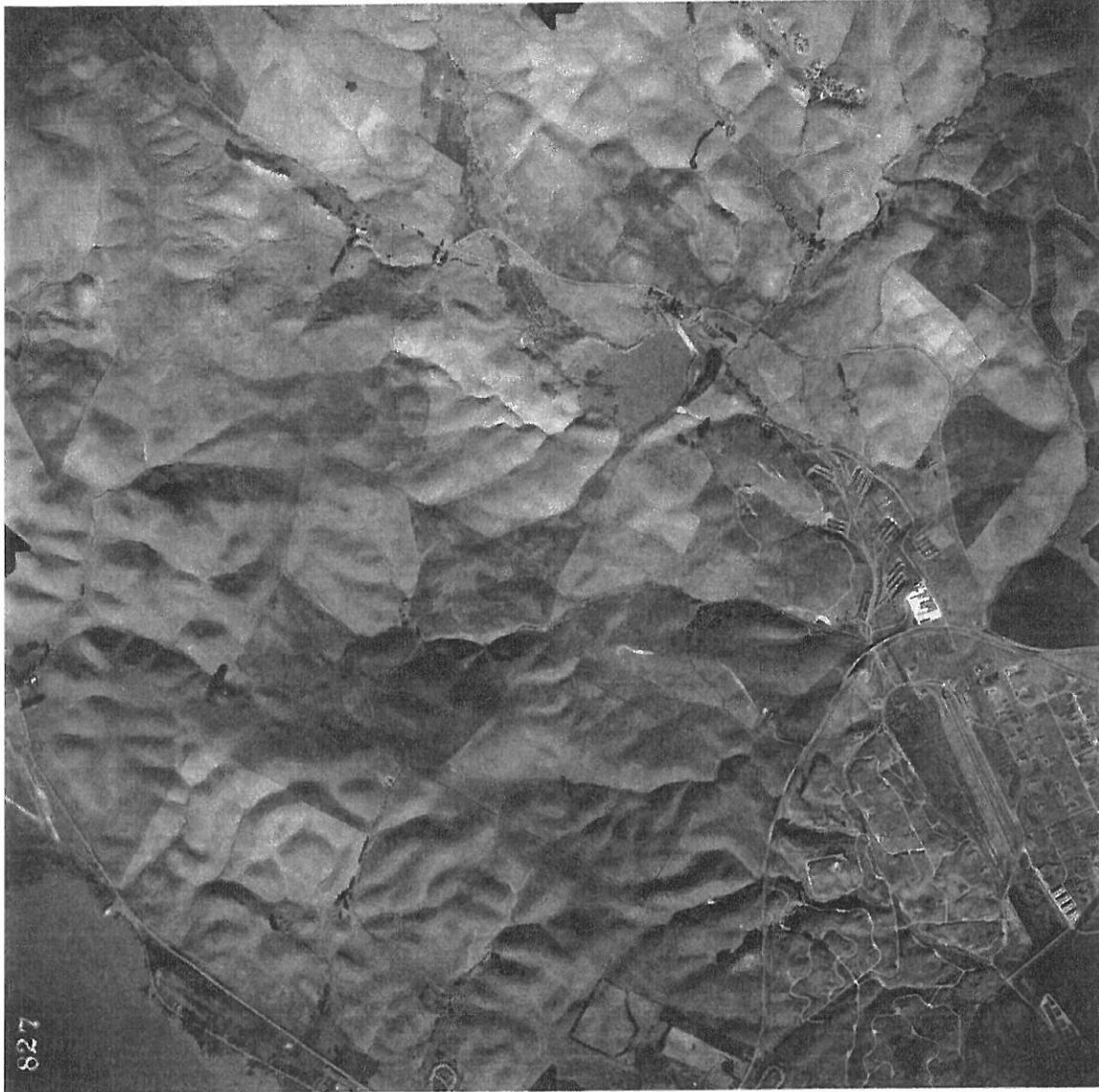
General Description of Photographs:

The Project Site is within the coverage of these four photographs. The property is identifiable in the eastern half of Photograph 101; it is in the southeastern portion of Photograph 102. Portions of the property are visible on Photographs 114 and 115. The property is situated in the northwestern quarter of Photograph 114 and on the western edge of Photograph 115. Lake Herman is visible to the northwest of the Project Site on Photographs 101 and 102 but is not visible on Photographs 114 and 115. A number of railroad spurs have been constructed to the east of the Project Site and are clearly visible in all four photographs. The tanks in the Exxon Oil Company property to the southeast of the Project Site have not been constructed in 1945. Buildings and roads associated with the Benicia Arsenal are now clearly visible to the south of the Project Site. Portions of Suisun Bay are visible in the southeastern corner of Photographs 114 and 115. There are two complexes of buildings just south of the Project Site, possibly homesteads; one of these complexes is noted between Demolition Sites #1 and #2 and the current Exxon Oil Company property, while the second complex is situated between Demolition Site #1 and the railroad tracks, just south of the present-day McAllister Drive Land Bridge.

Project Site Description:

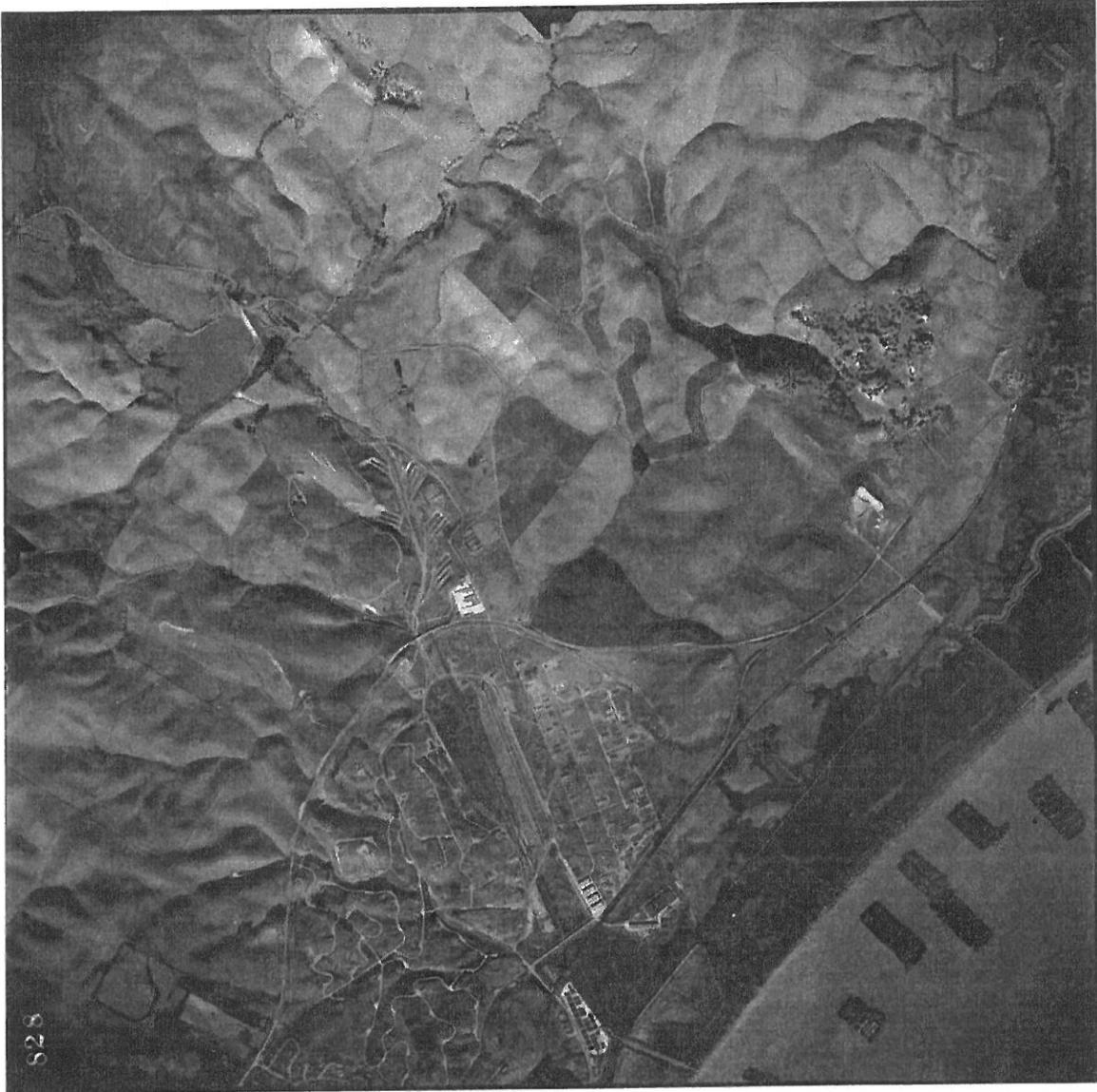
These photographs appear to pre-date any construction on the Project Site portion of the arsenal site.

- **North Valley:** There appear to be no changes to the North Valley since 1937. The Project Site fence line is visible, although no TNT Strips or any other structures (e.g., Howitzer Test Facility, Ammunition Renovation/Primer Destruction Site) are visible in the North Valley on Photographs 101-102. There appears to be some ground disturbance just south of the prominent east-west-trending tree line in the southeastern portion of the North Valley. Midway Road is not identifiable in any of these photographs. The North Valley Military Landfill is not visible in any of these photographs. The prominent tree line/brush that runs east and west from the railroad spurs is evident in Photographs 114-115. No evidence of grading activity is noted within the North Valley.
- **Ridge:** The Dynamite Burn Site is not visible on any of these photographs. There is no ground disturbance or activity noted along the Ridge area in Photographs 114-115. No structures are visible.
- **South Valley:** There is no evidence of activity noted within the South Valley in these photographs. The Demolition Sites and Flare Site are not visible. An east-west-trending road that travels from the railroad spurs westward is visible. This road was not visible on the 1937 photograph. There is no evidence of grading or construction; the McAllister Drive Land Bridge had not been constructed in 1945.



**Figure 8. Photo Number VVWZM7 AMS 1 DEC 47 43 (827)
Estimated Scale: 40,500**





**Figure 9. Photo Number VVWZM7 AMS 1 DEC 47 43 (828)
Estimated Scale: 40,500**



Photographs: VVWZM7AMS 1 Dec 47 43 827 (Figure 8) and
VVWZM7AMS 1 Dec 47 43 828 (Figure 9)

Source: DIA

Photo Scale: 1:27,000

Date: 12-1-1947

General Description of Photographs:

The Project Site is situated in the central portion of Photograph 827 (Figure 8) and the central-western portion of Photograph 828 (Figure 9). Lake Herman is visible to the northwest of the Project Site in both photographs. Railroad tracks and spurs are visible to the east of the Project Site. By 1947, there are a number of buildings in the Exxon Oil Company area; however, there are no large tanks on the Exxon property. More buildings have been constructed on the Benicia Arsenal Property to the southeast, which is visible on both photographs. A number of boats and/or ships appear to be docked in Suisun Bay, as noted in the southeastern corner of Photograph 828. There is a small complex of buildings between D-1, D-2, and the Exxon Oil Company Buildings, near the South Valley portion of the Project Site.

Project Site Description:

- **North Valley:** There are substantial changes to the North Valley visible since 1945. It appears that portions of the Howitzer Test Facility, Ammunition Renovation/Primer Destruction Site, the North Valley Military Landfill, and Midway Road have been constructed at this point. The TNT Strips are also visible. There are four prominent TNT Strips (T1, T2, T4, T5). Ground disturbance is evident between T1 and T2. T3 is not visible. Midway Road links the Ammunition Renovation/Primer Destruction Site and Howitzer Test Facility to the prominent east-west-trending tree line. There are two small, square structures identified within an oval area surrounded by a few small trees; these are situated within the Ammunition Renovation/Primer Destruction Site. It is possible that these structures are the squirrel cages (ca. 1945-1947) and the Powder Loading Room (Building 183). Immediately to the east is a large, rectangular structure, probably the Test Firing Butts (Building 182). The Test Firing Tunnels are not visible. On the southeastern edge of the oval Ammunition Renovation/Primer Destruction Site is a dirt road, running northwest to southeast to the location of the (unseen) Test Firing Tunnels. There appear to be three temporary structures or stockpiles of soil/debris in this area. The North Valley Military Landfill area is visible to the east of Buildings 540 and 542. The Project Site fence line is visible on the western edge of the property.
- **Ridge:** The Dynamite Burn Site is not visible. On the south edge of the oval Ammunition Renovation/Primer Destruction Site is a dirt road running south-southwest toward the Ridge area; this road is shaped like a "J" and links the Dynamite Burn Site with the facilities in the North Valley. At the end of the "J" is a truck turnaround (the Dynamite Burn Site is to the north of this truck turnaround). There do not appear to be any buildings extant within or north of the truck turnaround, only a small stand of trees. The ground shows signs of disturbance with numerous vehicle tracks within the Dynamite Burn Site.

- **South Valley:** There are substantial changes to the South Valley visible since 1945. The Flare Site and Demolition Sites are visible on the north and south side of the valley. There is a dirt road leading to these areas through the valley. There is no evidence of grading activity noted in the South Valley. The McAllister Drive Land Bridge has not been constructed; no home construction has occurred.

8-3-52

ABO-3K-135

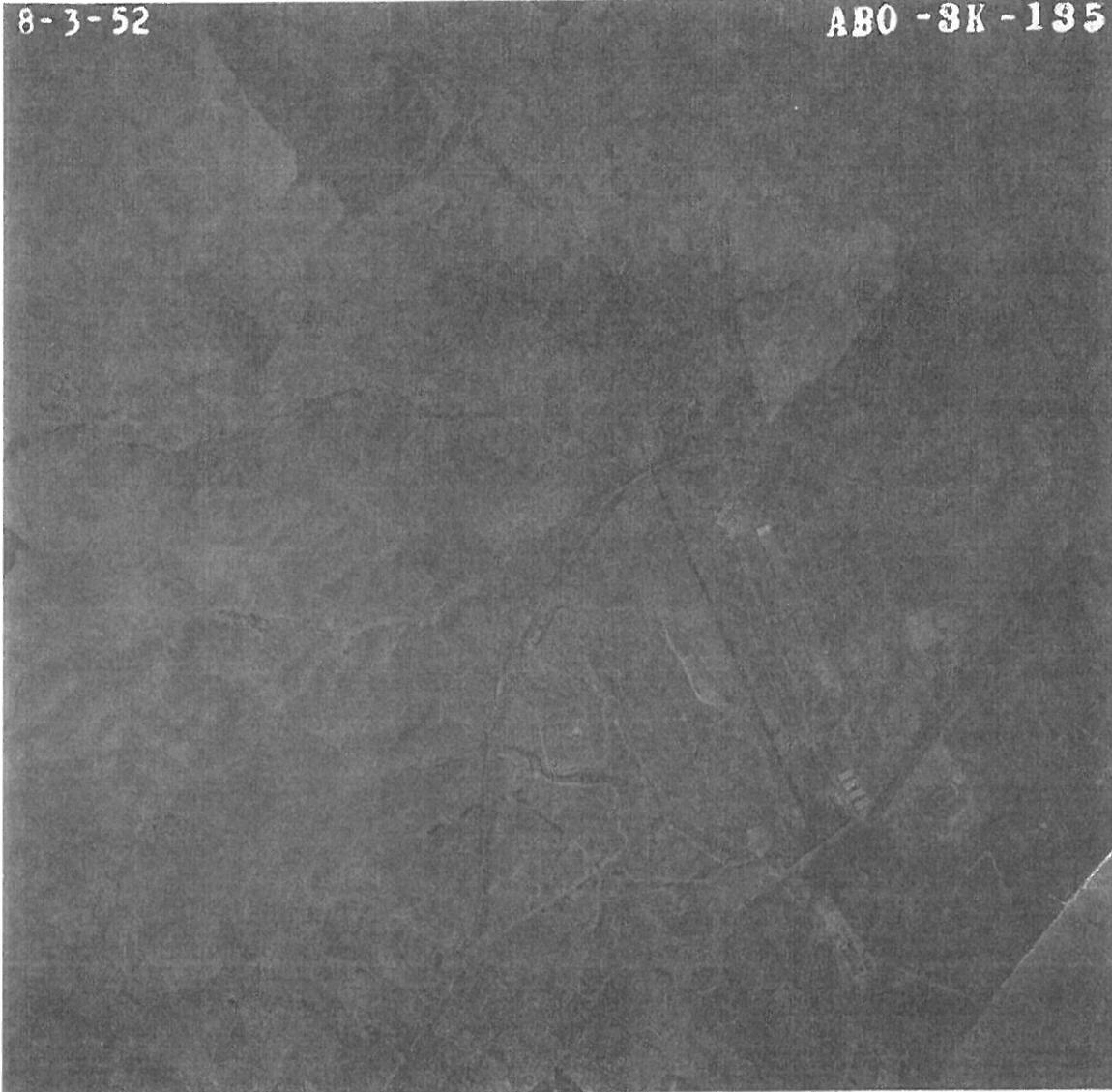


Figure 10. Photo Number ABO-3K 135
Estimated Scale: 1:30,000



8-3-52

ABO-3K-144

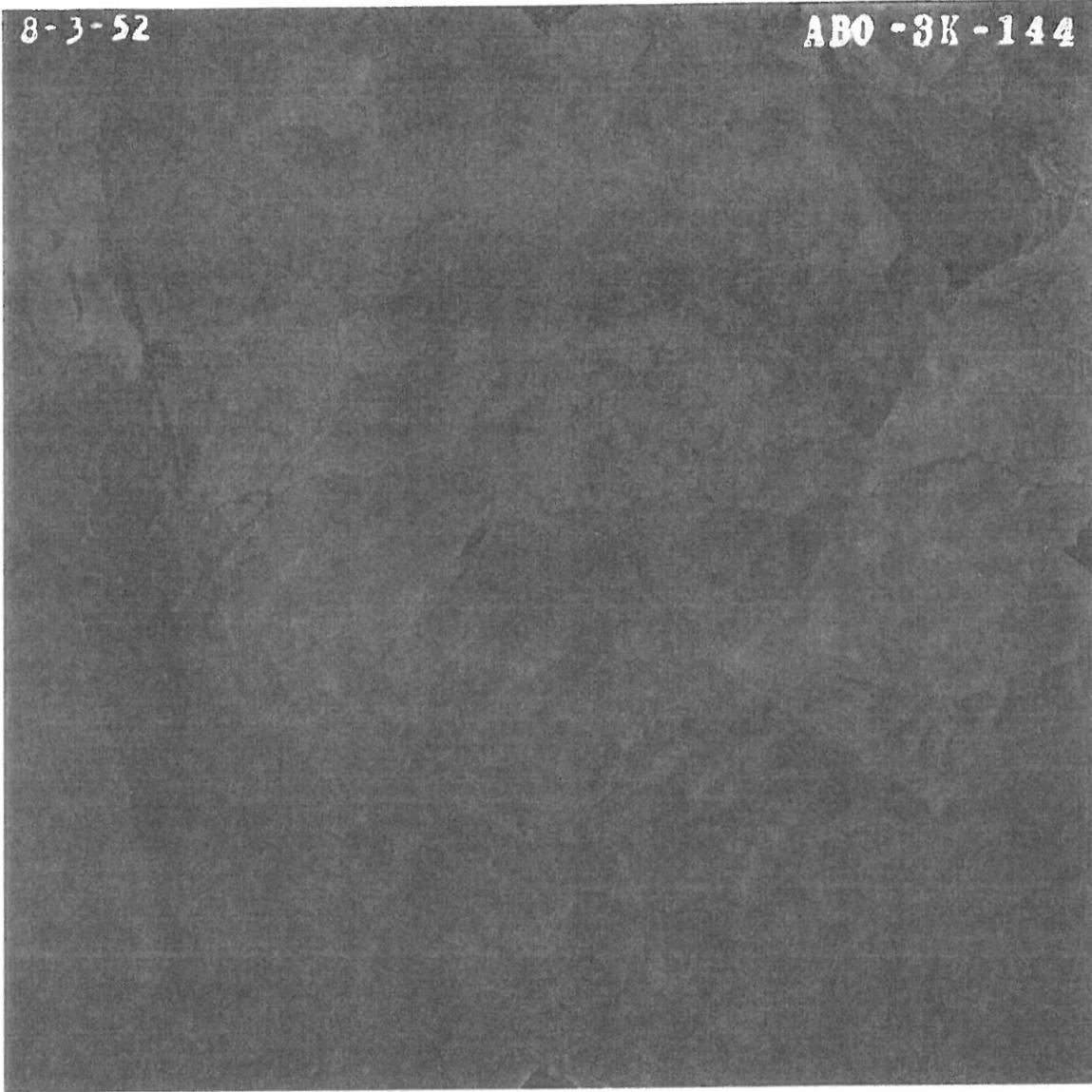


Figure 11. Photo Number ABO-3K 144
Estimated Scale: 1:30,000



Photographs: ABO-3K 135 (Figure 10) and ABO-3K 144 (Figure 11)

Source: U.S. Department of Agriculture

Photo Scale: 1:20,000

Date: 8-3-1952

General Description of Photographs:

The Project Site is situated in the north-central portion of Photograph 135. A portion of the Project Site is visible on the eastern edge of Photograph 144. Lake Herman is visible to the northwest of the Project Site on both photographs. Railroad spurs are visible to the east of the Project Site. There are a number of buildings associated with the Benicia Arsenal in the Exxon Oil Company area; however, no tanks are present on the Exxon Property as of 1952. The Benicia Arsenal is visible to the southwest of the Project Site on Photograph 135. The Suisun Bay is not visible on Photograph 144 but is visible in the southeastern corner of Photograph 135.

Note that the original photographs have a number of white specks on the images that have been caused by the printing process; these are not ground features.

Project Site Description:

- **North Valley:** There are only minor changes visible since 1947. All five TNT Strips, the Powder Loading Room (Building 183), and the Test Firing Butts (Building 182) in the Howitzer Test Facility are visible in the 1952 photograph. The ground disturbance between the TNT Strips noted in the 1947 photograph is no longer apparent. Midway Road and the prominent east-west-trending tree line are also visible. Although it appears that there is a small road leading to this location, neither Buildings 540 and 542 nor the Test Firing Tunnels (Building 181) in the Howitzer Test Facility are visible in these photographs. The North Valley Military Landfill, just east of the Test Firing Tunnel location, is faint. The Project Site Fence Line is faintly visible along the western boundary of the property. There is some ground disturbance noted in the Ammunition Renovation/Primer Destruction Site, although there do not appear to be any structures noted. No evidence of grading is visible.
- **Ridge:** There is evidence of the ground disturbance northwest of the Dynamite Burn Site that was also noted in the 1945 and 1947 photographs. A network of dirt roads converges on the Dynamite Burn Site from all directions. The "J"-shaped road links the Dynamite Burn Site to the facilities in the North Valley. Neither the soil/debris piles nor grading is visible along the Ridge.
- **South Valley:** The only activities visible in the South Valley are a few roads and a disturbed area extending west from the railroad tracks. This disturbed area lies along the southeastern border of the South Valley and the Project Site boundary. The major dirt road access extends westward from this area. Several other smaller roads/trails also cross the South Valley. Nothing is visible around the Flare Site/Demolition Sites except for the road leading to the area.



Figure 12. Photo Number 146 6inv
Estimated Scale: unknown





Figure 13. Photo Number 147 6inv
Estimated Scale: unknown



Photographs: 146 6inv (Figure 12) and 147 6inv (Figure 13)

Source: unknown

Photo Scale: unknown

Date: 5-5-1960

General Description of Photographs:

The Project Site is situated in the east-central portion of Photograph 146 (Figure 12); it is in the northeastern quarter of Photograph 147 (Figure 13). Lake Herman is visible to the northwest of the property on both photographs. Railroad tracks and spurs are still clearly visible to the east of the property; some of the tracks may have been removed from the spurs. There are a number of buildings associated with the Benicia Arsenal in the Exxon Oil Company area; however, no tanks are present on the Exxon Property as of 1960. The Benicia Arsenal is still a prominent feature to the south of the Project Site. Suisun Bay is not visible on Photograph 146 but is visible in the southeastern corner of Photograph 147. A number of boats and/or ships appear to be docked in Suisun Bay, as noted in the southeastern corner of Photograph 147.

Project Site Description:

- **North Valley:** There are a few changes noted since the 1952 photograph. There appears to be an area of recent grading that appears lighter than the surrounding area in the Howitzer Test Facility area and the Ammunition Renovation/Primer Destruction Site not visible in previous photographs. Only the Powder Loading Room (Building 183) and the Test Firing Butts (Building 182) are visible. Midway Road and the prominent east-west-trending tree line are visible in these photographs. Four out of five of the TNT Strips are also visible; T3 is not visible. There is evidence of ground disturbance activity in the area surrounding the North Valley Military Landfill; none of the buildings associated with these areas (Buildings 540, and 542) are visible. The ground disturbance activities have produced scarring in this area that appears lighter than the surrounding area; these activities were not observed in previous photographs of the North Valley. None of the buildings associated with the Ammunition Renovation/Primer Destruction Site are visible in these photographs. The Project Site fence line is prominent along the west edges of the North Valley.
- **Ridge:** The Dynamite Burn Site is visible in these photographs. Light shaded areas suggest grading activities at the Dynamite Burn Site, as well as in the southern part of the Ridge area (i.e., toward the South Valley). South of the prominent east-west-trending tree line that borders the southeastern edge of the North Valley is a light-colored, depressed area that follows the natural relief of the topography. There is evidence of grading at the location of the soil/debris stockpiles. A few piles are noted as well; these piles were not observed in previous photographs of the ridge. The "J"-shaped road, which links the Dynamite Burn Site to the North Valley, is visible and extends toward the soil/debris stockpiles.

- **South Valley:** There is disturbance along the South Valley from the railroad tracks and westward. Most of this disturbance appears lighter than the surrounding area and includes the Flare Site and Demolition Sites. The Flare Site and all three Demolition Sites, which had not been observed in previous photographs, are now visible. There are a number of new roads throughout the South Valley that are visible as well. McAllister Drive Land Bridge has not yet been constructed, nor has any of the housing construction begun.



Figure 14. Photo Number SOL 1-60
Estimated Scale: 1:36,000





Figure 15. Photo Number SOL 1-61
Estimated Scale: 1:36,000





Figure 16. Photo Number YOL 1-59
Estimated Scale: 1:36,000



Photograph: SOL 1-60 (Figure 14), SOL 1-61 (Figure 15), and YOL 1-59 (Figure 16)

Source: Geonex

Photo Scale: 1:24,000

Date: 7-2-1962

General Description of Photographs:

The Project Site is identifiable in the central-western section of Photograph SOL 1-60 and the southwestern corner of Photograph SOL 1-61. Portions of the property are in the northwestern corner of Photograph YOL 1-59. Lake Herman is situated to the northwest of the Project Site, which is identifiable in the northwestern quarter of Photograph SOL 1-60 and in the southwestern quarter of Photograph SOL 1-61. Lake Herman is not visible in Photograph YOL 1-59. Railroad tracks and spurs are still clearly visible to the east of the property. There are a number of buildings associated with the Benicia Arsenal in the Exxon Oil Company area; however, no tanks are present on the Exxon Property as of 1962. The Benicia Arsenal is still a prominent feature to the south of the Project Site. Suisun Bay is visible to the southeast in Photographs SOL 1-60 and YOL 1-59, but is not visible in Photograph SOL 1-61. A number of boats and/or ships appear to be docked in Suisun Bay, as noted in the southeastern corner of Photograph YOL 1-59.

