Five-Year Review Report

Second Five-Year Review Report

For

Celtor Chemical Works Superfund Site

Humboldt County
California

August 29, 2001

PREPARED BY:

Region IX

United States Environmental Protection Agency

San Francisco, CA

Approved by: Date:

Keith Takata 8-31-01

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Division Director
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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
BIA	Bureau of Indian Affairs
CAM TTLC	California Acid Metals Total Threshold Leachate Criteria
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act, as amended in 1977
DWR	Drinking Water Requirements
EHRT	Environmental Health Research Testing Inc.
EPA	Environmental Protection Agency
GWPS	Ground Water Protection System
IAG	Inter Agency Agreement
IRM	Initial Remedial Measure
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operations and Maintenance
OU	Operable Unit
NPL	National Priorities List
PCB	Poly Chlorinated Biphenyls
QAM	Quality Assurance Management
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
TBC	To Be Considered
TEPA	Tribal Environmental Protection Agency
VECP	Value Engineering Change Proposal
WCQAL	EPA One Hour National Ambient Water Quality Criteria for Protection of Freshwater Aquatic Life as promulgated under the CWA
XRF	X-Ray Fluorescence

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name ***(from WasteLAN)*****:** Celtor Chemical Works		
EPA ID ***(from WasteLAN)*****:** CAD980638860		
Region: IX	**State:** CA	**City/Country:** Hoopa/ Humboldt County

SITE STATUS	
NPL status: ✖ Final ☐ Deleted ☐ Other (specify)	
Remediation status (choose all that apply): ☐ Under Construction ☐ Operating ✖ Complete	
Multiple OUs? ☐ YES ✖ NO	**Construction completion date:** 10/14/1988
Has site been put into reuse? ☐ YES ✖ NO	

REVIEW STATUS	
Reviewing agency: ✖ EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author name: Beatriz Bofill	
Author title: Remedial Project Manager	**Author affiliation:** EPA Region IX
Review period: 9/30/1993 to 4/25/2001	
Date(s) of site inspection: 8/10/1998 and 4/18/2001	
Type of review: ☐ Statutory ☐ Policy (☐ Post-SARA ✖ Pre-Sara ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion)	
Review number: ☐ 1(first) ✖ 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction at OU # ___ ☐ Actual RA Start at OU# ___ ☐ Construction Completion ✖ Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date ***(from WasteLAN)*****:** 9/30/1993	
Due date ***(five years after triggering action date)*****:** 9/30/1998	

Five-Year Review Summary Form

Deficiencies: Two areas on or near the site have periodically shown visible contamination. Some soil/sediment samples collected in these areas contained contaminant levels above Record of Decision (ROD) cleanup goals. Concerns were raised by the Hoopa Indian Tribe concerning those areas.

1. Stained sediments on the gravel bar of the Trinity River: Orange stained sediments appear on the Trinity River's gravel bar on occasion. It is unknown whether these stained sediments are associated with the Celtor Site. No visible connection to a source has been identified. Stains were sampled by EPA in 1996, but the stains were not present during the 1998 and 2001 site visits. Areas of the gravel bar were sampled to determine if contamination was present in the absence of the orange stains, and no elevated levels of contaminants were found. The Trinity River flows through a highly mineralized area, and there are upstream mining operations that could be the source of the stains.

2. The hillside area where salts crystalize: Prior to remediation the Celtor facility was located in thes area and was on level ground. Following remediation clean fill was used to create a slope and restore the area to a more natural setting. Salts of unknown origin crystalize in a small patch between the river access road and the base of the hillside during the hot summer months. Sampling of the soil has shown levels above ROD cleanup standards. The salts were not present during the 2001 site visit, but the area where they have been seen was void of any vegetative growth.

Recommendations and Follow-up Actions: EPA will continue working with the Hoopa Indian Tribe to address the concerns described above. Communication between the EPA and the Tribal Environmental Protection Agency (TEPA) has been excellent and TEPA does an excellent job of monitoring and tracking contamination on tribal lands. The Tribe occasionally conducts soil sampling where contamination in the soil could affect water quality, funded in part by an EPA grant.

The Tribe should alert EPA when orange stains appear on the gravel bar. In this way EPA can continue to monitor these occurrences and perhaps identify their origin. Excavation on a case by case basis could be a possibility, but currently remediation is not possible because the stains are not present.

The hillside area where vegetative growth is absent will be sampled by EPA. If elevated levels of ROD contaminants are found, the area will be excavated and backfilled with clean fill. The excavated material will be disposed of appropriately.

Protectiveness Statement(s): Currently the Celtor Chemical Works site is not a significant human health risk because the cleanup levels in the 1985 ROD were established for residential areas assuming lifetime exposure, and are believed to be conservative for the site. However, additional data is needed to determine if the site poses a future risk, e.g. in the event that residences could be built in the area. EPA will investigate those areas of concern at the site, and take appropriate actions to ensure that the site is protective of human health and the environment regardless of site use or exposure.

I. Introduction

The Environmental Protection Agency (EPA) Region IX has conducted a five-year review of the remedial actions implemented at the Celtor Chemical Works site in Humboldt County, California. This review was conducted from April 2000 through April 2001. This report documents the results of the review. The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings and conclusions of the review are documented in a five-year review report. In addition, five-year review reports identify deficiencies found during the review, if any, and identify recommendations to address them.

This review is not required by policyor statute, but EPA decided to conduct this second five-year review for the Celtor Chemical Works Superfund Site. At the time the ROD was signed no five-year review requirements existed, therefore a five-year review was not necessary. However, at the time the Final Close Out Report (FCOR) was signed, a decision was made to do a five-year review. The first five-year review was completed on September 30, 1993, and stated that a next review would be performed in five years.

II. Site Chronology

Table 1 lists the chronology of events for the Celtor Chemical Works site.

Table 1: Chronology of Site Events

Date	Event
1981	*Initial discovery of problem or contamination*
December 1983	*National Priorities List (NPL) listing*
December 1983	*Removal Action (IRM Initial Remedial Measure)*
June 28, 1985	*Remedial Investigation/Feasibility Study (RI/FS) complete*
September 30, 1985	*ROD signature*
June 9, 1987	*Remedial design complete*
October 22, 1987	*Construction start*
October 14, 1988	*Construction complete*
September 29, 1989	*Final Close Out Report*
September 30, 1993	*First Five-Year Review*
December 5, 1995	*Consent Decree*

III. Background

The Celtor Chemical Works Superfund Site is a 2.5 acre parcel of mountainous terrain located at the northern end of the Hoopa Valley Indian Reservation in Humboldt County California, about 2 miles north of the town of Hoopa (Attachment A). A plant was