Project Site Description:

- **North Valley:** There are subtle changes to the North Valley since 1960. Four TNT Strips are visible; TNT Strip T3 is not visible. The Howitzer Test Facility is visible; the southern portion of this area appears to be surrounded by trees not noted in previous photographs. The Test Firing Tunnels (Building 181), the Test Firing Butts (Building 182), the squirrel cages, Buildings 540 and 542, the Powder Loading Room (Building 183), and other buildings associated with the Ammunition Renovation/Primer Destruction Site are visible. There is visible ground disturbance to the east and southeast of the Howitzer Test Facility, at the North Valley Military Landfill area. There appear to be a number of structures in the Ammunition Renovation/Primer Destruction Site; possible remnants of the squirrel cages (ca. 1945-1947). Both the Howitzer Test and the Ammunition Renovation/Primer Destruction Site appear to be contained inside of a fence, which is not noted in previous photographs. The Ammunition Renovation/Primer Destruction Site appears to be graded; both hilltops, as indicated by topographic maps, have been removed since 1937. Midway Road is visible. The Project Site fence line is visible along the western edge of North Valley. The prominent east-west tree line is visible. At the northeastern corner of the Project Site is a light-colored area that contrasts with the surrounding area just east of the TNT Strips.
- **Ridge:** The "J"-shaped road traveling south from the Howitzer Test Facility to the Ridge is faintly visible. The Dynamite Burn Site is visible at the end of the "J"-shaped road in these photographs. Some disturbance is shown along the Ridge, including a dirt road visible running south from the edge of the prominent east-west tree line in the southeastern portion of the North Valley toward the South Valley. A darker area that contrasts with the surrounding lighter vegetation of the area is noted along the east edge of the Ridge; this darker area was not apparent in any prior photographs. No

soil/debris piles are visible; however, this location has been disturbed by grading activities, as noted in photographs from 1945 and 1960.

- **South Valley:** No evidence of activity is noted in the South Valley area since 1960; faint traces of the Flare Site and the Demolition Sites are visible. Roads leading to these areas are faint. McAllister Drive Land Bridge has not yet been constructed, nor has any of the housing construction begun.

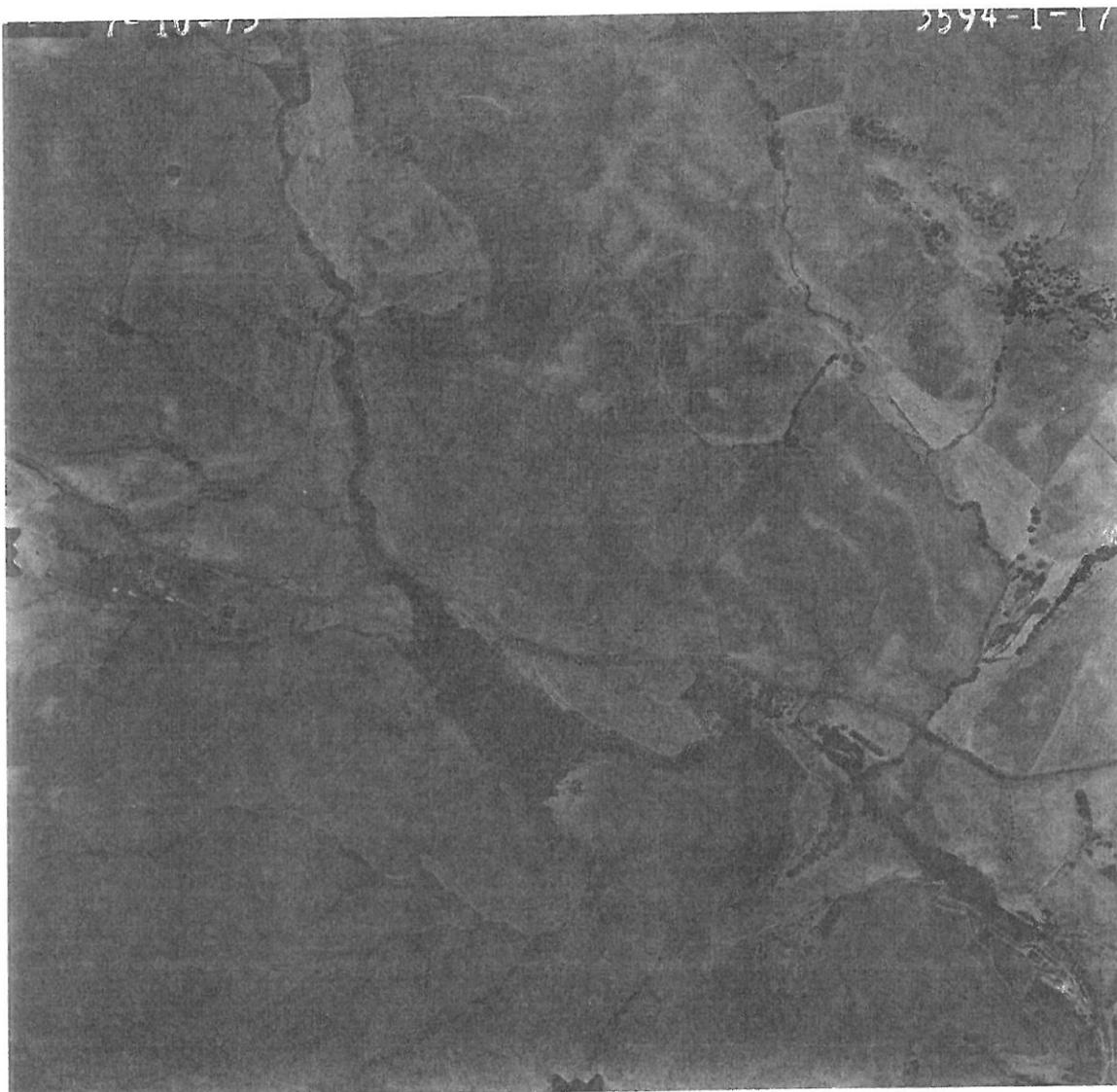


Figure 17. Photo Number 3594-1-179
Estimated Scale: 1:36,000



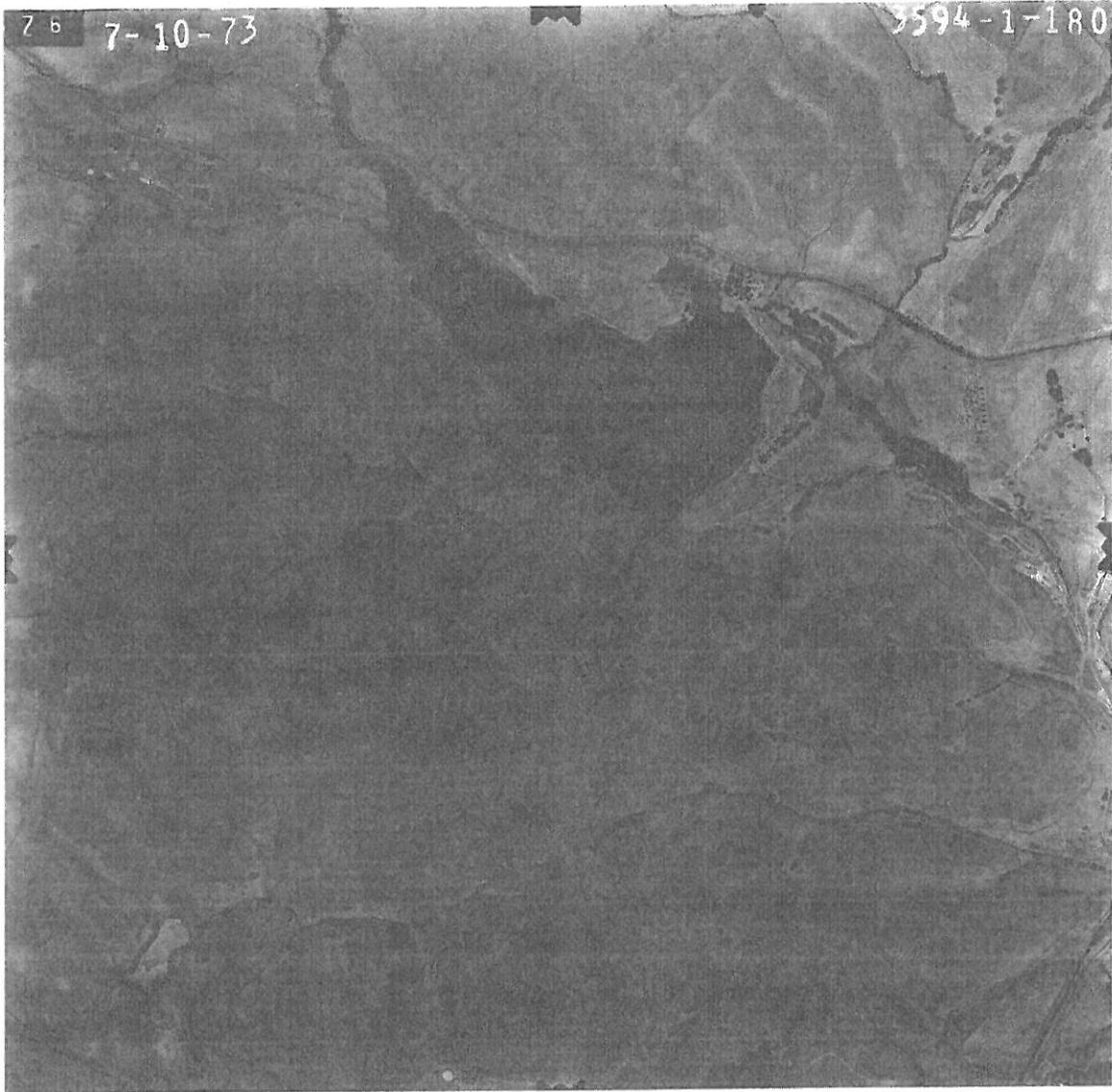


Figure 18. Photo Number 3594-1-180
Estimated Scale: 1:36,000





Figure 19. Photo Number 3594-1-181
Estimated Scale: 1:36,000





Figure 20. Photo Number 3594-1-191
Estimated Scale: 1:36,000





Figure 21. Photo Number 3594-1-192
Estimated Scale: 1:36,000



Photograph: 3594-1-179 (Figure 17), 3594-1-180 (Figure 18), 3594-1-181 (Figure 19), 3594-1-191 (Figure 20), and 3594-1-192 (Figure 21)

Source: Geonex

Photo Scale: 1:24,000

Date: 7-10-1973

General Description of Photographs:

Only the northern portion of the Project Site is visible on the 3594-1-179 photograph, in the south-central edge of the photograph. The entire parcel is visible in the center of Photographs 3594-1-180 and 1-181. Photographs 3594-1-191 and 3594-1-192 contain only the eastern side of the Project Site. Lake Herman is visible on Photographs 179-181 but is not visible on Photographs 191 and 192. Former railroad spurs, now occupied by warehouses, line the eastern edge of the property. There is a plowed area south of the property along the Exxon Oil Company property line. Tanks are now visible on the Exxon property. Tract housing and other development is now present in the location of the Former Benicia Arsenal. The Suisun Bay is not visible in any of these photographs.

Project Site Description:

- **North Valley:** All five TNT Strips are visible; there appears to be a sixth TNT Strip as well between TNT Strips between T3 and T4. This additional TNT Strip was not observed on previous photographs. Within the Howitzer Test Facility remains just one visible large building (Building 182, the Test Firing Butts). The Test Firing Tunnels (Building 181), the Powder Loading Room (Building 183), Buildings 540 and 542, and buildings associated with the Ammunition Renovation/Primer Destruction Site are not visible in these photographs. There is a building visible south of the TNT Strips; this building was not observed on previous photographs. Midway Road, a dirt road, runs from this building south, first curving west, then east around the base of a small knoll, then west again. It continues southwest until it intersects an asphalt road that runs along the perimeter of the property. The prominent east-west-trending tree line has extended to the west since 1962, intersecting the Ridge at the Dynamite Burn Site.
- **Ridge:** The "J"-shaped road traveling southwest from the North Valley to the Dynamite Burn Site is visible. The Dynamite Burn Site is fainter than in previous photographs. There is a dirt road running southwest from the, traveling southwest to a point where it meets the asphalt road, in the South Valley, parallel to the property fence line; this road was noted in the 1960-62 photographs. The disturbance noted in 1962 south-southeast of the tree line/Dynamite Burn Site is visible; however, no soil/debris piles are visible on the west edge of the Ridge.
- **South Valley:** There are minor changes to the South Valley since 1962. The Flare Site and Demolition Sites are not visible in the photographs from 1973, although the dirt roads leading to these areas appear graded. In Photograph 192, there are some graded roads visible from the tree line, traveling a half-moon shape to the south edge of the property; these roads extend toward the Flare Site and Demolition Sites. No other evidence of grading is noted on these photographs. The McAllister Drive Land Bridge is not present, and no construction of housing occurs within the property boundary.

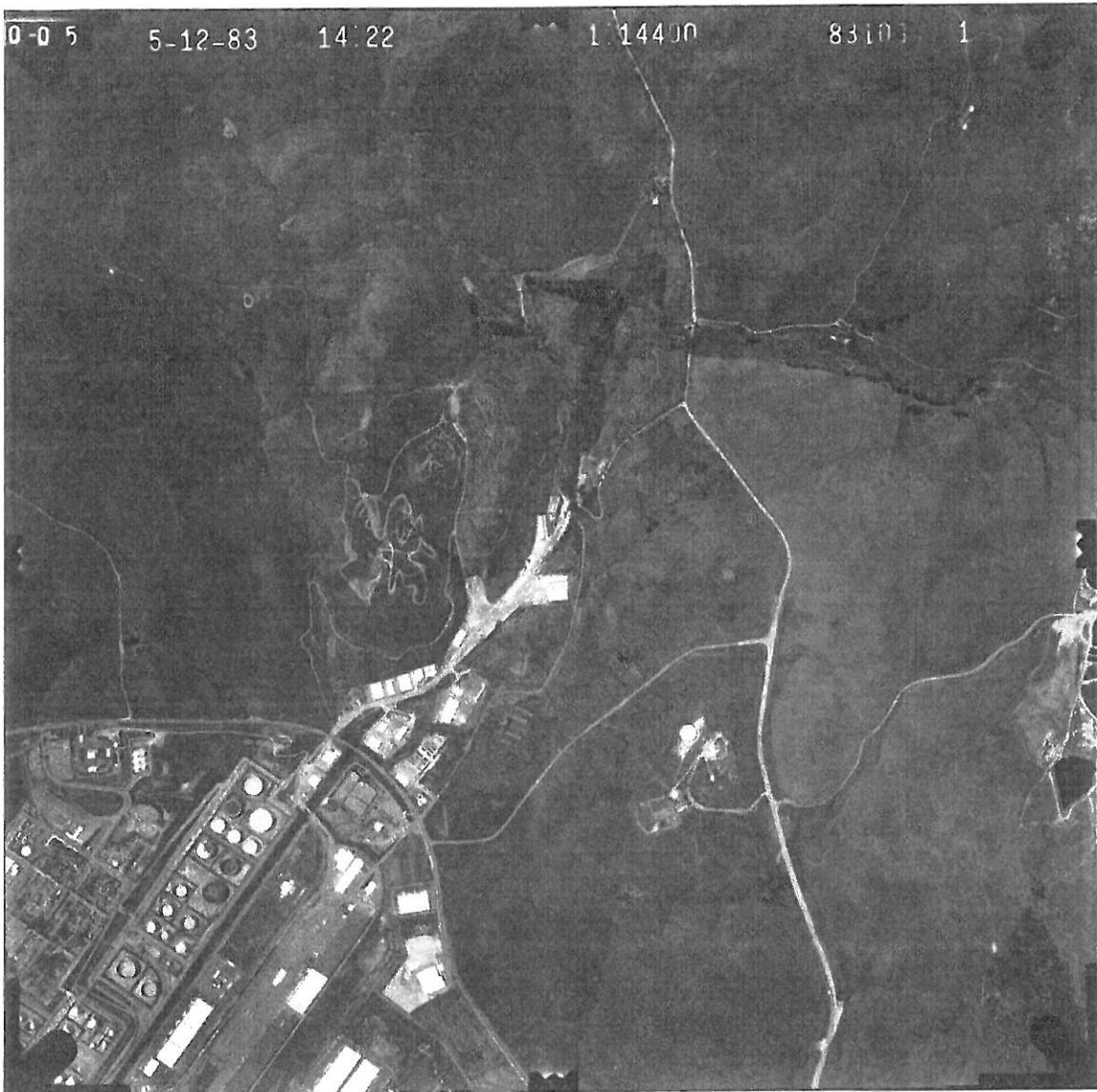


Figure 22. Photo Number 83103-1
Estimated Scale: 1:21,600



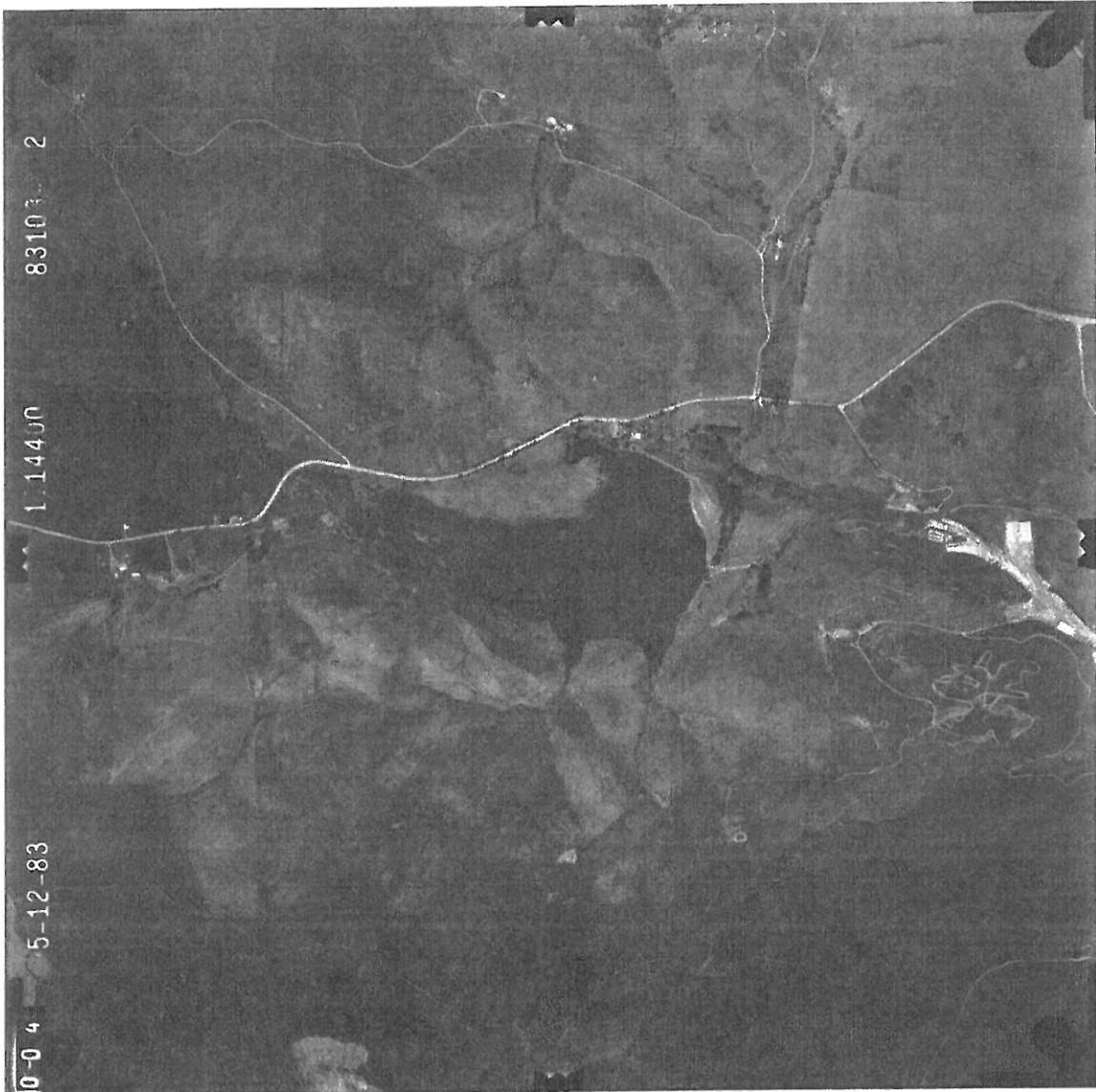


Figure 23. Photo Number 83103-2
Estimated Scale: 1:21,600



Photographs: 83103-1 (Figure 22) and 83103-2 (Figure 23)

Source: unknown

Photo Scale: 1:14,400

Date: 5-12-1983

General Description of Photographs:

The Project Site is situated in the central portion of Photograph 83103-1 and the south-central portion of Photograph 83103-2. Lake Herman is visible to the northwest of the Project Site on both photographs. There now appears to be a drainage and a dam/bridge at Lake Herman. No railroad tracks are visible, although the former beds and spurs are visible to the east of the property. Several warehouses have been constructed on the abandoned railbeds. Exxon Oil Company tanks and buildings are prominent to the south. The Benicia Arsenal and the Suisun Bay are not visible in either photograph.

Project Site Description:

- **North Valley:** There are minor changes to the North Valley since 1973. The Project Site fence line is very faint. Five TNT Strips are visible. There is ground disturbance visible within the Ammunition Renovation/Primer Destruction Site that was not observed in previous photographs. The ground disturbance appears to be from off-highway recreational vehicles. There are three structures in the northern half of the Howitzer Test Facility that include the Test Firing Butts (Building 182), the Powder Loading Room (Building 183), and the remnants of the squirrel cages (1945-47); disturbance is also noted in the middle of this area. Buildings 540 and 542, and the various buildings associated with the Ammunition Renovation/Primer Destruction Site are not visible in these photographs, nor were they seen in the 1973 photographs. Building 181 (Test Firing Tunnels) appears with the north-facing side as an east-west-trending linear feature. A dirt road lies between the buildings in the northern half of the Howitzer Test Facility. This road appears to be graded to the east and southeast of Building 181. The North Valley Military Landfill area is faintly visible, although a network of dirt roads traverses the area. Much of the Ammunition Renovation/Primer Destruction Site is graded as well. Midway Road is still visible.
- **Ridge:** There are minor changes to the Ridge since 1973. The Dynamite Burn Site is visible, surrounded by a number of dirt roads and trails, similar to areas that have been used by off-highway recreational vehicles. These roads or trails are not as numerous in the 1973 photographs. No soil/debris stockpiles are visible. Only a portion of the "J"-shaped road remains visible.
- **South Valley:** There are minor changes to the South Valley since 1973. From the Ridge area to the south and southeastward, there are a number of dirt roads and trails, and residual surface scarred areas previously observed to have some ground disturbance (especially around Demolition Site #1, the Flare Site, and other Demolition Sites). Several of these roads were observed in the 1973 photographs. The McAllister Drive Land Bridge is not present, and no construction of housing occurs within the property boundary.



Figure 24. Photo Number WAC-88CA 29-44
Estimated Scale: unknown



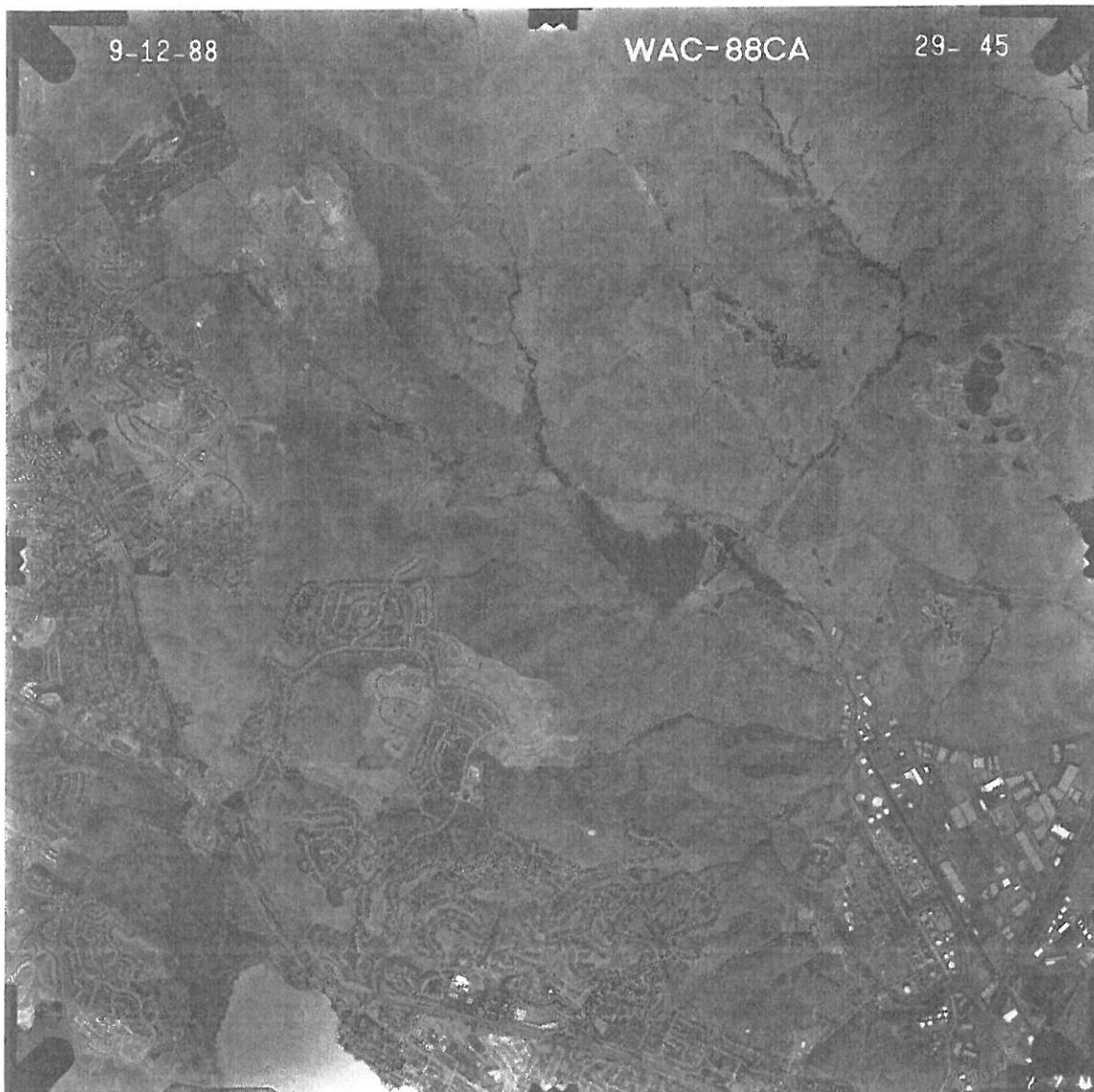


Figure 25. Photo Number WAC-88CA 29-45
Estimated Scale: unknown



Photograph: WAC-88CA 29-44 (Figure 24) and WAC-88CA 29-45 (Figure 25)

Source: Geonex

Photo Scale: unknown (152.35mm film)

Date: 9-12-1988

General Description of Photographs:

The Project Site is situated in the central portions of Photographs WAC-88CA 29-44 and WAC-88CA 29-45. Lake Herman is situated to the northwest of the property and is visible on both photographs. There are warehouses at the site of the former railroad spurs to the east of the Project Site. Tanks and buildings are still present on the Exxon Oil Company property, which lies to the southeast of the Project Site. More housing tracts are being constructed to the west and southwest of the property. The entire southern portions of the Former Benicia Arsenal have been developed. Suisun Bay is visible in the southeastern corner of Photograph 29-44.

Project Site Description:

- **North Valley:** Since 1983, there have been several changes to the North Valley. The Project Site fence line is very faint. Midway Road and a number of other roads are visible in the North Valley. However, there is no evidence of activity within the Howitzer Test Facility or the Ammunition Renovation/Primer Destruction Site. Only traces/outlines of former military use areas remain. None of the buildings associated with the Howitzer Test Facility or the Ammunition Renovation/Primer Destruction Site are visible, except for the north-facing side of the Test Firing Tunnels (Building 181). To the west of these areas is an area of disturbance that was visible in 1973 and 1983. Only faint traces of the TNT Strips are visible. The prominent east-west-trending tree line is visible.
- **Ridge:** There are only minor changes to the Ridge since 1983. The Dynamite Burn Site is visible. There are several dirt roads/trails present throughout the Ridge area. Only a portion of the "J"-shaped road is visible. No soil/debris piles are visible. There is a small, cleared area visible on the western edge of the Ridge.
- **South Valley:** There are very few changes to the South Valley since 1983. The Flare Site and Demolition Sites are extremely faint in these photographs. Several roads, including the one used to access the Flare Site and Demolition Sites, are observed throughout the South Valley. Many of these roads had been observed in the South Valley since 1973. No evidence of grading is noted. The McAllister Drive Land Bridge is not visible, nor are the housing tracts to the immediate south. Some housing is noted to the far west and southwest of the property boundary.



Figure 26. Photo Number SOL 136 AV 3601 4 19
Estimated Scale: 1:54,000





**Figure 27. Photo Number SOL 136 AV 3601 4 20
Estimated Scale: 1:54,000**



Photographs: SOL 136 AV 3601 4 19 (Figure 26) and SOL 136 AV 3601 4 20 (Figure 27)

Source: Pacific Aerial Surveys

Photo Scale: 1:36,000

Date: 7-18-1989

General Description of Photographs:

The Project Site is situated in the southwestern quarter of Photograph SOL 136 AV 3601 4 19 and in the northwestern quarter of Photograph AV 36014 20. Lake Herman is visible to the northwest of the Project Site in both photographs. Very little of the railroad tracks is visible to the east. Most of the spurs have been replaced with warehouses and other structures. Tanks and buildings are still present on the Exxon Oil Company property, which lies to the southeast of the Project Site. More housing tracts are being constructed to the west and southwest of the property. The entire southern portions of the Former Benicia Arsenal have been developed. Suisun Bay is visible in the southeastern corner of both photographs. A number of boats and/or ships appear to be docked in Suisun Bay.

Project Site Description:

- **North Valley:** Only minor changes to the North Valley are observed in photographs since 1988. It appears that very little of the Howitzer Test Facility remains, and faint ground disturbance is visible at the Ammunition Renovation/Primer Destruction Site. The Powder Loading Room (Building 183), Test Firing Butts (Building 182), and Test Firing Tunnels (Building 181) are faintly visible. The TNT Strips are faintly visible. The North Valley Military Landfill is faint. There is no evidence of grading activity near the landfill or west of the Ammunition Renovation/Primer Destruction Site. The prominent east-west-trending tree line remains visible. It appears that the Project Site boundary fence line has been replaced with a dirt road; this appearance is especially strong along the western edge. Midway Road is faintly visible.
- **Ridge:** The Dynamite Burn Site is visible but is fainter than in previous photographs. A prominent east-west-trending road extends to the "J"-shaped road. There is a small area of disturbance in the area of the soil/debris piles; no piles are visible, however. There are a number of dirt roads present throughout the Ridge.
- **South Valley:** There is faint evidence of the Flare Site and Demolition Sites visible in the South Valley. The dirt road leading to these areas is also faint, as are other roads throughout the South Valley. The McAllister Drive Land Bridge is not visible. The only housing tracts noted are outside of the Project Site to the west and southwest.



Figure 28. Photo Number WAC-North Bay 90 6-23
Estimated Scale: unknown



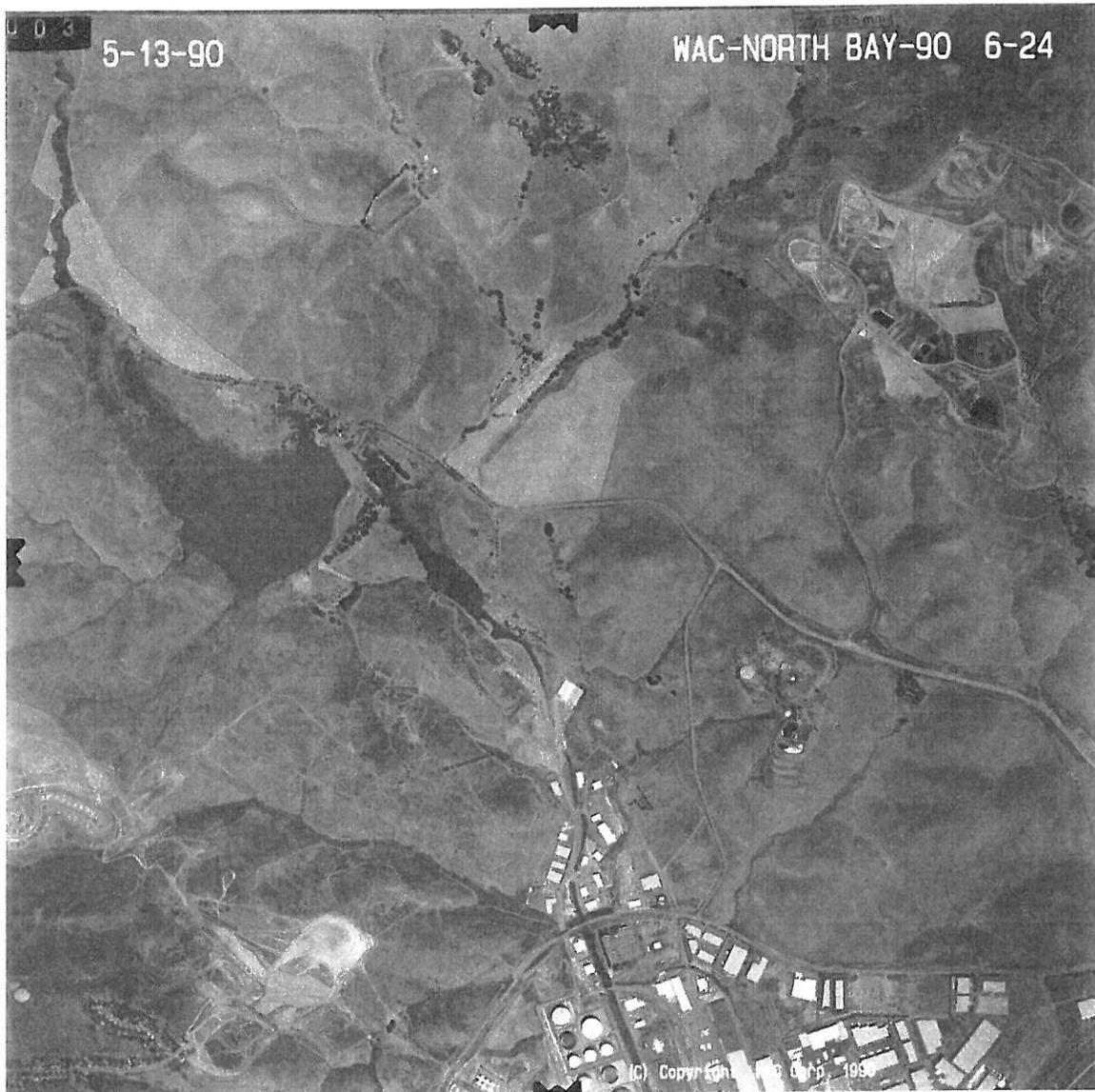


Figure 29. Photo Number WAC-North Bay 90 6-24
Estimated Scale: unknown



Photographs: WAC North Bay - 90 6-23 (Figure 28) and WAC North Bay 90 6-24 (Figure 29)

Source: WAC Corporation

Photo Scale: unknown (208.025mm film)

Date: 5-13-1990

General Description of Photographs:

The Project Site is situated in the northwestern quarter of Photograph 90 6-23 and in the southwestern quarter of Photograph 90 6-24. Lake Herman is visible to the northwest of the Project Site in both photographs. Railroad tracks and spurs are no longer visible. Warehouses are situated to the east of the Project Site. Tanks and buildings are present on the Exxon Oil Company property, which lies to the southeast of the Project Site. More housing tracts are being constructed to the west of the property. Housing tracts and other development are present to the south of the property in the Former Benicia Arsenal. The Suisun Bay is not visible in either of the photographs.

Project Site Description:

- **North Valley:** There are a few subtle changes to the North Valley since 1989. The building along the top of the Howitzer Test Facility (Test Firing Butts, Building 182) is still observable, along with the Powder Loading Room (Building 183). The Ammunition Renovation/Primer Destruction Site can be seen, although no buildings are seen in these locations. The TNT Strips are faint and not easily distinguished from the dirt roads in the area. A prominent, dark, linear feature at the north-facing side of the Test Firing Tunnels (Building 181) is visible. Buildings 540 and 542 are not visible. The North Valley Military Landfill is not visible due to a number of dirt roads and trails likely created by off-highway recreational vehicles. The east-west-trending tree line is visible. The fence line is faintly visible, as is Midway Road.
- **Ridge:** Only a few changes are noted along the Ridge since 1989. The tree line noted in the North Valley is visible, and extends into the Ridge area. The "J"-shaped road leading to the Dynamite Burn Site and the property fence road are visible. A small building is observed south of the approximate middle of the tree line; the building is unidentified and had not been noted in previous photographs of the Ridge. There is a substantial number of dirt roads and trails along the Ridge from off-highway recreational vehicles. A dirt road extends from the Ridge to the west of the South Valley at Kearny Street. The soil/debris piles are not visible, but there are roads throughout this area.
- **South Valley:** Since 1989, there are a few changes noted in the South Valley. There are still a number of roads and trails throughout the South Valley. The Flare Site and Demolition Sites are not visible due to the large number of roads/trails (including the original road that was used to access these sites) that cross the area. It appears that construction of the McAllister Drive Land Bridge has begun on the southern edge of the South Valley. Grading activities are noted south of the South Valley as well. Housing has been constructed to the west and southwest of the Project Site.



**Figure 30. Photo Number (not labeled with ID numbers)
Estimated Scale: 1:23,400**





**Figure 31. Photo Number (not labeled with ID numbers)
Estimated Scale: 1:23,400**



Photographs: Not labeled with Identification numbers (Figures 30 and 31)

Source: unknown

Photo Scale: 1:15,600

Date: 9-??-1990

General Description of Photographs:

The Project Site is situated in the north-center of both photographs. Lake Herman is visible to the northwest of the Project Site in both photographs. Railroad tracks and spurs are no longer visible. Warehouses are situated to the east of the Project Site. Tanks and buildings are present on the Exxon Oil Company property, which lies to the southeast of the Project Site. More housing tracts are being constructed to the west of the property. Housing tracts and other development are present to the south of the property in the Former Benicia Arsenal. The Suisun Bay is not visible in either of the photographs.

Project Site Description:

- **North Valley:** There are a few changes noted in the North Valley since May 1990. The TNT Strips are not visible. Several off-highway recreational vehicle dirt roads/trails traverse the area. Only outlines of the Ammunition Renovation/Primer Destruction Site are visible. The North Valley Military Landfill is not distinguishable, since the area is inundated with off-highway recreational vehicle roads and trails. A dirt road has replaced the fence line on the western edge of the property. There is some grading activity visible at the sites associated with the former structures; none of the buildings associated with the Howitzer Test Facility or the Ammunition Renovation/Primer Destruction Site were observed. The east-west-trending tree line is still prominent. Midway Road is very faint and is surrounded by a number of additional roads.
- **Ridge:** Since May 1990, there are only minor changes noted along the Ridge. The Dynamite Burn Site is graded with visible changes to the elevation along the top of the Ridge. More dirt road/trails are apparent throughout the Ridge; these are straighter and wider than in previous photographs. There are a number of soil/debris piles evident on the western edge of the Ridge. The "J"-shaped road is mostly graded over, and additional dirt roads appear in that area.
- **South Valley:** The most changes noted in the September 1990 photographs are those in the South Valley. Grading activities are identified to the south, southwest, and west edges of the property, including Demolition Sites #1 and #2, and westward. The McAllister Drive Land Bridge that connects the southern portion of the South Valley to the Ridge area has been constructed. A road network covers the entire South Valley area. The Flare Site, Demolition Sites, and the road used to access them are no longer apparent due to grading activities throughout the South Valley, including an east-west-trending run-off control ditch along the south side of the valley. Graded pads being prepared for development are also visible.



Figure 32. Photo Number 91000 2 6-3
Estimated Scale: 1:36,000





Figure 33. Photo Number 91000 2 6-4
Estimated Scale: 1:36,000



Photographs: 91000 2 6-3 (Figure 32) and 91000 2 6-4 (Figure 33)

Source: Geonex

Photo Scale: 1:24,000

Date: 02-17-1991

General Description of Photographs:

The Project Site is noted in the northern half of Photograph 91000 2 6-3 and in the center of Photograph 91000 2 6-4. Railroad tracks and spurs are no longer visible. Warehouses are situated to the east of the Project Site. Tanks and buildings are present on the Exxon Oil Company property, which lies to the southeast of the Project Site. More housing tracts are being constructed to the south and west of the property. Housing tracts are now present to the south of the property in the Former Benicia Arsenal. The Suisun Bay is visible in Photograph 91000 2 6-3.

Project Site Description:

- **North Valley:** Since September 1990, there have been a few changes to the North Valley. The property fence line is extremely faint. The tree line is still prominent. East of the Howitzer Test Facility, there is a disturbed area in the shape of a circled figure eight. This circled figure eight was not observed in any of the previous photographs. Portions of Buildings 181, 182, 540, and 542 are visible as well. The buildings associated with the Ammunition Renovation/Primer Destruction Site are not visible. Portions of the TNT Strips are visible to the northeast of these buildings. An outline of the Ammunition Renovation/Primer Demolition Site is visible, mainly by the cleared area. Grading west and southwest of the Howitzer Test Facility is noted, as are soil/debris piles on the western side of the property. The location of the North Valley Military Landfill is not visible. Midway Road is faintly visible. Several other roads cross the North Valley.
- **Ridge:** There are many dirt trails/roads throughout the Project Site; several of these were noted in previous photographs. The grading along the Ridge was expanded to include additional adjacent areas to the west and north of the previous grading. The graded areas appear lighter than the surrounding area, and several soil piles are noted. The "J"-shaped road and the Dynamite Burn Site are no longer visible by grading activities. This grading was noted as early as May 1990.
- **South Valley:** There are fewer changes to the South Valley than in the previous photographs. Grading for housing and the east-west-trending run-off control ditch is noted on the south and southwest throughout the South Valley. Roads leading to the Flare Site and Demolition Sites appear to have been graded. The McAllister Drive Land Bridge is complete.



Figure 34. Photo Number SOL AV-4070 24 48
Estimated Scale: 1:18,000





Figure 35. Photo Number SOL AV-4070 24 49
Estimated Scale: 1:18,000



Photograph: SOL AV-4070 24 49 (Figure 34) and SOL AV-4070 24 48 (Figure 35)

Source: Pacific Aerial Surveys

Photo Scale: 1:12,000

Date: 6-21-1991

General Description of Photographs:

The Project Site is situated in the north-center of Photograph SOL AV-4070 24 49 and in the south-center of Photograph SOL AV-4070 24 48. Railroad tracks and spurs are no longer visible. Warehouses are situated to the east of the Project Site. Tanks and buildings are present on the Exxon Oil Company property, which lies to the southeast of the Project Site. More housing tracts are being constructed to the south and west of the property. Housing tracts and other development are now present to the south of the property in the Former Benicia Arsenal. The Suisun Bay is not visible from either photograph.

Project Site Description:

- **North Valley:** This photograph is similar to the February 17, 1991, photograph, except that the circled figure-eight shaped dirt road/trail is no longer visible. The TNT Strips are visible. There has been grading to the west and southwest of the Howitzer Test Facility. Grading had been noted since September 1990. Dirt/debris piles are identified on the western edge and in the south-central portion of the property. A number of dirt trails are evident in the North Valley. These trails had been observed in previous photographs of the North Valley. The Test Firing Butts (Building 182), Buildings 540, 541, Powder Loading Room (Building 183), and Test Tunnels (Building 181) are visible. The buildings at the Ammunition Renovation/Primer Destruction Site are visible. Midway Road is visible; however, the North Valley Military Landfill is not visible. The fenceline is visible.
- **Ridge:** Only minor changes are noted along the Ridge since February 1991. The Dynamite Burn Site is not visible in the June 1991 photographs. Soil/debris stockpiles are present on the Ridge. The "J"-shaped road is not visible. Grading has occurred along the western edge of the Ridge and southward toward the South Valley.
- **South Valley:** There are little to no changes observed in photographs of the South Valley since February 1991. The run-off control ditch for the residential development along the south side of the South Valley is visible. The Flare Site and Demolition Sites are not visible. The McAllister Drive Land Bridge is visible in this area. Housing tract lots are graded to the south and west of the property; however, there are none within the property.

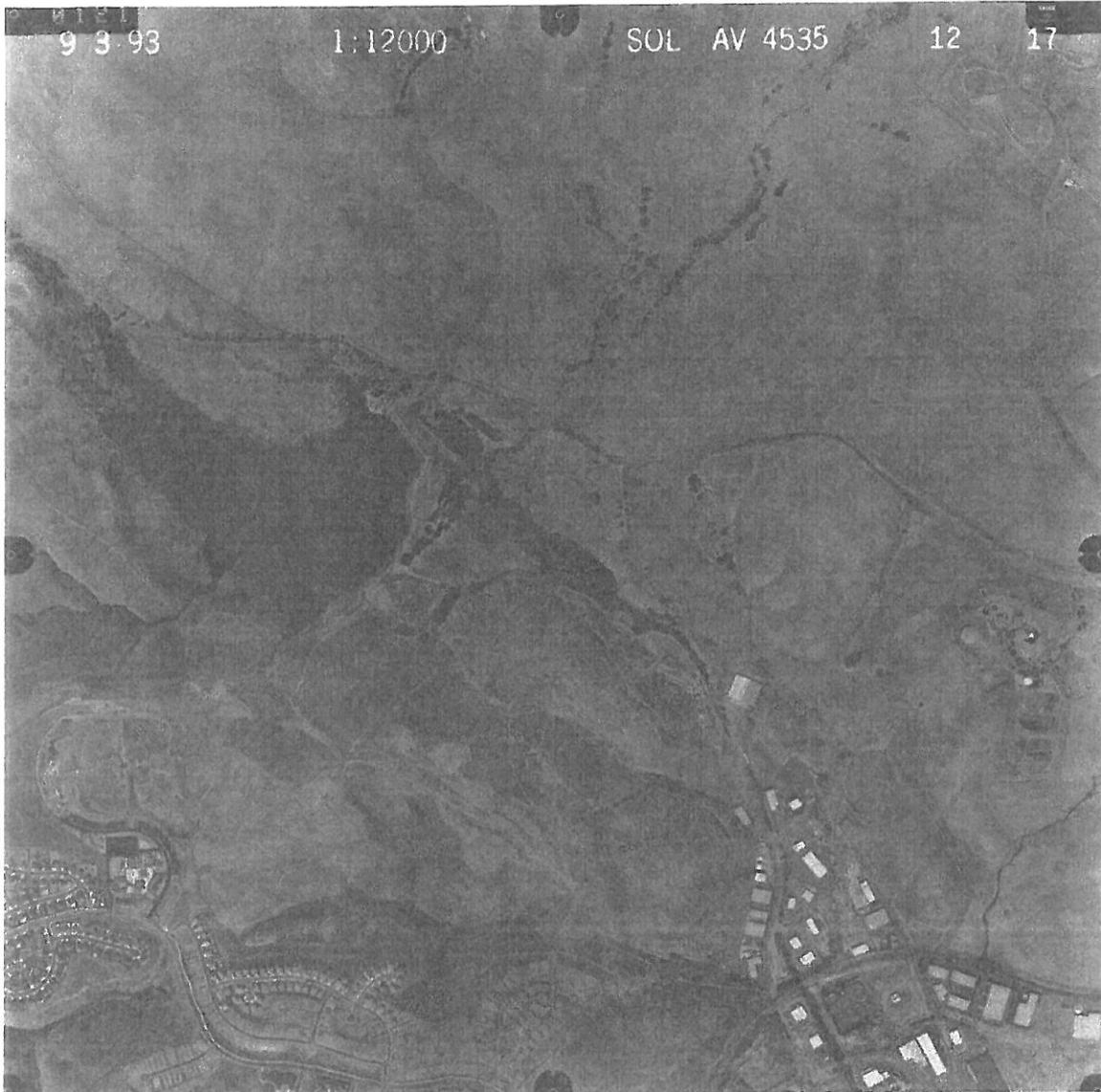
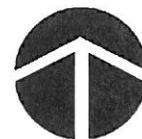


Figure 36. Photo Number SOL AV-4535 12 17
Estimated Scale: 1:18,000





Figure 37. Photo Number SOL AV-4535 12 18
Estimated Scale: 1:18,000



Photograph: SOL AV-4535 12 17 (Figure 36) and SOL AV-4535 12 18 (Figure 37)

Source: Pacific Aerial Surveys

Photo Scale: 1:12,000

Date: 9-3-1993

General Description of Photographs:

The Project Site is in the south-central quarter of Photograph 17 and in the northwestern quarter of Photograph 18. Lake Herman is situated to the northwest of the property and is visible on both photographs. Railroad tracks and spurs are no longer visible. Warehouses are situated to the east of the Project Site. Tanks and buildings are present on the Exxon Oil Company property, which lies to the southeast of the Project Site. Construction has begun on several athletic fields to the west of the Project Site. More housing tracts are being constructed to the south and west of the property. Housing tracts and other development are present to the south of the property in the Former Benicia Arsenal. The Suisun Bay is not visible from either photograph.

Project Site Description:

- **North Valley:** The TNT Strips, Test Firing Butts (Building 182), Test Firing Tunnels (Building 181), and Powder Loading Room (Building 183) are visible in the 1993 photographs. Neither Building 540 nor Building 542 is visible. The Ammunition Renovation/Primer Destruction Site is not visible. Midway Road is visible. The North Valley Military Landfill is not visible. Ground disturbance activities associated with the dirt roads and trails in the area southeast of the TNT Strips, and to the south toward the Ridge area, are still visible. Grading is ongoing southeast of the TNT Strips, south, and west of the property.
- **Ridge:** There are significant changes to the Ridge since 1991. Grading since 1990 has removed visible signs of the Dynamite Burn Site. There are several soil/debris stockpiles on the Ridge. The "J"-shaped road is no longer visible. There is a small, square area that appears to be a type of fenced enclosure on the southwestern edge of the westernmost portion of the graded area (soil/debris piles); this square area was not observed on previous photographs. South of the square enclosure is a dark, contrasting, circular area in a gully leading into the South Valley.
- **South Valley:** Only a few changes are noted along the South Valley since 1991. Grading is visible throughout the South Valley in 1993. The Flare Site and Demolition Sites are faintly visible, and the road leading to these areas is faintly visible. The run-off control ditch along the south side of the South Valley is visible. The McAllister Drive Land Bridge is visible in these photographs.



Figure 38. Photo Number SOL AV-5140 33 30
Estimated Scale: 1:36,000





Figure 39. Photo Number SOL AV-5140 33 31
Estimated Scale: 1:36,000



Photograph: SOLNO AV 5140 33 30 (Figure 38) and SOLNO AV 5140 33 31 (Figure 39)

Source: Pacific Aerial Surveys

Photo Scale: 1:24,000

Date: 4-26-1996

General Description of Photographs:

The Project Site is situated in the southwestern quarter of Photograph SOLNO AV5140 33 30 and the center of Photograph SOLNO AV 5140 33 31. Lake Herman is situated to the northwest of the property and is visible on both photographs. Railroad tracks and spurs are no longer visible. Warehouses are situated to the east of the Project Site. Tanks and buildings are present on the Exxon Oil Company property, which lies to the southeast of the Project Site. Completed athletic fields are to the west. More housing tracts are being constructed to the south and west of the property. Housing tracts and other development are present to the south of the property in the Former Benicia Arsenal. The Suisun Bay is visible in the southeastern corner of Photograph SOLNO AV 5140 33 31.

Project Site Description:

- **North Valley:** Not much change is noted in the North Valley since 1993. Five TNT Strips are visible. Portions of the Howitzer Test Facility, including the Test Firing Butts (Building 182), and the Test Tunnel (Building 181), are still visible; however, the Powder Loading Room (Building 182), and Buildings 540 and 542 are not visible. The Ammunition Renovation/Primer Destruction Site and its associated buildings are not visible. Midway Road is visible; however, the North Valley Military Landfill is not visible. There is grading to the southwest of the Howitzer Test Facility. There is a clearly defined road traveling west-east-southeast between the housing areas at the southern end of the property near Kearny Street. The grading had been noted in previous photographs, while the road was not. There appear to be fewer dirt trails south of the TNT Strips than in previous photographs because more vegetation cover has overgrown the disturbed areas.
- **Ridge:** There are several changes to the Ridge observed in the 1996 photographs. Grading has removed signs of the Dynamite Burn Site. Several soil/debris piles are visible. The "J"-shaped road is not visible on these photographs. The square area noted on the 1993 photographs is visible; but the dark, contrasting, circular area is not.
- **South Valley:** There are a few changes to the South Valley since 1993. Neither the Flare Site nor Demolition Sites #1 and #2 are visible, but Demolition Site #3 is visible. The McAllister Drive Land Bridge is visible. The run-off control ditch is visible, and previously graded areas have a greater amount of vegetative cover.



Figure 40. Photo Number SOL AV 5461 12 21
Estimated Scale: 1:18,000



Photograph: SOL AV 5461 12 21 (no stereo pair photograph available) (Figure 40)

Source: Pacific Aerial Surveys

Photo Scale: 1:12,000

Date: 7-28-1997

General Description of Photographs:

The Project Site is in the center of the photograph. Lake Herman is situated to the northwest of the property and is visible. Railroad tracks and spurs are no longer visible. Warehouses are situated to the east, while the Exxon Oil Company property to the south sustains a large number of petroleum, oil, and lubricant (POL) tanks. A number of housing tracts are being developed to the west and southwest. Several roads in the Andrew Court housing area have now been paved. Completed athletic fields are also situated to the west. Housing tracts and other development are now present to the south of the property in the Former Benicia Arsenal. The Suisun Bay is not visible in this photograph.

Project Site Description:

- **North Valley:** This is the most recent aerial photograph of the North Valley analyzed. Five TNT Strips (T1-T5) are visible. It appears that many of the structures associated with the Howitzer Test Facility (Buildings 181, 183, 540, 542, and the squirrel cages) and Ammunition Renovation/Primer Destruction Site are not visible, but the general outline of the area is visible. One building situated to the northeast of the former Test Firing Butts (Building 182) is visible. Midway Road is visible. The area around the Test Firing Tunnels (Building 181) shows some signs of surface disturbance and vegetation regrowth in the surrounding area. The North Valley Military Landfill is not discernable in 1997.
- **Ridge:** This is the most recent aerial photograph of the Ridge analyzed. There are a number of dirt/debris piles visible on the western edge of the Project Site along the Ridge. The area also contains the square, enclosed area, as noted previously. The dark, contrasting, circular area reappears in the same area as it was in 1993. The "J"-shaped road is not visible. Graded areas show signs of increased vegetative cover in those areas.
- **South Valley:** The 1997 photograph is the most recent aerial photograph of the South Valley analyzed. Construction activities south of the South Valley are observed in the photographs. The Flare Site and Demolition Sites are not visible, and vegetation is more dense than in previous photographs. There is less grading evident along the South Valley than previously noted. The McAllister Drive Land Bridge and adjacent road are visible and appear to be paved. The road leading south from the Ridge through the South Valley toward the housing complexes has also been paved.

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APPENDIX E

**CALIFORNIA STATE PRELIMINARY
REMEDATION GOALS**

FOR PLANNING PURPOSES

TOXICITY INFORMATION				CONTAMINANT		PRELIMINARY REMEDIATION GOALS (PRGs)					SOIL SCREENING LEVELS	
Sf ₀ 1/(mg/kg-d)	RfD ₀ (mg/kg-d)	Sf ₁ 1/(mg/kg-d)	RfD ₁ (mg/kg-d)	V skin O abs C solids	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (µg/m ³)	Tap Water (µg/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)	
8.7E-03	4.0E-03	8.7E-03	4.0E-03	r 0 0.10	30560-19-1	Acetophenone	5.0E+01	2.8E+02	7.7E-01	7.7E+00	7.7E+00	ca*
1.1E+01	2.0E-02	7.7E-03	2.0E-02	r 0 0.10	75-07-0	Acetaldehyde	1.1E+01	2.3E+01	8.7E-01	1.7E+00	1.7E+00	ca*
2.0E-02	1.0E-01	2.0E-02	1.0E-01	r 0 0.10	34256-92-1	Acetylchloride	1.2E+03	1.8E+04	7.3E+01	7.3E+02	7.3E+02	nc
1.0E-01	1.0E-01	1.0E-01	1.0E-01	r 1	87-66-1	Acetone	1.0E+03	6.2E+03	3.7E+02	6.1E+02	6.1E+02	nc
8.0E-04	8.0E-04	8.0E-04	8.0E-04	r 0 0.10	75-98-5	Acetone cyanohydrin	4.9E+01	7.0E+02	2.9E+00	2.9E+01	2.9E+01	nc
6.0E-03	1.7E-02	1.7E-02	1.7E-02	r 1	75-05-8	Acetonitrile	2.7E+02	1.7E+03	6.2E+01	6.2E+01	6.2E+01	nc
1.0E-01	5.7E-06	5.7E-06	5.7E-06	x 1	98-06-2	Acetophenone	4.9E-01	1.6E+00	2.1E-02	4.2E-02	4.2E-02	nc
1.1E-01	1.3E-02	1.1E-01	1.3E-02	r 0 0.10	90594-98-6	Acifluorfen	4.4E+00	2.2E+01	6.1E-02	6.1E-01	6.1E-01	ca*
2.0E-02	5.7E-06	5.7E-06	5.7E-06	r 1	107-02-9	Acrotonin	1.0E-01	3.4E-01	2.1E-02	4.2E-02	4.2E-02	nc
4.0E+00	2.0E-04	4.8E+00	2.0E-04	r 0 0.10	79-06-1	Acrylamide	1.1E-01	5.4E-01	1.5E-03	1.5E-02	1.5E-02	ca*
5.4E-01	1.0E-03	2.4E-01	2.9E-04	r 0 0.10	78-10-7	Acrylic acid	2.9E+04	1.0E+05	1.0E+00	1.8E+04	1.8E+04	ca*
8.1E-02	1.0E-02	8.0E-02	1.0E-02	r 0 0.10	15972-60-8	Acrylonitrile	2.1E-01	5.1E-01	2.8E-02	3.9E-02	3.9E-02	ca*
1.5E-01	1.5E-01	1.5E-01	1.5E-01	r 0 0.10	1596-84-5	Alar	6.0E+00	3.1E+01	8.4E-02	8.4E-01	8.4E-01	ca*
1.0E-03	1.0E-03	1.0E-03	1.0E-03	r 0 0.10	116-06-3	Aldicarb	6.1E+01	8.8E+02	3.7E+00	3.6E+01	3.6E+01	nc
1.0E-03	1.0E-03	1.0E-03	1.0E-03	r 0 0.10	1646-88-4	Aldicarb sulfone	6.1E+01	8.8E+02	3.7E+00	3.6E+01	3.6E+01	nc
1.7E+01	3.0E-05	1.7E+01	3.0E-05	r 0 0.10	309-00-2	Aldrin	2.9E-02	1.5E-01	3.9E-04	4.0E-03	4.0E-03	ca*
2.5E-01	2.5E-01	2.5E-01	2.5E-01	r 0 0.10	5585-64-8	Allyl	1.5E+04	1.0E+05	9.1E+02	9.1E+03	9.1E+03	nc
5.0E-03	5.0E-03	5.0E-03	5.0E-03	r 0 0.10	107-18-6	Allyl alcohol	3.1E+02	4.3E+03	1.8E+01	1.8E+02	1.8E+02	nc
5.0E-02	2.9E-04	2.9E-04	2.9E-04	r 0 0.10	107-05-1	Allyl chloride	3.0E+03	4.3E+04	1.0E+00	1.8E+03	1.8E+03	nc
1.0E+00	1.4E-03	1.4E-03	1.4E-03	r 0 0.10	7429-90-5	Aluminum	7.6E+04	1.0E+05	5.1E+00	3.6E+04	3.6E+04	nc
4.0E-04	3.0E-04	3.0E-04	3.0E-04	r 0 0.10	20859-73-8	Aluminum phosphide	3.1E+01	8.2E+02	1.1E+00	1.5E+01	1.5E+01	nc
3.0E-04	3.0E-04	3.0E-04	3.0E-04	r 0 0.10	7773-06-0	Amidrol	1.8E+01	2.6E+02	1.1E+00	1.1E+01	1.1E+01	nc
9.0E-03	9.0E-03	9.0E-03	9.0E-03	r 0 0.10	834-12-6	Ametryn	5.5E+02	7.9E+03	3.3E+01	3.3E+02	3.3E+02	nc
7.0E-02	7.0E-02	7.0E-02	7.0E-02	r 0 0.10	591-37-5	m-Aminophenol	4.3E+03	6.2E+04	2.6E+02	2.6E+03	2.6E+03	nc
2.0E-05	2.0E-05	2.0E-05	2.0E-05	r 0 0.10	504-24-5	4-Aminopyridine	1.2E+00	1.8E+01	7.3E-02	7.3E-01	7.3E-01	nc
2.5E-03	2.5E-03	2.5E-03	2.5E-03	r 0 0.10	33069-61-1	Amitraz	1.5E+02	2.2E+03	1.0E+02	9.1E+01	9.1E+01	nc
2.0E-02	2.0E-02	2.0E-02	2.0E-02	r 0 0.10	7684-41-7	Ammonia	1.2E+04	1.0E+05	1.0E+02	7.3E+03	7.3E+03	nc
5.7E-03	7.0E-03	5.7E-03	2.9E-04	r 0 0.10	7773-06-0	Ammonium sulfamate	8.5E+01	4.3E+02	1.0E+00	1.2E+01	1.2E+01	ca*
4.0E-04	4.0E-04	4.0E-04	4.0E-04	r 0 0.10	82-53-3	Aniline	3.1E+01	8.2E+02	1.5E+01	1.5E+01	1.5E+01	nc
5.0E-04	5.0E-04	5.0E-04	5.0E-04	r 0 0.10	7440-38-0	Antimony and compounds	3.9E+01	1.0E+03	1.8E+01	1.8E+01	1.8E+01	nc
9.0E-04	9.0E-04	9.0E-04	9.0E-04	r 0 0.10	1314-60-9	Antimony pentoxide	7.0E+01	1.8E+03	3.3E+01	3.3E+01	3.3E+01	nc
4.0E-04	4.0E-04	4.0E-04	4.0E-04	r 0 0.10	28300-74-3	Antimony potassium tartrate	3.1E+01	8.2E+02	1.5E+01	1.5E+01	1.5E+01	nc
4.0E-04	4.0E-04	4.0E-04	4.0E-04	r 0 0.10	1332-81-6	Antimony trioxide	3.1E+01	8.2E+02	2.1E-01	1.5E+01	1.5E+01	nc
1.3E-02	1.3E-02	1.3E-02	1.3E-02	r 0 0.10	1309-64-4	Antimony trioxide	3.1E+01	8.2E+02	2.1E-01	1.5E+01	1.5E+01	nc
2.5E-02	2.5E-02	2.5E-02	2.5E-02	r 0 0.10	74185-28-5	Appollo	7.9E+02	1.1E+04	4.7E+01	4.7E+02	4.7E+02	ca*
3.0E-04	3.0E-04	3.0E-04	3.0E-04	r 0 0.03	7440-38-2	Aramite	1.9E+01	9.9E+01	2.7E+01	2.7E+00	2.7E+00	ca*
1.5E+00	1.5E+01	1.5E+01	1.5E+01	r 0 0.03	7440-38-2	Arsenic (noncancer endpoint)	3.9E-01	2.7E+00	4.5E-04	4.5E-02	4.5E-02	ca*
9.0E-03	9.0E-03	9.0E-03	9.0E-03	r 0 0.10	76576-12-8	Arsenic (cancer endpoint)	5.5E+02	7.9E+03	3.3E+01	3.3E+02	3.3E+02	nc
5.0E-02	5.0E-02	5.0E-02	5.0E-02	r 0 0.10	3337-71-1	Assure	3.1E+03	4.4E+04	1.8E+02	1.8E+03	1.8E+03	nc
2.2E-01	3.5E-02	2.2E-01	3.5E-02	r 0 0.10	1912-24-9	Atazrine	2.2E+00	1.1E+01	3.1E-02	3.0E-01	3.0E-01	ca*
4.0E-04	4.0E-04	4.0E-04	4.0E-04	r 0 0.10	71751-41-2	Avermectin B1	2.4E+01	3.5E+02	1.5E+00	1.5E+01	1.5E+01	ca*
1.1E-01	1.1E-01	1.1E-01	1.1E-01	r 0 0.10	103-33-3	Azobenzene	4.4E+00	2.2E+01	6.2E-02	6.1E-01	6.1E-01	nc
7.0E-02	1.4E-04	1.4E-04	1.4E-04	r 0 0.10	7440-39-3	Banum and compounds	5.4E+03	1.0E+05	5.2E-01	2.6E+03	2.6E+03	nc
4.0E-03	4.0E-03	4.0E-03	4.0E-03	r 0 0.10	114-26-1	Baygon	2.4E+02	3.5E+03	1.5E+01	1.5E+02	1.5E+02	nc
3.0E-02	3.0E-02	3.0E-02	3.0E-02	r 0 0.10	43121-43-3	Bayleton	1.8E+03	2.6E+04	1.1E+02	1.1E+03	1.1E+03	nc
2.5E-02	2.5E-02	2.5E-02	2.5E-02	r 0 0.10	68359-37-5	Baythroid	1.5E+03	2.2E+04	9.1E+01	9.1E+02	9.1E+02	nc
3.0E-01	3.0E-01	3.0E-01	3.0E-01	r 0 0.10	1861-40-1	Benfenil	1.8E+04	1.0E+05	1.1E+03	1.1E+04	1.1E+04	nc
5.0E-02	5.0E-02	5.0E-02	5.0E-02	r 0 0.10	17604-35-2	Benomyl	3.1E+03	4.4E+04	1.8E+02	1.8E+03	1.8E+03	nc
3.0E-02	3.0E-02	3.0E-02	3.0E-02	r 0 0.10	29057-89-0	Benloxon	1.8E+03	2.8E+04	1.1E+02	1.1E+03	1.1E+03	nc
1.0E-01	1.0E-01	1.0E-01	1.0E-01	r 0 0.10	100-52-7	Benzoaldehyde	6.1E+03	8.8E+04	3.7E+02	3.6E+03	3.6E+03	nc
2.3E-02	3.0E-03	2.3E-02	3.0E-03	r 0 0.10	92-37-5	Benzoic acid	1.0E+05	1.0E+05	1.5E+04	1.5E+05	1.5E+05	nc
1.3E-01	1.3E-01	1.3E-01	1.3E-01	r 0 0.10	88-07-7	Benzotrithione	3.7E-02	1.9E-01	5.2E-04	5.2E-03	5.2E-03	ca*
3.0E-01	3.0E-01	3.0E-01	3.0E-01	r 0 0.10	100-51-6	Benzyl alcohol	1.8E+04	1.0E+05	1.1E+03	1.1E+04	1.1E+04	nc

Key: I=IRIS N=CEA D=HEAST X=WITHDRAWN O=Other EPA DOCUMENTS F=ROUTE EXTRAPOLATION CA=CANCER PRG NC=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *where: nc < 100X ca **where: nc < 100X ca ***where: nc < 10X ca

FOR PLANNING PURPOSES

TOXICITY INFORMATION

CONTAMINANT

PRELIMINARY REMEDIATION GOALS (PRGs)

SOIL SCREENING LEVELS

Sf ₀ (mg/kg-d)	Rf ₀ (mg/kg-d)	SFI 1/(mg/kg-d)	RfD (mg/kg-d)	V skin O abs. C soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m ³)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	100-44-7	8.9E-01	2.2E+03	4.0E-02	6.6E-02	6.3E+01	3E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	7440-41-7	6.1E+00	8.8E+01	3.7E-01	3.8E+00	6.3E+01	3E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	141-66-2	9.2E+02	1.3E+04	1.8E+02	3.0E+02	6.3E+01	3E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	82657-04-3	2.1E-01	6.2E-01	5.8E-03	9.8E-03	4.0E-04	2E-05
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	92-52-4	1.9E-04	4.4E-04	3.1E-05	5.2E-05	4.0E-04	2E-05
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	111-44-4	6.9E+00	3.5E+01	1.9E-01	9.8E-01	6.3E+01	3E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	108-60-1	3.5E+01	1.8E+02	4.8E-01	4.8E+00	6.3E+01	3E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	117-81-7	3.1E+03	4.4E+04	1.8E+02	1.8E+03	6.3E+01	3E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	90-95-7	5.5E+03	7.9E+04	2.1E+01	3.3E+03	6.3E+01	3E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	7440-42-8	2.8E+01	9.2E+01	1.0E+01	2.0E+01	6.3E+01	3E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	7637-07-2	1.0E+00	2.4E+00	1.1E-01	1.8E-01	6.3E+01	3E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	108-86-1	6.2E+01	3.1E+02	1.7E+00	8.5E+00	8E-01	4E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	75-25-2	3.9E+00	1.3E+01	5.2E+00	8.7E+00	8E-01	4E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	74-83-9	3.1E+02	4.4E+03	1.8E+02	1.8E+03	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	101-55-3	3.1E+02	4.4E+03	1.8E+01	1.8E+02	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	2104-96-3	1.2E+03	1.8E+04	7.3E+01	7.3E+02	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	1689-84-5	1.2E+03	1.8E+04	7.3E+01	7.3E+02	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	1689-99-2	3.5E-03	7.6E-03	3.7E-03	6.2E-03	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	71-36-3	6.1E+03	8.8E+04	3.7E+02	3.6E+03	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	106-99-0	1.4E+02	2.4E+02	3.7E+01	6.1E+01	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	104-51-8	1.3E+02	2.2E+02	3.7E+01	6.1E+01	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	135-9-88	1.3E+02	2.2E+02	3.7E+01	6.1E+01	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	98-96-6	1.3E+02	2.2E+02	3.7E+01	6.1E+01	2E-01	1E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	65-68-7	1.2E+04	1.0E+05	7.3E+02	7.3E+03	9E+02	8E+02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	65-70-1	1.8E+02	2.6E+03	1.1E+01	1.1E+02	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	75-90-5	3.7E+01	8.1E+02	1.1E-03	1.8E+01	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	7440-43-9	9.0E+00	1.0E+05	1.8E+03	1.8E+04	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	105-60-2	5.7E+01	2.9E+02	7.8E-01	7.8E+00	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	2425-96-1	1.4E+02	7.0E+02	1.9E+00	1.9E+01	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	53-08-2	6.1E+03	8.8E+04	4.0E+02	3.8E+03	6E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	53-25-2	2.4E+01	1.2E+02	3.4E-01	3.4E+00	6E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	86-74-6	3.1E+02	4.4E+03	1.8E+01	1.8E+02	6E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	1663-86-2	3.6E+02	7.2E+02	7.3E+02	1.0E+03	3E+01	2E+00
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	75-15-0	2.4E-01	5.3E-01	1.3E-01	1.7E-01	7E-02	3E-03
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	56-23-5	6.1E+02	8.8E+03	3.7E+01	3.6E+02	6E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	5285-14-8	6.1E+02	8.8E+03	3.7E+01	3.6E+02	6E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	5234-88-4	6.1E+02	8.8E+03	3.7E+01	3.6E+02	6E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	302-17-0	9.2E+02	1.3E+04	5.5E+01	5.5E+02	6E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	133-90-4	1.2E+00	6.1E+00	1.7E-02	1.7E-01	1E+01	5E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	118-75-2	1.6E+00	1.1E+01	1.9E-02	1.9E-01	1E+01	5E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	12789-03-6	1.2E+03	1.8E+04	7.3E+01	7.3E+02	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	90982-32-4	1.2E+03	1.8E+04	7.3E+01	7.3E+02	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	7762-90-5	3.6E+00	1.2E+01	7.3E+00	1.4E+01	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	10949-04-4	1.2E+02	1.8E+03	7.3E+00	7.3E+01	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	107-20-0	1.2E+02	1.8E+03	7.3E+00	7.3E+01	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	79-11-8	3.3E-02	1.1E-01	3.1E-02	5.2E-02	7E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	532-27-4	2.4E-02	3.5E-03	1.5E+01	1.5E+02	7E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	106-47-8	1.5E+02	5.4E+02	6.2E+01	1.1E+02	7E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	108-90-7	1.8E+00	9.1E+00	2.5E-02	2.5E-01	7E-01	3E-02
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	510-15-6	1.2E+04	1.0E+05	7.3E+02	7.3E+03	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	74-11-3	1.2E+03	1.8E+04	7.3E+01	7.3E+02	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	98-96-6	1.2E+03	1.8E+04	7.3E+01	7.3E+02	8E+00	4E-01
1.7E-01	2.0E-03	1.7E-01	1.0E-04	1	126-96-8	3.6E+00	1.2E+01	7.3E+00	1.4E+01	8E+00	4E-01

Key: E:IRIS; N:NECA; H:HEAST; W:WITHDRAWN; O:Other EPA DOCUMENTS; R:ROUTE EXTRAPOLATION; C:CARCINOGEN PRG; NC:NONCANCER PRG; max=CEILING LIMIT; **:(where: nc < 100X ca); **:(where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION				CONTAMINANT				PRELIMINARY REMEDIATION GOALS (PRGs)				SOIL SCREENING LEVELS	
SfO 1/(mg/kg-d)	RfD (mg/kg-d)	SfI 1/(mg/kg-d)	RfDI (mg/kg-d)	V skin O abs. C eccl	CAS No.	Chemical Name	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m ³)	Tap Water (ug/l)	Migration to Ground Water DfF 1 (mg/kg)	DfF 1 (mg/kg)	DfF 1 (mg/kg)
1.4E-01	1.4E-01	1.4E-01	1.4E-01	r	109-69-3	1-Chlorobutane	4.8E+02	4.8E+02	1.5E+03	nc	2.4E+03	nc	nc
1.4E-01	1.4E-01	1.4E-01	1.4E-01	r	75-98-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	3.4E+02	3.4E+02	5.2E+04	nc	8.7E+04	nc	nc
2.9E-03	4.0E-01	2.9E-03	2.9E-03	r	75-00-3	Chlorodifluoromethane	3.4E+02	3.4E+02	5.1E+04	nc	8.5E+04	nc	nc
3.0E+00	nc	6.5E+00	nc	ca	nc	Chloroethane	6.5E+00	6.5E+00	2.3E+00	ca	4.6E+00	ca	nc
8.1E-03	1.0E-02	8.1E-02	8.0E-02	r	110-75-8	2-Chloroethyl vinyl ether	2.4E-01	5.2E-01	8.4E-02	ca**	1.6E-01	ca**	3E-02
1.3E-02	h	8.3E-03	8.0E-02	r	87-98-3	Chloroform	1.2E+00	2.7E+00	1.1E+00	ca	1.5E+00	ca	nc
5.0E-01	h	5.0E-01	8.0E-02	r	74-87-3	Chloromethane	8.4E-01	4.3E+00	1.2E-02	ca	1.2E-01	ca	nc
4.0E-01	h	5.0E-01	8.0E-02	r	95-89-2	4-Chloro-2-methylaniline	1.1E+00	5.4E+00	1.5E-02	ca	1.5E-01	ca	nc
2.5E-02	h	4.0E-01	8.0E-02	r	1169-93-3	beta-Chloronaphthalene	4.9E+03	2.7E+04	2.9E+02	nc	4.9E+02	nc	nc
1.0E-02	h	1.0E-02	5.0E-03	r	100-00-5	p-Chloronitrobenzene	8.1E+00	2.3E+01	2.7E-01	ca	4.5E-01	ca	nc
1.1E-02	h	1.1E-02	5.0E-03	r	95-57-8	2-Chlorophenol	1.1E+01	3.2E+01	3.7E-01	ca	6.2E-01	ca	nc
2.0E-02	h	2.0E-02	2.0E-02	r	1807-45-6	Chloroethanol	6.3E+01	2.4E+02	1.8E+01	nc	3.0E+01	nc	4E+00
2.0E-01	h	2.0E-01	2.0E-01	r	95-49-8	o-Chlorotoluene	1.6E+02	5.7E+02	7.3E+01	nc	1.2E+02	nc	nc
3.0E-03	h	3.0E-03	3.0E-03	r	101-31-3	2-Chloropropane	1.2E+04	1.0E+05	7.3E+02	nc	7.3E+03	nc	nc
1.0E-02	h	1.0E-02	1.0E-02	r	2921-88-2	Chlorpyrifos	1.8E+02	2.6E+03	1.1E+01	nc	1.1E+02	nc	nc
5.0E-02	h	5.0E-02	5.0E-02	r	5598-13-0	Chlorpyrifos-methyl	6.1E+02	8.8E+03	3.7E+01	nc	3.6E+02	nc	nc
6.0E-04	h	4.2E-01	8.0E-04	r	60238-56-4	Chlorosulfuron	3.1E+03	4.4E+04	1.8E+02	nc	1.8E+03	nc	nc
1.5E+00	h	2.9E+02	2.9E+02	r	16085-03-1	Chlorthionos	4.9E+01	7.5E+02	2.9E+00	nc	2.9E+01	nc	nc
3.0E-03	h	3.0E-03	3.0E-03	r	16540-29-9	Total Chromium (1.6 ratio Cr:V:Cr III)	2.1E+02	4.0E+02	1.6E-04	ca	1.6E-04	ca	4E+01
6.0E-02	h	2.2E+00	2.2E+00	r	7440-48-4	Chromium III	1.0E+05	1.0E+05	5.5E+04	nc	5.5E+04	nc	2E+00
3.7E-02	h	1.8E+00	1.8E+00	r	8007-45-2	Chromium VI	3.0E+01	6.4E+01	2.3E-05	ca	1.1E-02	ca	4E+01
1.0E-01	h	1.0E-01	1.0E-01	r	7440-50-8	"CAL-Modified PRG" (PEA, 1994)	2.0E-01	6.4E+01	2.3E-05	ca	1.1E-02	ca	2E+00
2.0E-02	h	8.4E-01	2.0E-02	r	7440-48-4	Cobalt	4.7E+03	1.0E+05	3.1E-03	ca	2.2E+03	nc	nc
2.0E-02	h	8.4E-01	2.0E-02	r	123-73-9	Coke Oven Emissions	2.9E+03	7.6E+04	nc	ca	1.4E+03	nc	nc
2.0E-02	h	8.4E-01	2.0E-02	r	96-82-9	Copper and compounds	5.3E-03	1.1E-02	3.5E-03	ca	5.9E-03	ca	nc
2.0E-02	h	8.4E-01	2.0E-02	r	74-86-8	Crotonaldehyde	1.0E+02	5.2E+02	4.0E+02	nc	6.6E+02	nc	nc
5.0E-02	h	4.2E-01	8.0E-04	r	21725-46-2	Cumene (isopropylbenzene)	5.8E-01	2.9E+00	8.0E-03	ca	8.0E-02	ca	nc
1.0E-01	h	4.2E-01	8.0E-04	r	n/a	Cyanazine	6.1E+03	1.0E+05	nc	nc	3.6E+03	nc	nc
4.0E-02	h	2.2E+00	2.2E+00	r	542-62-1	Cyanides	2.4E+03	3.5E+04	1.5E+03	nc	1.5E+03	nc	nc
5.0E-03	h	3.4E-02	5.0E-03	r	544-92-3	Barium cyanide	3.1E+02	4.4E+03	nc	nc	1.8E+02	nc	nc
2.0E-02	h	1.1E-01	1.1E-01	r	57-12-5	Calcium cyanide	1.2E+03	1.8E+04	nc	nc	7.3E+02	nc	nc
2.0E-02	h	8.4E-01	2.0E-02	r	74-86-8	Copper cyanide	1.1E+01	3.5E+01	nc	nc	3.1E+00	nc	4E+01
5.0E-02	h	4.2E-01	8.0E-04	r	151-50-8	Hydrogen cyanide	3.1E+03	4.4E+04	nc	nc	1.8E+03	nc	nc
2.0E-01	h	1.1E-01	1.1E-01	r	506-61-6	Potassium cyanide	1.2E+03	1.0E+05	nc	nc	7.3E+03	nc	nc
1.0E-01	h	8.4E-01	2.0E-02	r	506-64-9	Potassium silver cyanide	6.1E+03	8.8E+04	nc	nc	3.6E+03	nc	nc
4.0E-02	h	2.2E+00	2.2E+00	r	143-33-9	Silver cyanide	2.4E+03	3.5E+04	nc	nc	1.5E+03	nc	nc
5.0E-02	h	4.2E-01	8.0E-04	r	557-21-1	Sodium cyanide	3.1E+03	4.4E+04	nc	nc	1.8E+03	nc	nc
9.0E-02	h	9.0E-02	9.0E-02	r	460-19-5	Zinc cyanide	1.3E+02	4.3E+02	1.5E+02	nc	2.4E+02	nc	nc
5.0E-02	h	5.0E-02	5.0E-02	r	506-68-3	Cyanogen bromide	2.9E+02	9.7E+02	3.3E+02	nc	5.5E+02	nc	nc
5.0E-02	h	5.0E-02	5.0E-02	r	506-77-4	Cyanogen chloride	1.6E+02	5.4E+02	1.8E+02	nc	3.0E+02	nc	nc
5.0E-02	h	5.0E-02	5.0E-02	r	108-94-1	Cyclohexanone	1.0E+05	1.0E+05	1.8E+04	nc	1.8E+05	nc	nc
2.0E-01	h	1.1E-01	1.1E-01	r	108-91-5	Cyclohexanone	1.2E+04	1.0E+05	max	nc	7.3E+03	nc	nc
5.0E-03	h	5.0E-03	5.0E-03	r	69085-85-8	Cyclohexylamine	3.1E+02	4.4E+03	1.8E+01	nc	1.9E+02	nc	nc
1.0E-02	h	1.0E-02	1.0E-02	r	52315-07-8	Cyhalothrin/Karate	6.1E+02	8.8E+03	3.7E+01	nc	3.6E+02	nc	nc
7.5E-03	h	7.5E-03	7.5E-03	r	66215-21-8	Cypermethrin	4.6E+02	6.8E+03	2.7E+01	nc	2.7E+02	nc	nc
1.0E-02	h	1.0E-02	1.0E-02	r	1691-32-1	Cyromazine	6.1E+02	8.8E+03	3.7E+01	nc	3.6E+02	nc	nc
3.0E-02	h	3.0E-02	3.0E-02	r	75-99-0	Dacathal	1.8E+03	2.6E+04	1.1E+02	nc	1.1E+03	nc	nc
2.9E-02	h	2.4E-01	2.5E-02	r	39515-41-4	Dalapon	1.5E+03	2.2E+04	9.1E+01	nc	9.1E+02	nc	nc
3.4E-01	h	3.4E-01	3.4E-01	r	72-64-8	Dantrol	2.4E+00	1.7E+01	2.8E-02	ca	2.8E-01	ca	2E+01
3.4E-01	h	3.4E-01	3.4E-01	r	50-29-3	DDD	1.7E+00	1.2E+01	2.0E-02	ca	2.0E-01	ca	3E+00
1.0E-02	h	1.0E-02	1.0E-02	r	1163-19-5	DDT	6.1E+02	8.8E+03	3.7E+01	nc	3.6E+02	nc	nc
4.0E-03	h	4.0E-03	4.0E-03	r	5985-48-3	Decabromodiphenyl ether	2.4E+00	3.5E+01	1.5E-01	nc	1.5E+00	nc	nc

Key: f=IRIS n=NCEA n=HEAST x=WITHDRAWN c=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *where: nc < 100X ca) **where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION

CONTAMINANT

PRELIMINARY REMEDIATION GOALS (PRGs)

SOIL SCREENING LEVELS

SFO 1/(mg/kg-d)	RfDo (mg/kg-d)	SFI 1/(mg/kg-d)	RD1 (mg/kg-d)	V skin O abs, C soils	CAS No.	Diallate	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m ³)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)
6.1E-02 h	9.0E-04 h	6.1E-02 f	9.0E-04 f	0 0.10	2303-16-4	Diallate	8.0E+00 ca	4.0E+01 ca	1.1E-01 ca	1.1E+00 ca	1E-01 DAF 20 (mg/kg)
8.4E-02 i	9.0E-04 f	8.4E-02 f	9.0E-04 f	0 0.10	333-41-5	Diazinon	5.5E+01 nc	7.9E+02 nc	3.3E+00 nc	3.3E+01 nc	
1.4E+00 h	4.0E-03 x	4.0E-03 x	4.0E-03 f	0 0.10	132-84-9	Dibenzofuran	2.9E+02 nc	5.1E+03 nc	1.5E+01 nc	2.4E+01 nc	
8.4E-02 i	1.0E-02 f	1.0E-02 f	1.0E-02 f	0 0.10	105-37-6	1,4-Dibromobenzene	6.1E+02 nc	8.8E+03 nc	3.7E+01 nc	3.6E+02 nc	
1.4E+00 h	2.0E-02 f	8.4E-02 f	2.0E-02 f	0 0.10	124-48-1	1,2-Dibromochloroethane	1.1E+00 ca	2.7E+02 ca	8.0E-02 ca	1.3E-01 ca	2E-02
8.9E-01 i	5.7E-05 f	2.4E-03 h	5.7E-05 f	1 1	96-12-8	2,2-Dibromo-3-chloropropane *CAL-Modified PRG** (PEA, 1994)	4.5E-01 ca*	4.0E+00 ca*	2.1E-01 ca*	4.8E-02 ca*	4E-01
8.9E-01 i	5.7E-05 h	7.7E-01 i	5.7E-05 h	1 1	105-93-4	1,2-Dibromoethane	6.0E-02 ca	4.8E-02 ca	8.7E-03 ca*	7.6E-04 ca	
1.0E-01 i	1.0E-01 f	1.0E-01 f	1.0E-01 f	0 0.10	64-74-2	Dibutyl phthalate	6.1E+03 nc	8.8E+04 nc	3.7E+02 nc	3.6E+03 nc	2E+03
3.0E-02 i	3.0E-02 f	3.0E-02 f	3.0E-02 f	0 0.10	1018-00-9	Dicamba	1.8E+03 nc	2.6E+04 nc	1.1E+02 nc	1.1E+03 nc	
9.0E-02 i	5.7E-05 h	5.7E-05 h	5.7E-05 f	0 0.10	95-50-1	1,2-Dichlorobenzene	3.7E+02 sat	3.7E+02 sat	2.1E+02 nc	3.7E+02 nc	2E+01
9.0E-04 f	9.0E-04 f	9.0E-04 f	9.0E-04 f	0 0.10	541-73-1	1,3-Dichlorobenzene	1.3E+01 nc	5.2E+01 nc	3.3E+00 nc	5.9E+00 nc	
2.4E-02 h	3.0E-02 n	2.2E-02 n	3.0E-02 f	1 1	106-46-7	1,4-Dichlorobenzene	3.4E+00 ca	8.1E+00 ca	3.1E-01 ca	5.0E-01 ca	2E+00
4.5E-01 f	4.5E-01 f	4.5E-01 f	4.5E-01 f	0 0.10	91-94-1	3,3-Dichlorobenzidine	1.1E+00 ca	5.5E+00 ca	1.5E-02 ca	1.5E-01 ca	7E-03
9.3E+00 f	9.3E+00 h	9.3E+00 h	9.3E+00 h	1 1	264-41-0	1,4-Dichloro-2-butene	7.9E-03 ca	1.8E-02 ca	7.2E-04 ca	1.2E-03 ca	3E-04
2.0E-01 i	5.7E-02 h	5.7E-02 h	5.7E-02 h	0 0.10	75-71-6	Dichlorodifluoromethane	9.4E+01 nc	3.1E+02 nc	2.1E+02 nc	3.9E+02 nc	
1.0E-01 h	1.0E-01 h	1.0E-01 h	1.0E-01 h	0 0.10	75-34-3	1,1-Dichloroethane	5.9E+02 nc	2.1E+03 nc	5.2E+02 nc	8.1E+02 nc	1E+00
3.0E-02 n	5.1E-02 i	5.1E-02 i	5.1E-02 i	0 0.10	107-06-2	1,2-Dichloroethane (EDC)	3.5E-01 ca*	7.6E-01 ca*	7.4E-02 ca*	1.2E-01 ca*	1E-03
6.0E-01 i	9.0E-03 f	1.9E-01 i	9.0E-03 f	1 1	75-35-4	1,1-Dichloroethylene	5.4E-02 ca	1.2E-01 ca	3.8E-02 ca	4.8E-02 ca	6E-02
1.0E-02 h	1.0E-02 h	1.0E-02 h	1.0E-02 f	0 0.10	156-59-2	1,2-Dichloroethylene (cis)	4.3E+01 nc	1.5E+02 nc	3.7E+01 nc	6.1E+01 nc	2E-02
2.0E-02 i	2.0E-02 f	2.0E-02 f	2.0E-02 f	0 0.10	156-60-5	1,2-Dichloroethylene (trans)	6.3E+01 nc	2.1E+02 nc	7.3E+01 nc	1.2E+02 nc	3E-02
3.0E-03 f	3.0E-03 f	3.0E-03 f	3.0E-03 f	0 0.10	120-65-2	2,4-Dichlorophenol	1.8E-02 nc	2.6E+03 nc	1.1E+01 nc	1.1E+02 nc	1E+00
6.0E-02 h	1.1E-03 f	8.8E-02 f	1.1E-03 f	1 1	78-87-5	4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	4.9E+02 nc	7.0E+03 nc	2.9E+01 nc	2.9E+02 nc	1E-03
1.9E-01 i	3.0E-04 i	1.3E-01 h	3.0E-04 i	0 0.10	94-92-6	2,4-Dichlorophenoxyacetic Acid (2,4-D)	6.9E+02 nc	1.2E+04 nc	3.7E+01 nc	3.6E+02 nc	4E-03
2.9E-01 i	5.0E-04 i	2.9E-01 f	5.0E-04 i	0 0.10	62-73-7	Dichlorvos	1.7E+00 ca*	8.5E+00 ca*	2.3E-02 ca*	2.3E-01 ca*	
4.4E-01 x	4.4E-01 f	4.4E-01 f	4.4E-01 f	0 0.10	115-32-2	Dicofol	1.1E+00 ca	5.6E+00 ca	1.5E-02 ca	1.5E-01 ca	
1.9E+01 i	5.0E-02 h	1.6E-01 i	5.0E-02 h	0 0.10	77-73-6	Dicyclopentadiene	5.4E-01 ca	1.8E+00 ca	2.1E-01 ca	4.2E-01 ca	4E-03
5.7E-03 f	5.7E-03 f	5.7E-03 f	5.7E-03 h	0 0.10	60-57-1	Dieldrin	3.0E-02 ca	1.5E-01 ca	4.2E-04 ca	4.2E-03 ca	
2.0E+00 h	2.0E+00 f	2.0E+00 f	2.0E+00 f	0 0.10	112-34-5	Diethylene glycol, monobutyl ether	3.5E+02 nc	5.0E+03 nc	2.1E+01 nc	2.1E+02 nc	
1.2E-03 i	1.1E-02 h	1.1E-02 h	1.1E-02 h	0 0.10	617-84-5	Diethylene glycol, monoethyl ether	1.0E+05 max	1.0E+05 max	7.3E+03 nc	7.3E+04 nc	
8.0E-01 i	8.0E-01 f	1.2E-03 f	8.0E-01 f	0 0.10	103-23-1	Diethylformamide	6.7E+02 nc	9.7E+03 nc	4.0E+01 nc	4.0E+02 nc	
4.7E-03 h	4.7E-03 f	4.7E-03 f	4.7E-03 f	0 0.10	84-85-2	Diethyl phthalate	4.9E+04 nc	1.0E+05 max	2.9E+03 nc	2.9E+04 nc	
8.0E-02 f	8.0E-02 f	8.0E-02 f	8.0E-02 f	0 0.10	56-53-1	Diethylstilbestrol	1.0E-04 ca	5.2E-04 ca	7.4E-06 ca	7.4E-05 ca	
2.0E-02 f	2.0E-02 f	2.0E-02 f	2.0E-02 f	0 0.10	43222-48-6	Difluorquat (Avenge)	4.9E+03 nc	7.0E+04 nc	2.9E+02 nc	2.9E+03 nc	
1.1E+01 f	1.1E+01 f	1.1E+01 f	1.1E+01 f	1 1	35367-36-5	Diflubenzuron	1.2E+03 nc	1.8E+04 nc	7.3E+01 nc	7.3E+02 nc	
8.0E-02 f	8.0E-02 f	8.0E-02 f	8.0E-02 f	0 0.10	75-37-6	1,1-Difluoroethane	4.9E+03 nc	7.0E+04 nc	4.2E+04 nc	6.9E+04 nc	
2.0E-02 f	2.0E-02 f	2.0E-02 f	2.0E-02 f	0 0.10	55290-64-7	Diisopropyl methylphosphonate	1.2E+03 nc	1.8E+04 nc	7.3E+01 nc	7.3E+02 nc	
2.0E-04 f	2.0E-04 f	2.0E-04 f	2.0E-04 f	0 0.10	60-51-5	Dimethoate	1.2E+01 nc	1.8E+02 nc	7.3E-01 nc	7.3E+00 nc	
5.7E-06 f	5.7E-06 f	5.7E-06 f	5.7E-06 f	0 0.10	124-40-3	Dimethylamine	3.5E+01 nc	1.5E+02 nc	4.8E-01 ca	4.8E+00 ca	
2.0E-03 i	2.0E-03 i	2.0E-03 i	2.0E-03 i	0 0.10	121-68-7	N,N-Dimethylaniline	1.2E+02 nc	1.8E+03 nc	7.3E+00 nc	7.3E+01 nc	
7.9E-01 h	7.9E-01 f	7.9E-01 f	7.9E-01 f	0 0.10	1445-75-6	2,4-Dimethylamine	6.5E-01 ca	3.3E+00 ca	9.0E-03 ca	9.0E-02 ca	
5.9E-01 h	5.9E-01 f	5.9E-01 f	5.9E-01 f	0 0.10	2136-96-4	2,4-Dimethylamine hydrochloride	8.4E-01 ca	4.3E+00 ca	1.2E-02 ca	1.2E-01 ca	
9.2E+00 h	9.2E+00 f	9.2E+00 f	9.2E+00 f	0 0.10	119-93-7	3,3-Dimethylbenzidine	5.3E-02 ca	2.7E-01 ca	7.3E-04 ca	7.3E-03 ca	
2.6E+00 x	3.9E+00 x	3.9E+00 x	3.9E+00 x	0 0.10	57-14-7	1,1-Dimethylhydrazine	1.9E-01 ca	9.5E-01 ca	1.9E-03 ca	2.6E-02 ca	
3.7E-01 x	3.7E-01 x	3.7E-01 x	3.7E-01 x	0 0.10	540-73-9	1,2-Dimethylhydrazine	1.3E-02 ca	6.7E-02 ca	1.8E-04 ca	1.8E-03 ca	
1.0E-01 h	6.6E-03 i	6.6E-03 i	6.6E-03 i	0 0.10	68-12-2	N,N-Dimethylformamide	6.1E+01 nc	8.8E+02 nc	3.7E+01 nc	3.6E+03 nc	
1.0E-03 h	1.0E-03 f	1.0E-03 f	1.0E-03 f	0 0.10	122-06-8	Dimethylphenethylamine	1.2E+03 nc	1.8E+04 nc	7.3E+01 nc	7.3E+02 nc	
6.0E-04 i	6.0E-04 f	6.0E-04 f	6.0E-04 f	0 0.10	576-26-1	2,4-Dimethylphenol	3.7E+01 nc	5.3E+02 nc	2.2E+00 nc	2.2E+01 nc	
1.0E-03 i	1.0E-03 f	1.0E-03 f	1.0E-03 f	0 0.10	95-65-8	3,4-Dimethylphenol	6.1E+01 nc	8.8E+02 nc	3.7E+01 nc	3.6E+01 nc	
1.0E-01 i	1.0E-01 f	1.0E-01 f	1.0E-01 f	0 0.10	131-11-3	Dimethyl phthalate	1.0E+05 max	1.0E+05 max	3.7E+04 nc	3.6E+05 nc	
1.0E-01 i	1.0E-01 f	1.0E-01 f	1.0E-01 f	0 0.10	120-61-6	Dimethyl terephthalate	6.1E+03 nc	8.3E+04 nc	3.7E+02 nc	3.6E+03 nc	

FOR PLANNING PURPOSES

TOXICITY INFORMATION				PRELIMINARY REMEDIATION GOALS (PRGs)										SOIL SCREENING LEVELS	
SfD 1/(mg/kg-d)	RfD (mg/kg-d)	SfI 1/(mg/kg-d)	RfD (mg/kg-d)	V skin O abs. C soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m ³)	Tap Water (ug/l)	Migration to Ground Water DAF 1 (mg/kg)	DAF 20 (mg/kg)	DAF 1 (mg/kg)	DAF 20 (mg/kg)	DAF 1 (mg/kg)	DAF 20 (mg/kg)
4.0E-04	2.0E-03	4.0E-04	2.0E-03	r	131-86-5	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc	nc	nc	nc	nc
1.0E-04	1.0E-04	1.0E-04	1.0E-04	r	58-29-0	2.4E+01	8.8E+01	1.5E+00	1.5E+01	nc	nc	nc	nc	nc	nc
4.0E-04	2.0E-03	4.0E-04	2.0E-03	r	100-25-4	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc	nc	nc	nc	nc
1.0E-04	1.0E-04	1.0E-04	1.0E-04	r	51-28-5	2.4E+01	8.8E+01	1.5E+00	1.5E+01	nc	nc	nc	nc	nc	nc
6.8E-01	3.0E-02	6.8E-01	3.0E-02	r	25321-14-6	7.2E+01	3.6E+02	9.9E-03	9.9E-02	ca	ca	ca	ca	3E-01	1E-02
2.0E-03	1.0E-03	2.0E-03	1.0E-03	r	117-84-0	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc	nc	nc	8E-04	4E-05
1.0E-03	1.0E-03	1.0E-03	1.0E-03	r	605-20-2	6.1E+01	8.8E+02	3.7E+00	3.6E+01	nc	nc	nc	nc	8E-04	4E-05
2.0E-02	2.0E-02	2.0E-02	2.0E-02	r	86-85-7	4.4E+01	2.2E+02	6.1E-01	6.1E+00	nc	nc	nc	nc	7E-04	3E-05
1.5E+05	3.0E-02	1.5E+05	3.0E-02	r	1746-01-6	3.9E+06	2.7E+05	4.5E+08	4.5E+07	ca	ca	ca	ca	1E+04	1E+04
1.1E-02	2.5E-02	1.1E-02	2.5E-02	r	123-91-1	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc	nc	nc	nc	nc
8.0E-01	9.0E-03	7.7E-01	9.0E-03	r	122-86-7	6.1E+01	8.8E+02	3.7E+00	3.6E+01	nc	nc	nc	nc	nc	nc
8.0E+00	2.2E-03	8.0E+00	2.2E-03	r	127-83-9	1.3E+02	1.9E+03	8.0E+00	8.0E+01	nc	nc	nc	nc	nc	nc
8.1E+00	2.0E-03	8.1E+00	2.0E-03	r	1597-37-7	5.7E-02	2.9E-01	7.8E-04	7.8E-03	ca	ca	ca	ca	7.8E-03	7.8E-03
9.3E+00	2.0E-03	9.3E+00	2.0E-03	r	2602-46-2	6.0E-02	3.0E-01	8.3E-04	8.3E-03	ca	ca	ca	ca	8.3E-03	8.3E-03
4.0E-05	4.0E-05	4.0E-05	4.0E-05	r	16071-86-6	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc	nc	nc	nc	nc
1.0E-02	1.0E-02	1.0E-02	1.0E-02	r	505-29-3	6.1E+01	8.8E+02	3.7E+00	3.6E+01	nc	nc	nc	nc	nc	nc
2.0E-03	2.0E-03	2.0E-03	2.0E-03	r	330-54-1	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc	nc	nc	nc	nc
4.0E-03	4.0E-03	4.0E-03	4.0E-03	r	2439-10-3	2.4E+02	3.5E+03	1.5E+01	1.5E+02	nc	nc	nc	nc	nc	nc
6.0E-03	6.0E-03	6.0E-03	6.0E-03	r	115-23-7	3.7E+02	5.3E+03	2.2E+01	2.2E+02	nc	nc	nc	nc	nc	nc
2.0E-02	2.0E-02	2.0E-02	2.0E-02	r	145-73-3	1.2E+03	1.8E+04	7.3E+01	7.3E+02	nc	nc	nc	nc	nc	nc
3.0E-04	3.0E-04	3.0E-04	3.0E-04	r	72-20-8	1.8E+01	2.6E+02	1.1E+00	1.1E+01	nc	nc	nc	nc	nc	nc
2.0E-03	2.0E-03	2.0E-03	2.0E-03	r	106-89-8	7.8E+00	1.0E+01	1.0E+00	2.0E+00	nc	nc	nc	nc	nc	nc
5.7E-03	5.7E-03	5.7E-03	5.7E-03	r	106-88-7	3.5E+02	5.0E+03	2.1E+01	2.1E+02	nc	nc	nc	nc	nc	nc
2.5E-02	2.5E-02	2.5E-02	2.5E-02	r	759-39-4	1.3E+03	2.2E+04	9.1E+01	9.1E+02	nc	nc	nc	nc	nc	nc
5.0E-03	5.0E-03	5.0E-03	5.0E-03	r	16872-87-0	3.1E+02	4.4E+03	1.8E+01	1.8E+02	nc	nc	nc	nc	nc	nc
5.0E-04	5.0E-04	5.0E-04	5.0E-04	r	563-12-2	3.1E+01	4.4E+02	1.8E+00	1.8E+01	nc	nc	nc	nc	nc	nc
4.0E-01	5.7E-02	4.0E-01	5.7E-02	r	110-30-5	2.4E+04	1.0E+05	2.1E+02	2.1E+04	nc	nc	nc	nc	nc	nc
3.0E-01	3.0E-01	3.0E-01	3.0E-01	r	111-15-9	1.8E+04	1.0E+05	1.1E+03	1.1E+04	nc	nc	nc	nc	nc	nc
9.0E-01	9.0E-01	9.0E-01	9.0E-01	r	141-78-6	1.9E+04	3.7E+04	3.3E+03	3.3E+03	nc	nc	nc	nc	nc	nc
4.8E-02	4.8E-02	4.8E-02	4.8E-02	r	140-88-5	2.1E-01	4.5E-01	1.4E-01	2.3E-01	ca	ca	ca	ca	1E+01	7E-01
1.0E-01	2.9E-01	1.0E-01	2.9E-01	r	100-11-4	2.3E+02	2.3E+02	1.1E+03	1.3E+03	nc	nc	nc	nc	nc	nc
4.0E-01	2.8E-03	4.0E-01	2.8E-03	r	75-00-3	3.0E+00	6.5E+00	2.3E+00	4.6E+00	ca	ca	ca	ca	nc	nc
3.0E-01	3.0E-01	3.0E-01	3.0E-01	r	109-78-4	1.8E+04	1.0E+05	1.1E+03	1.1E+04	nc	nc	nc	nc	nc	nc
2.0E-02	2.0E-02	2.0E-02	2.0E-02	r	107-15-3	1.2E+03	1.8E+04	7.3E+01	7.3E+02	nc	nc	nc	nc	nc	nc
2.0E+00	2.0E+00	2.0E+00	2.0E+00	r	107-21-1	1.0E+05	1.0E+05	7.3E+03	7.3E+04	nc	nc	nc	nc	nc	nc
5.7E-03	5.7E-03	5.7E-03	5.7E-03	r	111-76-2	3.5E+02	5.0E+03	2.1E+01	2.1E+02	nc	nc	nc	nc	nc	nc
1.0E+00	3.5E-01	1.0E+00	3.5E-01	r	75-21-8	1.4E-01	3.6E-01	1.9E-02	2.4E-02	nc	nc	nc	nc	nc	nc
1.1E-01	1.1E-01	1.1E-01	1.1E-01	r	95-45-7	4.4E+00	2.2E+01	6.1E-02	6.1E-01	ca**	ca**	ca**	ca**	nc	nc
2.0E-01	2.0E-01	2.0E-01	2.0E-01	r	60-28-7	1.8E+03	1.8E+03	7.3E+02	7.3E+03	nc	nc	nc	nc	nc	nc
9.0E-02	9.0E-02	9.0E-02	9.0E-02	r	97-63-2	1.4E-02	1.4E+02	3.3E+02	5.5E+02	nc	nc	nc	nc	nc	nc
1.0E-05	1.0E-05	1.0E-05	1.0E-05	r	2104-64-5	6.1E-01	8.8E+00	3.7E-02	3.6E-01	nc	nc	nc	nc	nc	nc
3.0E+00	3.0E+00	3.0E+00	3.0E+00	r	84-72-0	1.0E+05	1.0E+05	1.1E+04	1.1E+05	nc	nc	nc	nc	nc	nc
8.0E-03	8.0E-03	8.0E-03	8.0E-03	r	101200-48-0	4.9E+02	7.0E+03	2.9E+01	2.9E+02	nc	nc	nc	nc	nc	nc
2.5E-04	2.5E-04	2.5E-04	2.5E-04	r	22224-92-6	1.5E+01	2.2E+02	9.1E-01	9.1E+00	nc	nc	nc	nc	nc	nc
1.3E-02	1.3E-02	1.3E-02	1.3E-02	r	2104-17-2	7.9E+02	1.1E+04	4.7E+01	4.7E+02	nc	nc	nc	nc	nc	nc
6.0E-02	6.0E-02	6.0E-02	6.0E-02	r	16884-46-8	3.7E+03	7.0E+04	2.9E+02	2.9E+03	nc	nc	nc	nc	nc	nc
9.0E-02	9.0E-02	9.0E-02	9.0E-02	r	59756-60-4	4.9E+03	7.0E+04	2.9E+02	2.9E+03	nc	nc	nc	nc	nc	nc
2.0E-02	2.0E-02	2.0E-02	2.0E-02	r	86425-91-3	1.2E+03	1.8E+04	7.3E+01	7.3E+02	nc	nc	nc	nc	nc	nc
6.0E-02	6.0E-02	6.0E-02	6.0E-02	r	66332-96-5	3.7E+03	5.3E+04	2.2E+02	2.2E+03	nc	nc	nc	nc	nc	nc
1.0E-02	1.0E-02	1.0E-02	1.0E-02	r	89408-94-5	6.1E+02	8.8E+03	3.7E+01	3.6E+02	nc	nc	nc	nc	nc	nc
3.5E-03	3.5E-03	3.5E-03	3.5E-03	r	133-07-3	1.4E+02	7.0E+02	1.9E+00	1.9E+01	ca	ca	ca	ca	1.9E+01	1.9E+01
1.9E-01	1.9E-01	1.9E-01	1.9E-01	r	72178-02-0	2.6E+00	1.3E+01	3.5E-02	3.5E-01	ca	ca	ca	ca	3.5E-01	3.5E-01

Key: H=HEAST I=HEAVY W=WITHDRAWN O=Other EPA DOCUMENTS R=ROUTE EXTRAPOLATION C=CANCER PRG OC=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT (where: nc < 100X ca) ** (where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION

CONTAMINANT

PRELIMINARY REMEDIATION GOALS (PRGs)

SOIL SCREENING LEVELS

SFO 1/(mg/kg-d)	RfDo (mg/kg-d)	SFI 1/(mg/kg-d)	RfDI (mg/kg-d)	V skin		CAS No.	Residential Soil (mg/kg)		Industrial Soil (mg/kg)	Ambient Air (ug/m ³)	Tap Water (ug/l)	Migration to Ground Water	
				O obs.	C soils		DAF 20 (mg/kg)	DAF 1 (mg/kg)					
1.5E-01	4.5E-02		2.0E-03	0	0.10	944222-9	1.2E+02	1.8E+03	nc	7.3E+01	nc	nc	nc
1.5E-01	4.5E-02		2.0E-03	0	0.10	50-00-0	1.2E+02	1.8E+03	nc	7.3E+01	nc	nc	nc
2.0E-00	2.0E-00	h	3.0E+00	0	0.10	64-18-6	1.0E+05	1.0E+05	max	7.3E+03	nc	5.8E+03	nc
3.0E+00	3.0E+00	h	3.0E+00	0	0.10	39148-24-6	1.0E+05	1.0E+05	max	7.3E+03	nc	7.3E+04	nc
1.0E-03	1.0E-03	h	1.0E-03	1	0.10	110-00-9	2.5E+00	8.5E+00	nc	3.7E+00	nc	6.1E+00	nc
3.0E+00	3.0E+00	h	1.4E-02	0	0.10	87-45-8	1.3E-01	6.5E-01	ca	1.8E-03	ca	1.8E-02	ca
3.0E+00	3.0E+00	h	1.4E-02	0	0.10	98-01-1	1.8E+02	2.6E+02	nc	5.2E+01	nc	1.1E+02	nc
5.0E-01	5.0E-01	h	4.0E-04	0	0.10	931-82-8	9.7E-03	4.9E-02	ca	1.3E-04	ca	1.3E-03	ca
3.0E-02	3.0E-02	h	4.0E-04	0	0.10	90566-05-0	1.6E+01	8.2E+01	ca	2.2E-01	ca	2.2E+00	ca
4.0E-04	4.0E-04	h	2.9E-04	0	0.10	77182-82-2	2.4E+01	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc
4.0E-04	4.0E-04	h	2.9E-04	0	0.10	765-34-4	2.4E+01	3.5E+02	nc	1.5E+00	nc	1.5E+01	nc
1.0E-01	1.0E-01	h	1.0E-01	0	0.10	1071-83-6	6.1E+03	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc
5.0E-05	5.0E-05	h	5.0E-05	0	0.10	89866-40-2	3.1E+00	4.4E+01	nc	1.8E-01	nc	1.8E+00	nc
1.3E-02	1.3E-02	h	1.3E-02	0	0.10	79777-27-3	7.9E+02	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc
5.0E-04	5.0E-04	h	5.0E-04	0	0.10	76-44-8	1.1E-01	5.5E-01	ca	1.5E-03	ca	1.5E-02	ca
1.3E-05	1.3E-05	h	1.3E-05	0	0.10	1024-57-3	5.3E-02	2.7E-01	ca	7.4E-04	ca	7.4E-03	ca
2.0E-03	2.0E-03	h	2.0E-03	0	0.10	87-82-1	1.2E+02	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc
8.0E-04	8.0E-04	h	6.0E-04	0	0.10	119-74-1	3.0E-01	1.5E+00	ca	4.2E-02	ca	4.2E-02	ca
2.0E-04	2.0E-04	h	2.0E-04	0	0.10	87-66-3	6.2E+00	3.2E+01	ca	8.6E-02	ca	8.6E-01	ca
6.3E+00	6.3E+00	h	6.3E+00	0	0.04	319-84-6	9.0E-02	5.9E-01	ca	1.1E-03	ca	1.1E-02	ca
1.8E+00	1.8E+00	h	1.8E+00	0	0.04	319-85-7	4.4E-01	2.1E+00	ca	3.7E-03	ca	3.7E-02	ca
1.3E+00	1.3E+00	h	1.3E+00	0	0.04	58-99-9	4.4E-01	2.9E+00	ca	5.2E-03	ca	5.2E-02	ca
1.8E+00	1.8E+00	h	1.8E+00	0	0.04	808-73-1	3.2E-01	2.1E+00	ca	3.8E-03	ca	3.7E-02	ca
7.0E-03	7.0E-03	h	2.0E-05	0	0.10	77-47-4	4.2E+02	5.0E+03	nc	7.3E-02	nc	2.6E-02	nc
1.0E-03	1.0E-03	h	1.0E-03	0	0.10	67-72-1	7.8E-05	4.9E-04	ca	1.5E-06	ca	1.1E-05	ca
3.0E-04	3.0E-04	h	3.0E-04	0	0.10	70-30-4	1.8E+01	2.6E+02	nc	1.1E+00	nc	4.7E+00	nc
2.9E-06	2.9E-06	h	3.0E-03	1	0.10	121-82-4	4.4E+00	2.2E+01	ca	6.1E-02	ca	6.1E-01	ca
6.0E-02	6.0E-02	h	2.9E-06	1	0.10	822-06-0	1.7E-01	2.5E+00	nc	1.0E-02	nc	1.0E-01	nc
3.3E-02	3.3E-02	h	3.3E-02	1	0.10	110-54-3	2.0E+03	2.9E+04	nc	1.2E+02	nc	1.2E+03	nc
3.0E+00	3.0E+00	h	1.7E-01	0	0.10	31255-04-2	1.6E-01	8.2E-01	ca	3.9E-04	ca	2.2E-02	ca
3.0E-03	3.0E-03	h	2.9E-04	1	0.10	7647-01-0	2.4E+03	3.5E+04	nc	1.0E+00	nc	1.1E+02	nc
1.3E-02	1.3E-02	h	1.3E-02	0	0.10	3554-44-0	7.9E+02	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc
2.5E-01	2.5E-01	h	2.5E-01	0	0.10	81335-37-7	1.5E+04	1.0E+05	max	9.1E+02	nc	9.1E+03	nc
4.0E-02	4.0E-02	h	4.0E-02	0	0.10	36734-19-7	2.4E+03	3.5E+04	nc	1.3E+02	nc	1.3E+03	nc
3.0E-01	3.0E-01	h	3.0E-01	1	0.10	7439-99-6	2.3E+04	1.0E+05	max	1.1E+04	nc	1.1E+04	nc
3.0E-01	3.0E-01	h	3.0E-01	1	0.10	78-83-1	1.3E+04	4.0E+04	sat	1.1E+03	nc	1.8E+03	nc
1.5E-02	1.5E-02	h	1.5E-02	0	0.10	78-59-1	5.1E+02	2.6E+03	ca	7.1E+00	ca	7.1E+01	ca
1.0E-01	1.0E-01	h	1.1E-01	0	0.10	33820-53-0	9.2E+02	1.3E+04	ca	5.3E+01	ca	5.3E+02	ca
5.0E-02	5.0E-02	h	5.0E-02	0	0.10	1832-54-8	6.1E+03	8.8E+04	nc	4.0E+02	nc	3.6E+03	nc
2.0E-03	2.0E-03	h	2.0E-03	0	0.10	77501-63-4	1.2E+02	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc
1.0E-07	1.0E-07	h	1.0E-07	0	0.10	7439-92-1	4.0E+02	1.0E+03	nc	3.6E-03	nc	3.6E-03	nc
2.0E-03	2.0E-03	h	2.0E-03	0	0.10	330-55-2	1.2E+02	1.8E+03	nc	7.3E+00	nc	7.3E+01	nc
2.0E-02	2.0E-02	h	2.0E-02	0	0.10	7439-93-2	1.6E+03	4.1E+04	nc	7.3E+02	nc	7.3E+02	nc
2.0E-01	2.0E-01	h	2.0E-01	0	0.10	83655-98-6	1.2E+04	1.0E+05	max	7.3E+02	nc	7.3E+03	nc
2.0E-02	2.0E-02	h	2.0E-02	0	0.10	121-75-5	1.2E+03	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc
1.0E-01	1.0E-01	h	1.0E-01	0	0.10	108-31-8	6.1E+03	8.8E+04	nc	3.7E+02	nc	3.6E+03	nc
5.0E-01	5.0E-01	h	5.0E-01	1	0.10	123-33-1	1.7E+03	2.4E+03	sat	1.8E+03	nc	3.0E+03	nc
2.0E-05	2.0E-05	h	2.0E-05	0	0.10	108-77-3	1.2E+03	1.8E+04	nc	7.3E-02	nc	7.3E-01	nc
3.0E-02	3.0E-02	h	3.0E-02	0	0.10	8018-01-7	1.8E+03	2.6E+04	nc	1.1E+02	nc	1.1E+03	nc
5.0E-03	5.0E-03	h	5.0E-03	0	0.10	12427-38-2	8.1E+00	4.1E+01	ca	1.1E-01	ca	1.1E+00	ca
2.4E-02	2.4E-02	h	2.4E-02	1	0.10	7439-98-5	1.8E+03	3.2E+04	nc	5.1E-02	nc	8.8E+02	nc

Key: I=IRIS, n=NCEA, h=HEAST, r=WITHDRAWN, o=Other EPA DOCUMENTS, F=ROUTE EXTRAPOLATION, ca=CANCER PRG, nc=NONCANCER PRG, max=CELLING LIMIT, * (where: nc < 100X ca) ** (where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION				CONTAMINANT		PRELIMINARY REMEDIATION GOALS (PRGs)				SOIL SCREENING LEVELS	
SfO 1/(mg/kg-d)	RfDo (mg/kg-d)	SfI 1/(mg/kg-d)	RfDI (mg/kg-d)	V O C colis	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m ³)	Tap Water (mg/L)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
2.8E-02	3.0E-02	1.0E-01	3.0E-02	0	1430-30-4	1.7E+01	8.5E+01	2.3E-01	2.3E+00	nc	nc
3.0E-04	3.0E-04	2.9E-02	3.0E-01	0	7430-97-6	2.3E+01	6.1E+02	3.1E-01	1.1E+01	nc	nc
1.0E-04	3.0E-05	3.0E-05	3.0E-05	0	22867-82-8	6.1E+00	8.8E+01	1.1E-01	3.6E+00	nc	nc
3.0E-05	3.0E-05	3.0E-05	3.0E-05	0	150-50-5	1.8E+00	2.6E+01	1.1E-01	1.1E+00	nc	nc
3.0E-05	3.0E-05	3.0E-05	3.0E-05	0	78-48-8	1.8E+00	2.6E+01	1.1E-01	1.1E+00	nc	nc
6.0E-02	6.0E-02	6.0E-02	6.0E-02	0	57-837-18-1	3.7E+03	5.3E+04	2.2E+02	2.2E+03	nc	nc
1.0E-04	2.0E-04	2.0E-04	2.0E-04	h	128-98-7	2.1E+00	8.8E+00	7.3E-01	1.0E+00	nc	nc
5.0E-05	5.0E-05	5.0E-05	5.0E-05	0	10285-92-6	3.1E+00	1.0E+05	1.8E+03	1.8E+00	nc	nc
5.0E-01	5.0E-01	5.0E-01	5.0E-01	0	87-58-1	3.1E+04	1.0E+05	1.8E+03	1.8E+04	nc	nc
1.0E-03	1.0E-03	1.0E-03	1.0E-03	0	950-37-8	6.1E+01	8.8E+02	3.7E+00	3.6E+01	nc	nc
2.5E-02	2.5E-02	2.5E-02	2.5E-02	f	18752-77-5	4.4E+01	1.5E+02	9.1E+01	1.5E+02	nc	nc
5.0E-03	5.0E-03	5.0E-03	5.0E-03	0	72-43-5	3.1E+02	4.4E+03	1.8E+01	1.8E+02	nc	nc
1.0E-03	1.0E-03	1.0E-03	1.0E-03	0	110-88-4	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc
2.0E-03	2.0E-03	4.8E-02	4.8E-02	0	99-59-2	1.1E+01	5.4E+01	1.5E-01	1.5E+00	nc	nc
4.6E-02	4.6E-02	4.6E-02	4.6E-02	0	79-20-9	2.2E+04	9.6E+04	3.7E+03	6.1E+03	nc	nc
1.0E+00	1.0E+00	1.0E+00	1.0E+00	f	96-33-3	7.0E+01	2.3E+02	1.1E+02	1.8E+02	nc	nc
3.0E-02	3.0E-02	2.4E-01	2.4E-01	0	95-53-4	2.0E+00	1.0E+01	2.8E-02	2.8E-01	nc	nc
1.8E-01	1.8E-01	1.8E-01	1.8E-01	0	638-21-5	2.7E+00	1.2E+01	3.7E-02	3.7E-01	nc	nc
1.0E+00	1.0E+00	1.0E+00	1.0E+00	0	79-22-1	6.1E+04	1.0E+05	3.7E+03	3.6E+04	nc	nc
5.0E-04	5.0E-04	5.0E-04	5.0E-04	0	84-81-5	3.1E+01	4.4E+02	1.8E+00	1.8E+01	nc	nc
1.0E-03	1.0E-03	1.0E-03	1.0E-03	0	93-68-2	6.1E+01	8.8E+02	3.7E+01	3.6E+02	nc	nc
1.0E-03	1.0E-03	1.0E-03	1.0E-03	0	10494-77-8	6.1E+01	8.8E+02	3.7E+00	3.6E+01	nc	nc
6.6E-01	6.6E-01	6.6E-01	6.6E-01	h	108-87-2	2.8E+03	8.8E+03	3.1E+03	5.2E+03	nc	nc
2.5E-01	2.5E-01	2.5E-01	2.5E-01	0	101-77-9	1.9E+00	9.9E+00	2.7E-02	2.7E-01	nc	nc
1.3E-01	1.3E-01	1.3E-01	1.3E-01	0	101-14-4	3.7E+00	1.9E+01	5.2E-02	5.2E-01	nc	nc
4.6E-02	4.6E-02	4.6E-02	4.6E-02	0	101-81-1	1.1E+01	5.4E+01	1.5E-01	1.5E+00	nc	nc
7.5E-03	7.5E-03	7.5E-03	7.5E-03	h	75-09-2	8.9E+00	2.1E+01	4.1E+00	4.3E+00	nc	nc
1.7E-04	1.7E-04	1.7E-04	1.7E-04	0	78-93-3	1.0E+01	1.5E+02	6.2E-01	6.2E+00	nc	nc
6.0E-01	6.0E-01	6.0E-01	6.0E-01	1	60-34-4	4.4E-01	2.2E+00	6.1E-03	6.1E-02	nc	nc
1.1E+00	1.1E+00	1.1E+00	1.1E+00	0	108-10-1	7.9E+02	2.9E+03	8.3E+01	1.6E+02	nc	nc
8.0E-02	8.0E-02	8.0E-02	8.0E-02	h	74-93-1	3.9E+01	5.0E+02	2.1E+00	2.1E+01	nc	nc
5.7E-04	5.7E-04	5.7E-04	5.7E-04	0	60-62-6	2.2E+03	2.7E+03	7.3E+02	1.4E+03	nc	nc
1.4E+00	1.4E+00	1.4E+00	1.4E+00	1	98-55-8	1.5E+01	7.5E+01	2.0E-01	2.0E+00	nc	nc
2.5E-04	2.5E-04	2.5E-04	2.5E-04	0	209-00-0	1.5E+01	2.2E+02	9.1E-01	9.1E+00	nc	nc
5.0E-02	5.0E-02	5.0E-02	5.0E-02	0	85-48-7	3.1E+03	4.4E+04	1.8E+02	1.8E+03	nc	nc
5.0E-02	5.0E-02	5.0E-02	5.0E-02	0	108-99-4	3.1E+03	4.4E+04	1.8E+02	1.8E+03	nc	nc
5.0E-03	5.0E-03	5.0E-03	5.0E-03	0	108-44-5	3.1E+02	4.4E+03	1.8E+01	1.8E+02	nc	nc
5.0E-03	5.0E-03	5.0E-03	5.0E-03	0	993-13-5	1.2E+03	1.8E+04	7.3E+01	7.3E+02	nc	nc
6.0E-03	6.0E-03	6.0E-03	6.0E-03	h	25013-15-4	1.3E+02	5.6E+02	4.2E+01	6.0E+01	nc	nc
7.0E-02	7.0E-02	7.0E-02	7.0E-02	f	86-43-9	6.8E+02	6.8E+02	2.6E+02	4.3E+02	nc	nc
8.6E-01	8.6E-01	8.6E-01	8.6E-01	1	1834-04-4	9.2E+03	1.0E+05	5.5E+02	5.5E+03	nc	nc
1.5E-01	1.5E-01	1.5E-01	1.5E-01	0	51217-45-2	1.5E+03	2.2E+04	9.1E+01	9.1E+02	nc	nc
2.5E-02	2.5E-02	2.5E-02	2.5E-02	0	21087-64-9	2.7E-01	1.4E+00	3.7E-03	3.7E-02	nc	nc
1.8E+00	1.8E+00	1.8E+00	1.8E+00	0	2385-85-5	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc
2.0E-03	2.0E-03	2.0E-03	2.0E-03	0	2212-67-1	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc
5.0E-03	5.0E-03	5.0E-03	5.0E-03	0	7439-98-7	3.9E+02	1.0E+04	3.7E+02	1.8E+02	nc	nc
1.0E-01	1.0E-01	1.0E-01	1.0E-01	h	10558-98-3	6.1E+03	8.8E+04	3.7E+02	3.6E+03	nc	nc
2.0E-03	2.0E-03	2.0E-03	2.0E-03	0	300-76-5	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc
1.0E-01	1.0E-01	1.0E-01	1.0E-01	0	15298-98-7	6.1E+03	8.8E+04	3.7E+02	3.6E+03	nc	nc
2.0E-02	2.0E-02	2.0E-02	2.0E-02	0	7440-02-0	1.6E+03	4.1E+04	3.7E+02	7.3E+02	nc	nc
						1.5E+02				1E+02	7E+00

FOR PLANNING PURPOSES

TOXICITY INFORMATION				CONTAMINANT				PRELIMINARY REMEDIATION GOALS (PRGs)				SOIL SCREENING LEVELS	
SFO	RfDo	SFI	RfDI	V	eln	CAS No.	Contaminant	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m ³)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)
1/(mg/kg-d)	(mg/kg-d)	1/(mg/kg-d)	(mg/kg-d)	O	abs.			ca	ca	ca	ca	(mg/kg)	(mg/kg)
1.5E-03	1.5E-03	1.7E+00	1.5E-03	r	0	12035-72-2	Nickel refinery dust	9.2E+01	1.1E+04	8.0E-03	5.5E+01	nc	nc
5.7E-06	5.7E-06	8.4E-01	5.7E-06	r	0	1929-82-4	Nickel subsulfide	7.8E+03	1.3E+03	4.0E-03	1.0E+04	nc	nc
5.0E-04	5.7E-04	1.7E+00	5.7E-04	r	0	14797-55-6	Nitrapyrin	3.5E+00	5.0E+01	2.1E-01	2.1E+00	nc	nc
7.0E-02	7.0E-02	1.4E-02	7.0E-02	r	0	10102-43-9	Nitrate	2.0E+01	1.1E+02	2.1E+00	3.4E+00	nc	nc
1.5E+00	1.5E+00	1.4E-02	1.5E+00	r	0	14797-85-0	Nitrite	4.3E+03	6.2E+04	2.8E+02	2.5E+03	nc	nc
1.4E-02	1.4E-02	1.4E-02	1.4E-02	r	0	88-74-4	2-Nitroanthiline	3.2E+01	1.8E+00	7.2E-04	4.8E-02	ca	ca
9.4E+00	9.4E+00	1.4E-02	9.4E+00	r	0	87-20-9	Nitrofurantoin	6.1E+03	8.8E+04	3.7E+02	3.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	55-83-0	Nitrofurazone	4.9E+02	1.8E+02	4.8E-01	4.8E+00	ca	ca
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	556-88-7	Nitroguanidine	6.1E+03	8.8E+04	3.7E+02	3.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	100-02-7	4-Nitrophenol	4.9E+02	7.0E+03	2.9E+01	2.9E+02	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	79-46-9	2-Nitropropane	2.4E-02	6.1E-02	7.2E-04	1.2E-03	ca	ca
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	924-16-3	N-Nitrosod-n-butylamine	1.7E-01	8.8E-01	2.4E-03	2.4E-02	ca	ca
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	1116-54-7	N-Nitrosodiphenylamine	3.2E-03	1.0E-02	4.5E-03	4.5E-04	ca	ca
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	55-18-5	N-Nitrosodimethylamine	9.9E+01	4.8E-02	1.4E+00	1.3E-03	ca	ca
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	86-30-6	N-Nitrosodiphenylamine	6.9E-02	3.5E-01	9.6E-04	9.6E-03	ca	ca
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	621-64-7	N-Nitrosodiphenylamine	2.2E-02	1.1E-01	3.1E-04	3.1E-03	ca	ca
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	10595-95-6	N-Nitroso di-n-propylamine	3.7E+02	1.00E+03	3.7E+01	6.1E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	930-55-2	N-Nitrosopyrrolidine	3.7E+02	1.00E+03	3.7E+01	6.1E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	99-08-1	m-Nitrotoluene	4.3E+01	6.2E+02	2.8E+00	2.8E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	99-08-1	o-Nitrotoluene	1.8E+02	2.6E+03	1.1E+01	1.1E+02	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	99-09-0	p-Nitrotoluene	3.1E+03	4.4E+04	1.8E+02	1.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	27514-13-2	Norflurazon	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	35509-19-9	NuStar	3.1E+03	4.4E+04	1.8E+02	1.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	19044-88-3	Octabromodiphenyl ether	3.1E+02	4.4E+04	1.8E+02	1.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	2691-141-0	Octahydro-1357-tetrahydro-1357- tetrazocine (HMX)	3.1E+02	4.4E+04	1.8E+02	1.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	152-16-9	Oxamyl	1.5E+03	2.2E+04	9.1E+01	9.1E+02	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	21135-22-0	Oxamyl	1.8E+02	2.6E+03	1.1E+01	1.1E+02	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	42874-03-3	Oxyfluorfen	7.9E+02	1.1E+04	4.7E+01	4.7E+02	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	76736-62-9	Paclobutrazol	2.7E+02	4.0E+03	1.8E+01	1.8E+02	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	6885-14-7	Paraquat	2.4E+03	5.3E+03	2.2E+01	2.2E+02	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	56-38-2	Parathion	3.1E+03	4.4E+04	1.8E+02	1.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	1114-71-2	Pebulate	2.1E+01	1.8E+03	7.3E+00	7.3E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	40487-42-1	Pendimethalin	1.2E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	67-84-3	Pentabromo-6-chloro cyclohexane	4.9E+01	7.0E+02	2.9E+00	2.9E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	32534-81-9	Pentabromodiphenyl ether	1.9E+00	9.5E+00	2.8E-02	2.8E-01	ca	ca
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	909-93-5	Pentachlorobenzene	3.0E+00	1.1E+01	5.8E-02	5.8E-01	ca	ca
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	82-86-8	Pentachloronitrobenzene	3.9E+01	1.0E+03	1.8E+02	1.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	87-96-5	Pentachlorophenol	3.1E+03	4.4E+04	1.8E+02	1.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	7601-90-3	Perchlorate	3.1E+03	4.4E+04	1.8E+02	1.8E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	52945-53-1	Permethrin	1.5E+04	1.0E+05	9.1E+02	9.1E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	13684-63-4	Phenmedipham	3.7E+04	1.0E+05	2.2E+03	2.2E+04	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	108-95-2	Phenol	3.7E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	92-84-2	m-Phenylenediamine	3.7E+02	1.8E+03	7.3E+00	7.3E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	106-45-2	p-Phenylenediamine	1.2E+04	1.0E+05	6.9E+02	6.9E+03	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	106-50-3	Phenylmercuric acetate	4.9E+00	7.0E+01	2.9E-01	2.9E+00	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	82-38-4	2-Phenylphenol	1.2E+01	1.8E+02	7.3E-01	7.3E+00	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	90-43-7	Phorate	1.2E+01	1.8E+02	7.3E-01	7.3E+00	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	268-02-2	Phosmel	1.2E+03	1.8E+04	7.3E+01	7.3E+02	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	732-11-6	Phosphoric acid	1.8E+01	2.5E+02	3.1E-01	3.1E+01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	7803-51-2	Phosphorus (white)	1.6E+00	4.1E+01	1.0E+01	7.3E-01	nc	nc
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	7864-38-2							
1.9E-02	1.9E-02	1.4E-02	1.9E-02	r	0	7723-14-0							

Key: * =IRIS n=NCEA h=HEAST * =WITHDRAWN e=Other EPA DOCUMENTS f=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sat=SOIL SATURATION max=CELLING LIMIT *(where: nc < 100X ca) ** (where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION

PRELIMINARY REMEDIATION GOALS (PRGs)

SOIL SCREENING LEVELS

SFO 1/(mg/kg-d)	RIDo (mg/kg-d)	SFI 1/(mg/kg-d)	RDI (mg/kg-d)	CAS No.			V skin			Residential (mg/kg)			Industrial (mg/kg)			Ambient Air (ug/m ³)			Tap Water (ug/l)			Migration to Ground Water DAF 1 (mg/kg)			
				h	h	h	h	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
2.0E+00	1.0E+00	1.0E+00	3.4E-02	100-21-0	0	0	0	0	100-21-0	1.0E+04	nc	1.0E+05	max	1.2E+02	nc	3.6E+04	nc	3.7E+03	nc	3.6E+04	nc	3.6E+04	nc	3.6E+04	nc
2.0E+00	1.0E+00	1.0E+00	7.0E-02	85-44-9	0	0	0	0	85-44-9	1.0E+05	max	1.0E+05	max	1.2E+02	nc	7.3E+04	nc	1.2E+02	nc	7.3E+04	nc	7.3E+04	nc	7.3E+04	nc
1.0E+02	1.0E+02	1.0E+02	7.0E-02	1918-02-1	0	0	0	0	1918-02-1	6.2E+04	nc	6.2E+04	nc	2.6E+02	nc	2.6E+03	nc	2.6E+02	nc	2.6E+03	nc	2.6E+03	nc	2.6E+03	nc
8.9E+00	7.0E-02	8.9E+00	7.0E-06	23505-41-1	0	0	0	0	23505-41-1	2.8E-01	ca**	2.8E-01	ca**	7.6E-04	ca*	7.6E-03	ca*	7.6E-04	ca*	7.6E-03	ca*	7.6E-03	ca*	7.6E-03	ca*
2.0E+00	2.0E+00	2.0E+00	7.0E-05	13336-36-3	0	0	0	0	13336-36-3	2.2E-01	ca	2.2E-01	ca	3.4E-03	ca*	3.4E-02	ca*	3.4E-03	ca*	3.4E-02	ca*	3.4E-02	ca*	3.4E-02	ca*
2.0E+00	2.0E+00	2.0E+00	2.0E-02	12674-11-2	0	0	0	0	12674-11-2	2.9E+00	ca**	2.9E+01	ca**	9.6E-02	ca**	9.6E-01	ca**	9.6E-02	ca**	9.6E-01	ca**	9.6E-01	ca**	9.6E-01	ca**
2.0E+00	2.0E+00	2.0E+00	2.0E+00	1104-20-2	0	0	0	0	1104-20-2	1.0E+00	ca	1.0E+00	ca	3.4E-03	ca*	3.4E-02	ca*	3.4E-03	ca*	3.4E-02	ca*	3.4E-02	ca*	3.4E-02	ca*
2.0E+00	2.0E+00	2.0E+00	2.0E+00	1141-18-5	0	0	0	0	1141-18-5	1.0E+00	ca	1.0E+00	ca	3.4E-03	ca*	3.4E-02	ca*	3.4E-03	ca*	3.4E-02	ca*	3.4E-02	ca*	3.4E-02	ca*
2.0E+00	2.0E+00	2.0E+00	2.0E+00	53489-21-9	0	0	0	0	53489-21-9	1.0E+00	ca	1.0E+00	ca	3.4E-03	ca*	3.4E-02	ca*	3.4E-03	ca*	3.4E-02	ca*	3.4E-02	ca*	3.4E-02	ca*
2.0E+00	2.0E+00	2.0E+00	2.0E+00	12872-28-8	0	0	0	0	12872-28-8	1.0E+00	ca	1.0E+00	ca	3.4E-03	ca*	3.4E-02	ca*	3.4E-03	ca*	3.4E-02	ca*	3.4E-02	ca*	3.4E-02	ca*
2.0E+00	2.0E+00	2.0E+00	2.0E+00	11097-69-1	0	0	0	0	11097-69-1	1.0E+00	ca**	1.0E+00	ca**	3.4E-03	ca*	3.4E-02	ca*	3.4E-03	ca*	3.4E-02	ca*	3.4E-02	ca*	3.4E-02	ca*
2.0E+00	2.0E+00	2.0E+00	2.0E+00	11098-82-5	0	0	0	0	11098-82-5	1.0E+00	ca	1.0E+00	ca	3.4E-03	ca*	3.4E-02	ca*	3.4E-03	ca*	3.4E-02	ca*	3.4E-02	ca*	3.4E-02	ca*
6.0E-02	3.0E-01	3.1E-03	6.0E-02	83-32-9	0	0	0	0	83-32-9	3.7E+03	nc	3.8E+04	nc	2.2E+02	nc	3.7E+02	nc	2.2E+02	nc	3.7E+02	nc	3.7E+02	nc	3.7E+02	nc
7.3E-01	3.1E-01	3.1E-01	3.0E-01	120-12-7	0	0	0	0	120-12-7	2.2E+04	ca	1.0E+05	max	1.1E+03	nc	1.8E+03	nc	1.1E+03	nc	1.8E+03	nc	1.8E+03	nc	1.8E+03	nc
7.3E-01	3.1E-01	3.1E-01	4.0E-02	86-55-3	0	0	0	0	86-55-3	6.2E-01	ca	2.9E+00	ca	2.2E-02	ca	9.2E-02	ca	2.2E-02	ca	9.2E-02	ca	9.2E-02	ca	9.2E-02	ca
7.3E-02	3.1E-02	3.1E-02	4.0E-02	205-99-2	0	0	0	0	205-99-2	6.2E-01	ca	2.9E+00	ca	2.2E-02	ca	9.2E-02	ca	2.2E-02	ca	9.2E-02	ca	9.2E-02	ca	9.2E-02	ca
7.3E-02	3.1E-02	3.1E-02	4.0E-02	207-98-9	0	0	0	0	207-98-9	6.2E-01	ca	2.9E+01	ca	2.2E-01	ca	9.2E-01	ca	2.2E-01	ca	9.2E-01	ca	9.2E-01	ca	9.2E-01	ca
7.3E+00	3.1E+00	3.1E+00	6.0E-02	50-32-8	0	0	0	0	50-32-8	6.2E-02	ca	2.9E-01	ca	2.2E-03	ca	9.2E-03	ca	2.2E-03	ca	9.2E-03	ca	9.2E-03	ca	9.2E-03	ca
7.3E-03	3.1E-03	3.1E-03	3.0E-01	218-01-9	0	0	0	0	218-01-9	6.2E+01	ca	2.9E+02	ca	2.2E+00	ca	9.2E+00	ca	2.2E+00	ca	9.2E+00	ca	9.2E+00	ca	9.2E+00	ca
7.3E+00	3.1E+00	3.1E+00	4.0E-02	53-70-3	0	0	0	0	53-70-3	6.2E-02	ca	2.9E-01	ca	2.2E-03	ca	9.2E-03	ca	2.2E-03	ca	9.2E-03	ca	9.2E-03	ca	9.2E-03	ca
4.0E-02	4.0E-02	4.0E-02	4.0E-02	208-44-0	0	0	0	0	208-44-0	2.3E+03	nc	3.0E+04	nc	1.5E+02	nc	1.5E+03	nc	1.5E+02	nc	1.5E+03	nc	1.5E+03	nc	1.5E+03	nc
4.0E-02	4.0E-02	4.0E-02	4.0E-02	86-73-7	0	0	0	0	86-73-7	2.6E+03	nc	3.3E+04	nc	1.5E+02	nc	2.4E+02	nc	1.5E+02	nc	2.4E+02	nc	2.4E+02	nc	2.4E+02	nc
7.3E-01	3.1E-01	3.1E-01	4.0E-02	193-39-5	0	0	0	0	193-39-5	6.2E-01	ca	2.9E+00	ca	2.2E-02	ca	9.2E-02	ca	2.2E-02	ca	9.2E-02	ca	9.2E-02	ca	9.2E-02	ca
2.0E-02	3.0E-02	1.5E-01	8.6E-04	91-20-3	0	0	0	0	91-20-3	5.6E+01	nc	1.9E+02	nc	3.1E+00	nc	6.2E+00	nc	3.1E+00	nc	6.2E+00	nc	6.2E+00	nc	6.2E+00	nc
3.0E-02	3.0E-02	3.0E-02	3.0E-02	128-00-0	0	0	0	0	128-00-0	3.2E+00	ca	1.6E+01	ca	4.5E-02	ca	4.5E-01	ca	4.5E-02	ca	4.5E-01	ca	4.5E-01	ca	4.5E-01	ca
9.0E-03	1.5E-01	1.5E-01	9.0E-03	6747-09-5	0	0	0	0	6747-09-5	3.7E+02	nc	5.3E+03	nc	2.2E+01	nc	2.2E+02	nc	2.2E+01	nc	2.2E+02	nc	2.2E+02	nc	2.2E+02	nc
6.0E-03	6.0E-03	6.0E-03	6.0E-03	26395-36-0	0	0	0	0	26395-36-0	9.2E+02	nc	1.3E+04	nc	5.5E+01	nc	5.5E+02	nc	5.5E+01	nc	5.5E+02	nc	5.5E+02	nc	5.5E+02	nc
1.5E-02	1.5E-02	1.5E-02	1.5E-02	1610-18-0	0	0	0	0	1610-18-0	2.4E+02	nc	3.5E+03	nc	1.5E+01	nc	1.5E+02	nc	1.5E+01	nc	1.5E+02	nc	1.5E+02	nc	1.5E+02	nc
4.0E-03	4.0E-03	4.0E-03	4.0E-03	7287-18-6	0	0	0	0	7287-18-6	4.6E+03	nc	6.6E+04	nc	2.7E+02	nc	2.7E+03	nc	2.7E+02	nc	2.7E+03	nc	2.7E+03	nc	2.7E+03	nc
1.3E-02	1.3E-02	1.3E-02	1.3E-02	23390-58-5	0	0	0	0	23390-58-5	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc	4.7E+01	nc	4.7E+02	nc	4.7E+02	nc	4.7E+02	nc
5.0E-03	5.0E-03	5.0E-03	5.0E-03	1918-16-7	0	0	0	0	1918-16-7	3.1E+02	nc	4.4E+03	nc	1.8E+01	nc	1.8E+02	nc	1.8E+01	nc	1.8E+02	nc	1.8E+02	nc	1.8E+02	nc
2.0E-02	2.0E-02	2.0E-02	2.0E-02	209-98-8	0	0	0	0	209-98-8	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc	7.3E+01	nc	7.3E+02	nc	7.3E+02	nc	7.3E+02	nc
2.0E-02	2.0E-02	2.0E-02	2.0E-02	122-42-9	0	0	0	0	122-42-9	1.2E+03	nc	1.8E+04	nc	7.3E+01	nc	7.3E+02	nc	7.3E+01	nc	7.3E+02	nc	7.3E+02	nc	7.3E+02	nc
2.0E-02	2.0E-02	2.0E-02	2.0E-02	107-19-7	0	0	0	0	107-19-7	7.9E+02	nc	1.1E+04	nc	4.7E+01	nc	4.7E+02	nc	4.7E+01	nc	4.7E+02	nc	4.7E+02	nc	4.7E+02	nc
1.3E-02	1.3E-02	1.3E-02	1.3E-02	60307-90-1	0	0	0	0	60307-90-1	1.6E+02	nc	1.8E+04	nc	4.0E+02	nc	4.0E+02	nc	4.0E+02	nc	4.0E+02	nc	4.0E+02	nc	4.0E+02	nc
1.0E-01	1.0E-01	1.0E-01	1.0E-01	98-62-8	0	0	0	0	98-62-8	1.4E+02	nc	2.4E+02	nc	3.7E+01	nc	3.7E+01	nc	3.7E+01	nc	3.7E+01	nc	3.7E+01	nc	3.7E+01	nc
1.0E-02	1.0E-02	1.0E-02	1.0E-02	103-65-1	0	0	0	0	103-65-1	1.0E+05	max	1.0E+05	max	7.3E+04	nc	7.3E+05	nc	7.3E+04	nc	7.3E+05	nc	7.3E+05	nc	7.3E+05	nc
7.0E-01	7.0E-01	7.0E-01	7.0E-01	111-35-3	0	0	0	0	111-35-3	4.3E+04	nc	1.0E+05	max	2.6E+03	nc	2.6E+04	nc	2.6E+03	nc	2.6E+04	nc	2.6E+04	nc	2.6E+04	nc
7.0E-01	7.0E-01	7.0E-01	7.0E-01	107-86-2	0	0	0	0	107-86-2	1.9E+00	ca*	9.1E+00	ca*	5.2E-01	ca*	5.2E-01	ca*	5.2E-01	ca*	5.2E-01	ca*	5.2E-01	ca*	5.2E-01	ca*
8.8E-03	8.8E-03	8.8E-03	8.8E-03	75-56-9	0	0	0	0	75-56-9	1.5E+04	nc	1.0E+05	max	2.6E+03	nc	2.6E+04	nc	2.6E+03	nc	2.6E+04	nc	2.6E+04	nc	2.6E+04	nc
2.9E-01	2.9E-01	2.9E-01	2.9E-01	81335-77-5	0	0	0	0	81335-77-5	4.3E+04	nc	1.0E+05	max	2.6E+03	nc	2.6E+04	nc	2.6E+03	nc	2.6E+04	nc	2.6E+04	nc	2.6E+04	nc
2.9E-02	2.9E-02	2.9E-02	2.9E-02	51630-58-1	0	0	0	0	51630-58-1	1.5E+04	nc	1.0E+05	max	2.6E+03	nc	2.6E+04	nc	2.6E+03	nc	2.6E+04	nc	2.6E+04	nc	2.6E+04	nc
1.0E-03	1.0E-03	1.0E-03	1.0E-03	110-86-1</																					

Key: I=IRIS N=NEA H=EAST X=WITHDRAWN O=Other EPA DOCUMENTS F=ROUTE EXTRAPOLATION C=CANCER PRG NC=NONCANCER PRG sat=SOIL SATURATION max=CEILING LIMIT *(where: nc < 100X ca) ** (where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION

CONTAMINANT

PRELIMINARY REMEDIATION GOALS (PRGs)

SOIL SCREENING LEVELS

SFO 1/(mg/kg-d)	RfDo (mg/kg-d)	SFI 1/(mg/kg-d)	RID (mg/kg-d)	V skin			CAS No.	Residential Soil (mg/kg)			Industrial Soil (mg/kg)			Ambient Air (ug/m ³)			Tap Water (ug/l)			Migration to Ground Water DAF 20 (mg/kg)			DAF 1 (mg/kg)
				O abs.	C	S		Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	Soil (mg/kg)	
7.0E-02	9.0E-02	1.2E-01	9.0E-02	0	0	0	74051-80-2	3.1E+02	4.4E+03	1.8E+02	3.3E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	3E-01	
5.0E-03	5.0E-03	1.2E-01	2.0E-03	0	0	0	7440-22-4	3.9E+02	1.0E+04	1.8E+02	3.3E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	5E+00	
5.0E-03	5.0E-03	1.2E-01	2.0E-03	0	0	0	7440-22-4	3.1E+02	1.0E+04	1.8E+02	3.3E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	3E+01	
5.0E-03	5.0E-03	1.2E-01	2.0E-03	0	0	0	7440-22-4	3.1E+02	1.0E+04	1.8E+02	3.3E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	3E+01	
1.2E-01	5.0E-03	1.2E-01	2.0E-03	0	0	0	7440-22-4	3.1E+02	1.0E+04	1.8E+02	3.3E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	1.8E+02	3E+01	
2.7E-01	3.0E-02	2.7E-01	3.0E-02	0	0	0	26628-22-8	2.4E+02	3.5E+03	1.5E+01	1.5E+02	1.5E+02	1.5E+02	1.5E+02	1.5E+02	1.5E+02	1.5E+02	1.5E+02	1.5E+02	1.5E+02	1.5E+02	2E+00	
2.0E-05	2.0E-05	2.0E-05	2.0E-05	0	0	0	148-18-1	1.8E+00	9.1E+00	2.5E-02	2.5E-02	2.5E-02	2.5E-02	2.5E-02	2.5E-02	2.5E-02	2.5E-02	2.5E-02	2.5E-02	2.5E-02	2.5E-02	3E-01	
1.0E-03	1.0E-03	1.0E-03	1.0E-03	0	0	0	62-14-8	1.2E+00	1.8E+01	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	3E-01	
1.0E-03	1.0E-03	1.0E-03	1.0E-03	0	0	0	13718-26-8	6.1E+01	8.8E+02	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3E-01	
6.0E-01	6.0E-01	6.0E-01	6.0E-01	0	0	0	7440-24-8	1.7E+03	1.7E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	4E+00	
3.0E-04	3.0E-04	3.0E-04	3.0E-04	0	0	0	57-24-9	1.7E+03	1.7E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	1.1E+03	2E-01	
2.0E-01	2.0E-01	2.0E-01	2.0E-01	0	0	0	100-42-5	1.5E+03	2.2E+04	9.1E+01	9.1E+01	9.1E+01	9.1E+01	9.1E+01	9.1E+01	9.1E+01	9.1E+01	9.1E+01	9.1E+01	9.1E+01	9.1E+01	3E-01	
2.5E-02	2.5E-02	2.5E-02	2.5E-02	0	0	0	86671-89-0	3.9E-06	2.7E-05	4.5E-08	4.5E-08	4.5E-08	4.5E-08	4.5E-08	4.5E-08	4.5E-08	4.5E-08	4.5E-08	4.5E-08	4.5E-08	4.5E-08	3E-01	
1.5E+05	1.5E+05	1.5E+05	1.5E+05	h	h	h	2,3,7,8-TCDD (dioxin)	4.3E+03	6.2E+04	2.8E+02	2.8E+02	2.8E+02	2.8E+02	2.8E+02	2.8E+02	2.8E+02	2.8E+02	2.8E+02	2.8E+02	2.8E+02	2.8E+02	3E-01	
7.0E-02	7.0E-02	7.0E-02	7.0E-02	0	0	0	34014-18-1	1.2E+03	1.8E+04	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	3E-01	
2.0E-02	2.0E-02	2.0E-02	2.0E-02	0	0	0	3383-86-8	1.2E+03	1.8E+04	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	7.3E+01	3E-01	
1.3E-02	1.3E-02	1.3E-02	1.3E-02	0	0	0	5902-51-2	7.9E+02	1.1E+04	4.7E+01	4.7E+01	4.7E+01	4.7E+01	4.7E+01	4.7E+01	4.7E+01	4.7E+01	4.7E+01	4.7E+01	4.7E+01	4.7E+01	3E-01	
2.5E-05	2.5E-05	2.5E-05	2.5E-05	0	0	0	13071-79-9	1.5E+00	2.2E+01	9.1E-02	9.1E-02	9.1E-02	9.1E-02	9.1E-02	9.1E-02	9.1E-02	9.1E-02	9.1E-02	9.1E-02	9.1E-02	9.1E-02	3E-01	
1.0E-03	1.0E-03	1.0E-03	1.0E-03	0	0	0	886-50-0	6.1E+01	8.8E+02	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	3E-01	
3.0E-04	3.0E-04	3.0E-04	3.0E-04	0	0	0	95-84-3	1.8E+01	2.6E+02	1.1E+01	1.1E+01	1.1E+01	1.1E+01	1.1E+01	1.1E+01	1.1E+01	1.1E+01	1.1E+01	1.1E+01	1.1E+01	1.1E+01	3E-01	
2.8E-02	2.8E-02	2.8E-02	2.8E-02	0	0	0	630-20-6	3.0E+00	7.0E+00	2.8E+01	2.8E+01	2.8E+01	2.8E+01	2.8E+01	2.8E+01	2.8E+01	2.8E+01	2.8E+01	2.8E+01	2.8E+01	2.8E+01	3E-01	
2.0E-01	6.0E-02	2.0E-01	6.0E-02	0	0	0	79-34-5	3.8E-01	9.0E-01	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3.3E-02	3E-03	
5.2E-02	1.0E-02	2.0E-03	1.1E-01	0	0	0	127-18-4	5.7E+00	1.9E+01	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	6E-02	
2.0E-01	3.0E-02	2.0E-01	3.0E-02	0	0	0	58-90-2	1.8E+03	2.6E+04	1.1E+02	1.1E+02	1.1E+02	1.1E+02	1.1E+02	1.1E+02	1.1E+02	1.1E+02	1.1E+02	1.1E+02	1.1E+02	1.1E+02	3E-03	
2.4E-02	3.0E-02	2.4E-02	3.0E-02	0	0	0	5216-25-1	2.4E+02	1.2E+01	3.4E+04	3.4E+04	3.4E+04	3.4E+04	3.4E+04	3.4E+04	3.4E+04	3.4E+04	3.4E+04	3.4E+04	3.4E+04	3.4E+04	3E-03	
7.6E-03	2.1E-01	6.8E-03	8.8E-02	0	0	0	109-88-9	6.4E+01	3.2E+02	9.9E-01	9.9E-01	9.9E-01	9.9E-01	9.9E-01	9.9E-01	9.9E-01	9.9E-01	9.9E-01	9.9E-01	9.9E-01	9.9E-01	3E-03	
7.0E-05	7.0E-05	7.0E-05	7.0E-05	0	0	0	1314-32-5	5.5E+00	1.4E+02	2.8E+00	2.8E+00	2.8E+00	2.8E+00	2.8E+00	2.8E+00	2.8E+00	2.8E+00	2.8E+00	2.8E+00	2.8E+00	2.8E+00	4E-01	
9.0E-05	9.0E-05	9.0E-05	9.0E-05	0	0	0	563-68-8	7.0E+00	1.8E+02	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	4E-01	
9.0E-05	9.0E-05	9.0E-05	9.0E-05	0	0	0	6533-73-9	6.3E+00	1.6E+02	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	4E-01	
8.0E-05	8.0E-05	8.0E-05	8.0E-05	0	0	0	7391-12-0	6.3E+00	1.6E+02	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	4E-01	
9.0E-05	9.0E-05	9.0E-05	9.0E-05	0	0	0	12095-52-0	7.0E+00	1.8E+02	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	3.3E+00	4E-01	
8.0E-05	8.0E-05	8.0E-05	8.0E-05	0	0	0	7446-18-6	6.3E+00	1.6E+02	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	4E-01	
1.0E-02	1.0E-02	1.0E-02	1.0E-02	0	0	0	28249-77-6	6.1E+02	8.8E+03	3.7E+01	3.7E+01	3.7E+01	3.7E+01	3.7E+01	3.7E+01	3.7E+01	3.7E+01	3.7E+01	3.7E+01	3.7E+01	3.7E+01	4E-01	
1.0E-01	1.0E-01	1.0E-01	1.0E-01	0	0	0	N/A	6.1E+03	1.0E+05	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	4E-01	
3.0E-04	3.0E-04	3.0E-04	3.0E-04	0	0	0	39196-18-4	1.8E+01	2.6E+02	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	4E-01	
8.0E-02	8.0E-02	8.0E-02	8.0E-02	0	0	0	23564-05-6	4.9E+03	7.0E+04	2.9E+02	2.9E+02	2.9E+02	2.9E+02	2.9E+02	2.9E+02	2.9E+02	2.9E+02	2.9E+02	2.9E+02	2.9E+02	2.9E+02	4E-01	
5.0E-03	5.0E-03	5.0E-03	5.0E-03	0	0	0	137-26-8	3.1E+02	4.4E+03	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	4E-01	
6.0E-01	6.0E-01	6.0E-01	6.0E-01	0	0	0	108-68-3	4.7E+04	1.0E+05	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	3.7E+02	4E-01	
2.0E-01	2.0E-01	2.0E-01	2.0E-01	0	0	0	95-80-7	5.2E+02	5.2E+02	4.0E+02	4.0E+02	4.0E+02	4.0E+02	4.0E+02	4.0E+02	4.0E+02	4.0E+02	4.0E+02	4.0E+02	4.0E+02	4.0E+02	6E-01	
6.0E-01	6.0E-01	6.0E-01	6.0E-01	0	0	0	95-80-7	1.5E-01	7.7E-01	2.1E-03	2.1E-03	2.1E-03	2.1E-03	2.1E-03	2.1E-03	2.1E-03	2.1E-03	2.1E-03	2.1E-03	2.1E-03	2.1E-03	6E-01	
2.0E-01	2.0E-01	2.0E-01	2.0E-01	0	0	0</																	

Key: f=IRIS n=NCEA h=HEAST x=WITHDRAWN p=Other EPA DOCUMENTS r=ROUTE EXTRAPOLATION ca=CANCER PRG nc=NONCANCER PRG sal=SOIL SATURATION max=CEILING LIMIT * (where: nc < 100X ca) ** (where: nc < 10X ca)

FOR PLANNING PURPOSES

TOXICITY INFORMATION				CONTAMINANT		PRELIMINARY REMEDIATION GOALS (PRGs)										SOIL SCREENING LEVELS			
SFO (mg/kg-d)	RfCo (mg/kg-d)	SFI (mg/kg-d)	RfDI (mg/kg-d)	V skin O abs. C soils	CAS No.	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m ³)	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)	9E-04 (mg/kg)	3E-03	1E+01	8E-03				
5.7E-02	4.0E-03	5.6E-02	4.0E-03	r	79-00-5	8.4E-01	1.9E+00	1.2E-01	2.0E-01	ca	2E-02	6E-02	3E+02	1E+01	8E-03				
1.1E-02	6.0E-03	6.0E-03	4.0E-03	r	79-01-6	3.8E+00	6.1E+00	1.1E+00	1.6E+00	ca*	2E-02	6E-02	3E+02	1E+01	8E-03				
1.1E-02	1.0E-01	1.1E-02	1.0E-01	r	75-99-4	2.9E+02	2.00E+03	7.3E+02	1.3E+03	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
1.0E-02	1.0E-02	1.0E-02	1.0E-02	r	95-95-4	6.1E+03	8.8E+04	3.7E+02	3.6E+03	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
9.0E-03	8.0E-03	8.0E-03	8.0E-03	r	95-92-1	4.4E+01	2.2E+02	6.2E-01	6.1E+00	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
5.0E-03	5.0E-03	5.0E-03	5.0E-03	r	88-08-2	6.1E+03	8.8E+04	3.7E+02	3.6E+03	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
7.0E+00	6.0E-03	7.0E+00	6.0E-03	r	598-77-8	1.5E+01	7.0E+03	2.9E+01	2.9E+02	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
3.0E-03	3.0E-03	3.0E-03	3.0E-03	r	98-18-4	1.4E-03	3.1E-03	9.6E-04	1.6E-03	ca	2E-02	6E-02	3E+02	1E+01	8E-03				
5.0E-03	5.0E-03	5.0E-03	5.0E-03	r	96-19-5	1.2E+01	3.9E+01	1.8E+01	3.0E+01	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
3.0E+01	8.0E+00	8.0E+00	8.0E+00	h	76-13-1	5.6E+03	5.6E+03	3.1E+04	5.9E+04	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
2.0E-03	2.0E-03	2.0E-03	2.0E-03	r	121-44-6	1.8E+02	2.6E+03	1.1E+01	1.1E+02	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
7.7E-03	7.7E-03	7.7E-03	7.7E-03	r	1922-08-8	2.3E+01	3.2E+02	8.7E-01	8.7E+00	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
5.0E-02	1.7E-03	1.7E-03	1.7E-03	r	95-63-6	5.7E+00	5.7E+00	6.2E+00	1.2E+01	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
3.7E-02	3.7E-02	3.7E-02	3.7E-02	r	108-67-8	2.1E+01	7.0E+01	6.2E+00	1.2E+01	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
1.0E-02	3.0E-02	3.0E-02	3.0E-02	r	96-35-4	1.8E+03	2.6E+04	1.1E+02	1.1E+03	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
3E-02	5.0E-04	3E-02	5.0E-04	r	479-45-8	6.1E+02	8.8E+03	3.7E+01	3.6E+02	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
7.0E-03	7.0E-03	7.0E-03	7.0E-03	r	118-96-7	1.8E+01	8.2E+01	2.2E-01	2.2E+00	ca**	2E-02	6E-02	3E+02	1E+01	8E-03				
2.0E-02	2.0E-02	2.0E-02	2.0E-02	h	7440-62-2	7.0E+02	1.4E+04	1.8E+04	3.3E+02	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
1.0E-03	1.0E-03	1.0E-03	1.0E-03	r	1314-62-1	1.6E+03	4.1E+04	1.8E+04	7.3E+02	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
2.5E-02	2.5E-02	2.5E-02	2.5E-02	r	1929-77-7	6.1E+01	8.8E+02	3.7E+00	3.6E+01	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
1.0E+00	1.0E+00	1.0E+00	1.0E+00	h	50471-44-8	1.5E+03	2.2E+04	9.1E+01	9.1E+02	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
1.1E-01	6.6E-04	1.1E-01	6.6E-04	r	108-05-4	4.3E+02	1.4E+03	2.1E+02	4.1E+02	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
1.9E+00	3.0E-01	3.0E-01	3.0E-01	h	953-90-2	1.9E-01	4.2E-01	6.1E-02	1.0E-01	ca*	2E-02	6E-02	3E+02	1E+01	8E-03				
2.0E+00	2.0E-01	2.0E-01	2.0E-01	r	75-01-4	1.8E+01	2.6E+02	1.1E+00	1.1E+01	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
3.0E-01	3.0E-01	3.0E-01	3.0E-01	r	1330-20-7	2.1E+02	2.1E+02	7.3E+02	1.4E+03	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
3.0E-04	3.0E-04	3.0E-04	3.0E-04	r	81-81-2	2.3E+04	1.0E+05	6.1E+02	1.1E+04	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
3.0E-04	3.0E-04	3.0E-04	3.0E-04	r	7440-66-6	2.3E+01	6.1E+02	6.1E+02	1.1E+01	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
3.0E-04	3.0E-04	3.0E-04	3.0E-04	r	1314-84-7	3.1E+03	4.4E+04	1.8E+02	1.8E+03	nc	2E-02	6E-02	3E+02	1E+01	8E-03				
5.0E-02	5.0E-02	5.0E-02	5.0E-02	r	12122-67-7	3.1E+03	4.4E+04	1.8E+02	1.8E+03	nc	2E-02	6E-02	3E+02	1E+01	8E-03				

APPENDIX F
WELL PERMIT APPLICATION
AND
EARTH TECH FORMS



Department of
Environmental Management
 601 TEXAS STREET
 FAIRFIELD, CALIFORNIA • 94533-6301

Site Address _____

Assessor's Parcel Number _____

Application/Permit Number _____

(707) 421-6770

WELL PERMIT APPLICATION

Property Owner _____ Phone _____

Mailing Address _____

Drilling Contractor _____ Phone _____

License Number _____ Expires _____

WORKERS' COMPENSATION DECLARATION

I hereby affirm that I have a certificate of consent to self-insure or a certificate of Workers' Compensation Insurance, or a certified copy thereof (Sec. 3800, Lab. C.)
 ___ Certified copy is hereby furnished. ___ Certified copy is filed with the County of Solano Environmental Health Division.

Date _____ Applicant _____

CERTIFICATE OF EXEMPTION FROM WORKERS' COMPENSATION INSURANCE

(This section need not be completed if the permit is for work valued at three hundred dollars (\$300) or less.)

I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Workers' Compensation Laws of California.

Date _____ Applicant _____

NOTICE TO APPLICANT: If, after making this Certificate of Exemption, you should become subject to the Workers' Compensation provisions of the Labor Code, you must forthwith comply with such provisions or this permit shall be deemed revoked.

PERMIT TYPE: ___ New Well ___ Repair/Modification ___ Destruction

WELL USE: ___ Domestic ___ Agriculture ___ Commercial ___ Cathodic ___ Monitoring (Describe _____)

DRILLING METHOD: ___ Rotary ___ Cable ___ Hollow Stem Auger ___ Other _____

CASING INFORMATION: Material: ___ Steel ___ PVC ___ Other _____ Proposed Depth _____
 Wall/Gauge _____ in. Casing Diameter _____ in. Well Bore Diameter _____ in.

ANNULAR SEAL: Depth _____ ft. Width of Annular Space _____ in.
 Sealing Material: ___ Neat Cement ___ Sand Cement ___ Concrete ___ Bentonite _____

Additional Work Description _____

I hereby agree to comply with all regulations of the Solano County Code pertaining to well construction, repair, modification, destruction and abandonment. The well driller shall furnish Environmental Health with a complete well log upon completion of well construction.

Applicant _____ Date _____

Site Approved _____ Date _____

FOR OFFICE USE ONLY - ENVIRONMENTAL HEALTH

\$ _____ Fee paid on _____ Receipt No. _____ Permit expires _____



Department of
Environmental Management
601 TEXAS STREET
FAIRFIELD, CALIFORNIA • 94533-6301

Environmental Health Division
(707) 421-6770

Clifford K. Covey, REHS, CHMM
Program Manager

WELL PERMIT APPLICATION INSTRUCTIONS

1. **GENERAL COMMENTS** - Chapter 13.10, Solano County Code establishes standards for the construction, reconstruction, destruction, and inactivation of water, cathodic protection, and monitoring wells. Although well permit applications may be submitted by homeowners, their agent, or a licensed well driller, only a person possessing a C-57 Water Well Drilling Contractor's License can actually perform work on a well. A copy of the license and Worker's Compensation Insurance Certificate must be on file or submitted with application with this office prior to issuance of a permit.
2. **APPLICATION** - The well permit application is to be submitted complete and signed. An accurate plot plan/vicinity or site map shall be included with the application. For monitoring wells, only one application is required per site regardless of the number of wells. Prior to issuance of the permit, certain circumstances may exist that would require that a site review be conducted to determine compliance with established standards. Payment of appropriate fee is required at the time of application submittal.
3. **PERMIT ISSUANCE** - If all information is provided on the application and the site is approved, a permit shall be issued. Drilling shall not begin until after the permit is received.
4. **CONSTRUCTION APPROVAL** - Environmental Health shall be notified at least 24 hours prior to the sealing of the annular space, please call 707-421-6770 and arrange for an inspection. The witnessing of the sealing of the annular space will be required on each well, including well destruction.

Please contact this office at 707-421-6770 if you have any questions or concerns.

welperm.ins



A **tyco** INTERNATIONAL LTD. COMPANY

Project No.: _____

Report No.: _____

Date: _____

Page: _____ of _____

Multiple horizontal lines for writing the report content.

Signature _____



A tyco INTERNATIONAL LTD. COMPANY

Owner: _____

Report No.: _____

Page _____ of _____

Project: _____

Date: _____

Project: No.: _____

Weather: A.M. _____ P.M. _____

Temp.(°F): High _____ Low _____ Rain _____

Contractor(s) _____

Contractor Super(s) _____

Number and Function of Contractors' Personnel, Hours Worked (Identify Subcontractors Separately)

Contractor	No. of People	Major Constr. Equip. Description	Size/Capacity	No.	No. in Use

Visitors

Representing

Daily Notations: _____

Signature: _____



Project Number		Project Name/Client				Custody Seal #		Earth Tech Cooler #	
Sample Custodian: (Signature)						Analysis Required		Matrix	
Item No.	Sample Description (Field ID Number)	Date	Time	Grab	Comp.	PID Reading (ppm)	Label Number	Sample Type	Sample Container
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Disposed of by: (Signature)		Items: Date / Time	
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Disposed of by: (Signature)		Items: Date / Time	
Send Lab Results To:		Remarks:		Federal Express Airbill No.:		Check Delivery Method:		Laboratory Receiving Notes:	
				Lab:		<input type="checkbox"/> Samples delivered in person <input type="checkbox"/> Common carrier		Custody Seal Intact?	
								Temp. of Shipping Container:	
								Sample Condition:	

PROJECT NAME:

PROJECT NO.:

CLIENT:

DRILLING CONTRACTOR:

DRILLING EQUIPMENT:

DRILLER:

SAMPLING METHOD:

TOTAL DEPTH:

START DATE:

COMPLETION DATE:

LOGGED BY:

APPROVED BY:

LOCATION:

SURFACE ELEVATION:

DEPTH	RECOVERY / ROD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
5								
10								
15								
20								



SURFACE WATER

Site _____

Project Number _____

Date _____

Temperature _____

Time _____

pH _____

Conductivity _____

Dissolved Oxygen _____

Collectors _____

Turbidity: Low _____
Medium _____
High _____

Sample Number

Color: _____

Sampling Equipment _____

Odor: _____

Water Depth: _____

Physical Description of Surface Water Sample Location: _____

SEDIMENT

Date _____

Time _____

Collectors _____

Sample Number

Sampling Equipment _____

Physical Description of Sediment Location: _____

Physical Description of Sediment: _____



A tyco INTERNATIONAL LTD. COMPANY

Site Name _____ Project No. _____ Well No. _____
Northing _____ Easting _____ Surf. Elev. _____ Ref. Boring No. _____
Drilling Contractor: _____ Well Installation Date/Time: _____
Driller's Name: _____ Inspected By: _____ Well Completion Date/Time: _____
Drilling Method: _____ Drilling Fluids (type): _____

Protective Casing:

Material:

Dia (in):

Length (ft):

Guard Posts

material:

Dia (in):

Top Cap or Plug: Type:

Concrete Collar:

Manufacturer:

Volumes:

+

=

Material between protective casing and Well Casing:

Upper Seal: Material:

Manufacturer:

Volume (Gal, Lbs)

Hydration: Volume Water:

Well Casing: Material:

Manufacturer:

Casing O.D./I.D.(ft)

Joints:

Annular Space Seal: Material:

Manufacturer:

Final Volumes:

+

+

=

Lower Seal: Material:

Manufacturer:

Volume (Gal, Lbs)

Hydration: Volume Water

Fine Sand: Material:

Manufacturer:

Volume (Gal, Lbs)

Filter Pack: Material:

Manufacturer:

Volume (Gal, Lbs)

Screen: Material:

Manufacturer:

I.D. (ft):

Slot Size:

NOTES: _____

Bottom Cap or Plug: Type: _____ **Length: (ft)** _____

Material Below Well: _____

Water Source: _____

Well Development (Must Have Well Construction Diagrams)



Well No.

Date: ____/____/____
 Mon. Tues. Weds. Thurs. Fri.

Site: _____

Weather: _____

Project No.: _____

Development: Pumped Bailed

Other: _____

Pump Type: _____

Bailer Type: _____

Volume Calculation: _____

$(D.T.B - D.T.W. \times \text{vol./ft.} = \text{PVC/well volume}) + (N \times H \times \text{Annulus vol./ft.}) = \text{Total well Volume}$

* (Wells that cannot be purged dry, 10x's the Total Well Volume must be purged)

(Wells that can be purged dry, slowly removing water, without surging until dry)

Time	Depth to Water (D.T.W.)	Depth to Bottom (D.T.B.)	Volume Removed (gal.)	PH	Cond.	Temp.	Color	Odor Y/N	Turbidity

Comments: _____

- *N = porosity of filter pack
- *H = length of filter pack or length of saturated filter pack (water level within screen length)
- * = A 30-minute surge and purge before the 10x's the Total Well Volume

Annulus	vol./ft.
4"	0.42
6"	1.24
8"	2.38
10"	3.85

Inside Diameter	vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

Signature: _____

HNU./PP	LEL/%	O ₂ /%	H ₂ S/PPM	CO/PPM	

Construction Photo Log



A **tyco** INTERNATIONAL LTD. COMPANY

Sheet _____ of _____

Project: _____ Project No.: _____

Date Taken	Picture No.	Description
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		

Notes: _____

APPENDIX G

TNT EnSys SOIL TEST SYSTEM

TNT EnSys[®] SOIL TEST SYSTEM

RAPID FIELD SCREEN

User's Guide

IMPORTANT NOTICE

The range of this test is between 1 and 30 ppm TNT/TNB/DNT. The relative standard deviation is 8%. The least detectable concentration is 0.7 ppm (TNT).

This test system should be used only under the supervision of a technically qualified individual who is capable of understanding any potential health and environmental risks of this product as identified in the product literature. The components must only be used for the analysis of soil samples for the presence of TNT. After use, the kits must be disposed of in accordance with applicable federal and local regulations.

PHASE 1 TEST PREPARATION

READ ALL INSTRUCTIONS BEFORE PROCEEDING WITH THE TEST

ITEMS INCLUDED IN TEST KIT

- | | | |
|--|--|---|
| <input type="checkbox"/> 2 Cuvette stopper plugs | <input type="checkbox"/> 20 Extraction jars | <input type="checkbox"/> 1 TNT control ampule |
| <input type="checkbox"/> 1 Ampule cracker | <input type="checkbox"/> 1 Bulb pipette | <input type="checkbox"/> 20 - 30cc syringes |
| <input type="checkbox"/> 20 Syringe filters | <input type="checkbox"/> 1 Developer solution | <input type="checkbox"/> 20 Weigh boats |
| <input type="checkbox"/> 20 Wooden spatulas | <input type="checkbox"/> 1 - 50mL graduated conical tube | |

ITEMS NOT INCLUDED IN TEST KIT

- | | | |
|--|--|--|
| <input type="checkbox"/> 2 matched HACH cuvettes | <input type="checkbox"/> Acetone | <input type="checkbox"/> Waste container |
| <input type="checkbox"/> Paper towels | <input type="checkbox"/> Hach DR/2000 or DR/2010 | <input type="checkbox"/> Balance |
| <input type="checkbox"/> Disposable gloves | <input type="checkbox"/> Calculator | |

READ BEFORE PROCEEDING

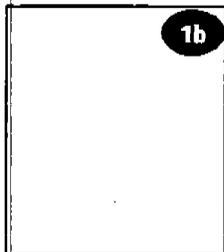
- For some matrices, air drying the soil samples may result in better TNT recovery or more reproducible data.
- A slightly modified protocol should be used if the primary analyte of concern is DNT. Please refer to the modification outlined on page 6.
- It is recommended that a control be run each day. See page 8 for instructions.
- SDI's EnSys® TNT Soil Test System is designed for use with either of Hach models DR/2000 or the newer DR/2010 spectrophotometers. Protocols for use of both instruments are provided in this User's Guide. Ensure the instrument protocol followed is appropriate for the instrument being used.
- The Hach DR/2000 is designed to turn off after a few minutes of inactivity. Press the "READ/ENTER" key every few minutes to prevent DR/2000 from turning off. If DR/2000 turns off, use Reference cuvette to rezero. Newer DR/2000 models and the DR/2010 have an override "constant on" feature that allows the machine to run indefinitely. Refer to the Instrument Operation: Spectrophotometer Setup section of the HACH DR/2000 or DR/2010 User's manuals.

If you are using the TNT test in conjunction with the RDX test it is important to save your sample extracts. They will be used in the RDX test. Remember to cap the extracts tightly after use. An RDX kit without extraction set-ups can be purchased specifically for this purpose.

PHASE 1 TEST PREPARATION

READ ALL INSTRUCTIONS BEFORE PROCEEDING WITH THE TEST

CLEAN CUVETTES



- 1a Fill 2 Hach matched cuvettes with approximately 5 mL water.
- 1b Cap each with cuvette stopper plug and, holding plug in place, shake vigorously for 3 seconds.
- 1c Empty into waste container.
- 1d Fill cuvettes with approximately 5 mL acetone.
- 1e Cap each with cuvette stopper plug and, holding plug in place, shake vigorously for 3 seconds.
- 1f Empty into waste container.
- 1g Repeat acetone wash (steps 1d - 1f).
- 1h Wipe outside of cuvette with paper towels. Take care to especially clean the side labeled "25 mL" and the side opposite.



Cuvette



Cuvette stopper

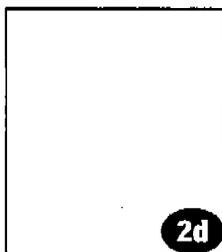
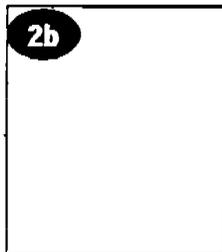
PHASE 1 TEST PREPARATION

READ ALL INSTRUCTIONS BEFORE PROCEEDING WITH THE TEST

READ BEFORE PROCEEDING

- Designate a "Reference" and "Sample" cuvette.

SPECTROPHOTOMETER PREPARATION



2a1 Turn on Hach DR/2000. The instrument will read "SELF-TEST" followed by "Method?". Select Method "0" and press the "READ/ENTER" key.

or

2a2 Turn on the Hach DR/2010. The instrument will read "Self-Test V.xx", then "Enter Program #". Press the [Shift] key (do not hold) and then the [ABS/8] key. Note: Select Program # "0" may also be used to select absorbance mode on the DR/2010.

2b Rotate the wavelength dial until the small display shows: 540 nm.

2c Fill both cuvettes with acetone to the 25 mL line.

2d Insert "Reference" cuvette into cell holder on Hach DR/2000 or DR/2010 with side marked "25 mL" on the right.

2e1 Close light shield of the DR/2000 and press "CLEAR/ZERO" key to establish the reference. The display will read "WAIT" and then "0.000 Abs."

or

2e2 Close the light shield of the DR/2010 and press the [ZERO] key. The display will read "Zeroing..." then "0.000 Abs."

2f Remove the "Reference" cuvette and place the "Sample" cuvette in the cell holder.

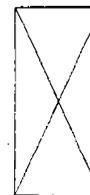
2g1 On the DR/2000, press the "READ/ENTER" key and record the absorbance on the worksheet as "Abs_{background}".

or

2g2 On the DR/2010, press the [READ] key and record the absorbance on the worksheet as "Abs_{background}".

2h If reading is greater than 0.002 in magnitude (+ or -), clean cuvettes and redo steps 2a - 2g.

2i Empty acetone from "Sample" cuvette into waste container.



Cuvette

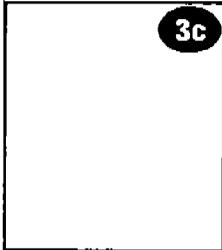
PHASE 2 SAMPLE EXTRACTION & PREPARATION

READ ALL INSTRUCTIONS BEFORE PROCEEDING WITH THE TEST

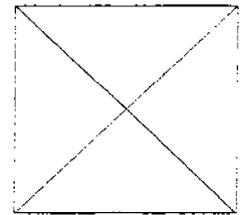
READ BEFORE PROCEEDING

- Sample should be mixed to ensure a homogeneous sample.

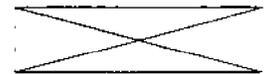
WEIGH SAMPLE



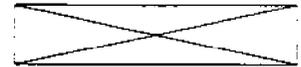
- Place an unused weigh boat on pan balance.
- Press ON/MEMORY button on pan balance. Balance will beep and display 0.0.
- Weigh out 10 \pm 0.1 grams of soil.
- If balance turns off prior to completing weighing, use empty weigh boat to retare, then continue.



Weigh Boat

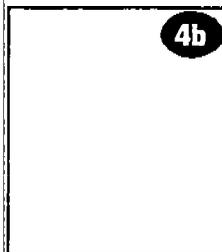


Pan balance

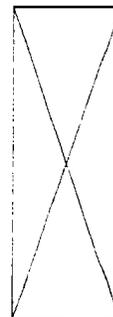


Wooden spatula

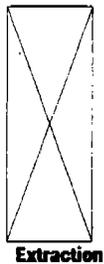
EXTRACT TNT



- Measure 50 mL acetone in the 50mL graduated conical tube.
 - Pour acetone into an extraction jar.
 - Using wooden spatula, transfer 10 grams of soil from weigh boat into extraction jar.
 - Recap extraction jar tightly and shake vigorously for three minutes.
 - Allow to settle for five minutes.
- Repeat steps 3a - 4e for each sample to be tested.

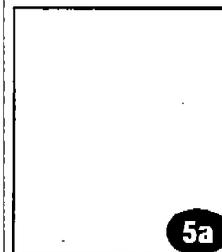


50mL
Graduated
Conical
Tube

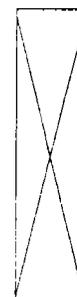


Extraction
jar

FILTER SAMPLE



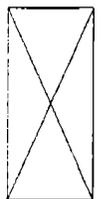
- Place tip of 30 cc syringe into liquid above the sediment layer in the extraction jar and draw up 25 mL of the sample.
- Screw the syringe filter onto the end of the syringe.
- Press the plunger firmly and dispense the sample into the "Sample" cuvette.



30 cc
syringe



Syringe
filter

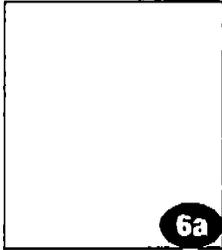


Cuvette

PHASE 3 SAMPLE ANALYSIS

READ ALL INSTRUCTIONS BEFORE PROCEEDING WITH THE TEST

READ SAMPLE



- 6a Place the "Sample" cuvette in the cell holder.
- 6b Press the "READ/ENTER" key and record the absorbance on the worksheet as "Abs_{initial}".
- 6c Remove the "Sample" cuvette from the cell holder.
- 6d Add 1 drop of Developer Solution.
- 6e Cap the "Sample" cuvette and shake vigorously for 3 seconds.



Cuvette

DNT Analysis Note:

For analysis of samples containing DNT, and/or where DNT concentration is of concern, samples must be allowed to develop for 10 minutes before reading sample absorbance. This will not effect color development for other nitroaromatics.

- 6f Remove the cuvette stopper and place the "Sample" cuvette in the cell holder.
- 6g Press the "READ/ENTER" key and record the absorbance on the worksheet as "Abs_{sample}".
- 6h Clean cuvette between samples using procedure in steps 1a - 1h.

PHASE 4 INTERPRETATION

READ ALL INSTRUCTIONS BEFORE PROCEEDING WITH THE TEST

INTERPRETATION OF RESULTS

- 7a Multiply the "Abs_{initial}" value for each sample by 4. Enter these values on the worksheet.
- 7b Subtract this value from the "Abs_{sample}" values for each sample and record on the worksheet.
- 7c Divide the adjusted sample value by 0.0323 and record on the worksheet. This value is the TNT concentration of the sample in parts per million.

$$\text{TNT (ppm)} = \frac{\text{Abs}_{\text{sample}} - (\text{Abs}_{\text{initial}} \times 4)}{0.0323}$$

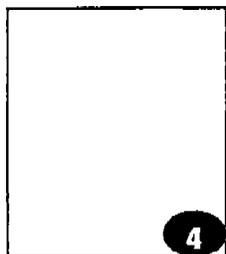
Note: For sample concentrations greater than 30ppm the sample extract should be diluted with acetone and reanalyzed. Remember to multiply the result by the dilution factor in order to determine the correct concentration.

CONTROL (QA/QC) CHECK

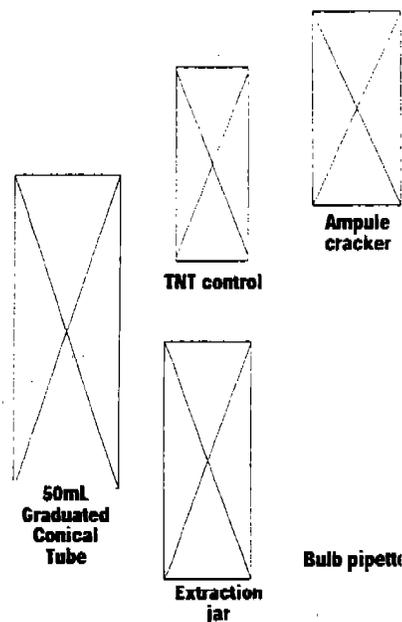
READ ALL INSTRUCTIONS BEFORE PROCEEDING WITH THE TEST

- The TNT control is optional, but it is recommended that it be run daily.

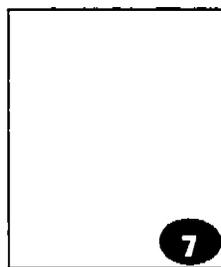
PREPARE CONTROL



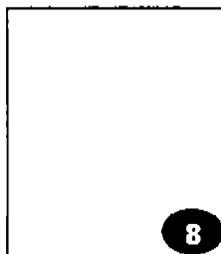
- 1 Measure 50 mL acetone in the 50mL graduated conical tube.
- 2 Pour into extraction jar.
- 3 Open TNT control ampule by slipping ampule cracker over top, and then breaking tip at scored neck.
- 4 Transfer entire contents of TNT control ampule into extraction jar using bulb pipette.
- 5 Cap extraction jar and shake vigorously for 3 seconds.



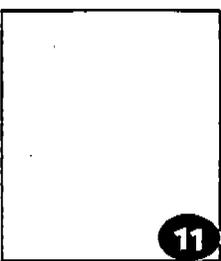
ANALYZE THE CONTROL



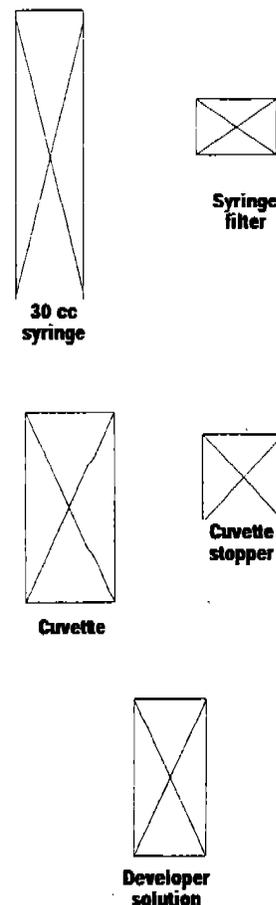
- 7 Place tip of 30 cc syringe in extraction jar and draw up 25 mL.
- 8 Attach syringe filter and dispense into "Sample" cuvette.
- 9 Add 1 drop of developer solution.
- 10 Cap the cuvette and shake vigorously for 3 seconds.
- 11 Remove the cuvette stopper and place in the cell holder.



- 12 Press "READ/ENTER" key and record the absorbance on the worksheet as "Abs_{control}".
Absorbance must be between 0.307 - 0.373 for the test to be in control.
 If test is not in control, clean "Sample" cuvette, and then redo steps 7-12 using the remaining liquid from the extraction jar.



- 13 If test is in control clean "Sample" cuvette before proceeding with samples.



QUALITY CONTROL

READ ALL INSTRUCTIONS BEFORE PROCEEDING WITH THE TEST

System Description

Each SDI EnSys® TNT Soil Test System contains enough material to perform twenty complete tests. The TNT Soil Test is divided into four phases. The instructions and notes should be reviewed before proceeding with the test.

Hotline Assistance

If you need assistance or are missing necessary Test System materials, call toll free: 1-800-544-8881.

Validation Information

Product claims are based on validation studies carried out under controlled conditions. Data has been collected in accordance with valid statistical methods and the product has undergone quality control tests of each manufactured lot.

Strategic Diagnostics Inc. does not guarantee that the results with the TNT Soil Test System will always agree with instrument-based analytical laboratory methods. All analytical methods, both field and laboratory, need to be subject to the appropriate quality control procedures.

How It Works

Controls, Samples, and color-change reagents are added to cuvettes. The concentration of TNT in an unknown Sample is determined by evaluating how much color is developed.

Quality Control

Standard precautions for maintaining quality control:

- Do not use reagents or components from one Test System with reagents or components from another Test System.
- Do not use the Test System after its expiration date.
- The sample must be analyzed immediately after adding the Developer Solution.
- Results may not be valid if DR/2000 reading for Control is outside of the range of 0.307 - 0.373.

Storage and Handling Precautions

- Wear protective gloves and eye wear.
- Store kit at room temperature and out of direct sunlight (less than 80°F).
- If acetone comes into contact with eyes, wash thoroughly with cold water and seek immediate medical attention.
- Operate test at temperatures greater than 4° C/40° F and less than 39° C/100° F.
- After use, dispose of kit components in accordance with applicable federal and local regulations.

**ON-SITE QUALITY CONTROL/QUALITY ASSURANCE
RECOMMENDATIONS
SDI EnSys® TEST SYSTEM**

Please read the following before proceeding with field testing.

SAMPLING

The result of your screening test is only as valid as the sample that was analyzed. Samples should be homogenized thoroughly to ensure that the 10 grams you remove for field testing is representative of the sample as a whole. All other applicable sample handling procedures should be followed as well.

PRIOR TO TESTING SAMPLES

Carefully follow the instructions in the User's Guide included with every test kit. This is the key element in obtaining accurate results. In addition, store your unused test kits at room temperature and do not use them past their expiration date (see label on each test kit).

INTERNAL TEST QC

One control is provided with each Kit to provide internal test system quality control. Test runs resulting in a number that falls outside of the specified range should be repeated to ensure valid conclusions.

QA/QC

The validity of field test results can be substantially enhanced by employing a modest, but effective QA/QC plan. SDI recommends that you structure your QA/QC plan with the elements detailed below. These have been developed based on the data quality principles established by the U.S. Environmental Protection Agency.

- A. **Sample Documentation**
 - 1. Location, depth
 - 2. Time and date of collection and field analysis
- B. **Field analysis documentation** - provide raw data, calibration, any calculations, and final results of field analysis for all samples screened (including QC samples)
- C. **Method calibration** - this is an integral part of SDI tests; a TNT control analysis should be performed daily (see the instructions in the User's Guide)
- D. **Method blank** - field analyze fresh acetone
- E. **Site-specific matrix background field analysis** - collect and field analyze uncontaminated sample from site matrix to document matrix effect
- F. **Duplicate sample field analysis** - field analyze duplicate sample to document method repeatability; at least one of every 20 samples should be analyzed in duplicate
- G. **Confirmation of field analysis** - provide confirmation of the quantitation of the analyte via an EPA-approved method different from the field method on at least 10% of the samples; provide chain of custody and documentation such as gas chromatograms, mass spectra, etc.
- H. **Performance evaluation sample field analysis (optional, but strongly recommended)** - field analyze performance evaluation sample daily to document method/operator performance
- I. **Matrix spike field analysis (optional)** - field analyze matrix spike to document matrix effect on analyte measurement

FURTHER QUESTIONS?

SDI's Technical Support personnel are always prepared to discuss your quality needs to help you meet your data quality objectives. Call 1-(800) 544-8881.

TNT SOIL TEST - ABBREVIATED PROCEDURE

STEP	P R O C E D U R E
1	<ul style="list-style-type: none"> • Clean cuvettes • Zero the spectrophotometer at 540 nm
2	<ul style="list-style-type: none"> • Add 10 g soil and 50 ml acetone to extraction jar • Shake 3 minutes, let settle • Draw up 25 mL extract, filter into cuvette
3	<ul style="list-style-type: none"> • Read Abs_{initial}, record • Add 1 drop developer solution, shake • Read Abs_{sample}, record
4	<ul style="list-style-type: none"> • Multiply Abs_{initial} by 4 • Subtract from Abs_{sample} • Divide by 0.0323 • $\text{TNT}_{(\text{ppm})} = \frac{\text{Abs}_{\text{sample}} - (\text{Abs}_{\text{initial}} \times 4)}{0.0323}$

APPENDIX H

QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

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QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

1. Contractor Chemical Quality Control (CCQC) Three-Phase Control Process

a. *Preparatory phase.* This is a generic checklist that should be modified to reflect actual conditions anticipated at the site. Items may be added or deleted from the checklist as appropriate for site conditions. A project-specific checklist should be developed and presented in Chapter 8.0 of the field sampling plan portion of the sampling and analysis plan.

- (1) Checklist of field equipment and other materials.
- (a) Contract specifications.
- (b) Contract plans.
- (c) Sampling and analysis plan.
- (d) Example tables for recording of all data.
- (e) Base maps for documenting sampling locations.
- (f) Quality assurance (QA) sample table to match up the quality control (QC) and QA samples (Figure 1 is an example of the format).
- (g) Technical reference books for the identification of chemical hazards.
- (h) Hazardous waste manifest forms.
- (i) Reference materials for proper completion of manifests.
- (j) Field screening instruments.
- (k) Calibration gas.
- (l) Calibration schedules.
- (m) Instrument operating manual, with copy provided to the QA personnel as an attachment to the DCQCR, if not already provided in the sampling and analysis plan.
- (n) Backup instrument for field screening.
- (o) Established procedures for instrument repair.
- (p) Standard operating procedures for decontamination.
- (q) Decontamination materials including solvents, rinse water, tissue, etc.
- (r) Sample collection equipment.
- (s) Labels for sample containers.
- (t) Examples of completed sample shipping documents (e.g., air bills).
- (u) Sample containers of the types to be used for each analysis.
- (v) Chain-of-custody forms.
- (w) Chain-of-custody seals.
- (x) Sample shipping coolers.
- (y) Strapping tape.
- (z) Sample packing materials, including plastic bags and vermiculite.
- (aa) Ice packs to cool sample cooler.
- (bb) Sample preservatives (e.g., acid for metals).
- (cc) Laboratory information: name; address, phone number, point of contact, turnaround time for the analyses, and documentation that all laboratories have been notified that the samples will be shipped and confirmation that the laboratory will accept the samples.
- (dd) Copy of a telephone log with USACE QA laboratory showing that the government QA samples have been scheduled with the laboratory.

(ee) Copy of ENG Form 4025, which remedial action contractors will use to transmit analytical data.

(2) Checklist of activities.

(a) The CQC representative shall review all pertinent sections of the plans and specifications during the preparatory meeting in order to ensure that all field personnel are cognizant of the overall project data quality objectives (DQOs) as well as any specific sampling and analysis requirements. This should include reading the sections aloud, if necessary, to clarify the requirements.

(b) Likewise the sampling analysis plan should be reviewed in detail.

(c) All instruments should be calibrated during the preparatory inspection meeting using certified calibration standards, gases, etc.

(d) Equipment decontamination procedures will be demonstrated in detail using the proper decontamination solutions in accordance with the sampling and analysis plan.

(e) A full set of sample custody forms will be completed to be used as a guide during sampling. The sample numbering system will be discussed. The laboratory addresses and phone numbers will be recorded on the form. Analytical test methods will be discussed and recorded on the form. Caution should be exercised to assure that the test method is clearly specified. Sample preservation will be recorded on the form. All required data should be documented on this sample form.

(f) The sampling team should demonstrate in detail how each type of sample will be collected, using the intended sample containers, sampling equipment, decontamination procedures, and data reporting requirements.

(g) Laboratory turnaround times shall be established and documented in the minutes of the preparatory meeting. The CQC representative shall present a tracking system to assure that all data are received in a timely manner.

b. *Initial phase checklist of activities.*

(1) The CQC representative should oversee the sampling activities and review the work for compliance with contract requirements.

(2) Individual sample labels and chain-of-custody forms will be inspected for accuracy, completeness, and consistency.

(3) The packaging and shipping of the samples will also be inspected by the CQC representative.

(4) Initial instrument calibration and ongoing calibrations will be observed, verified, and documented.

(5) Field notes will be inspected to assure that all pertinent data are recorded in accordance with the contract requirements. These notes shall include identification of field control samples (replicate samples, split samples, field blanks, etc.), detailed sketches showing the sample locations, and any other items identified from Instruction F-1, as applicable to the project. These sample locations should be recorded daily on the as-built drawings.

(6) The sampling team leader should complete the table that matches up primary and QA samples, at the conclusion of each day of sampling and attach a copy of the DCQCR.

c. *Follow-up phase.*

The CQC representative is responsible for continued daily contract compliance until completion of the particular feature of work.

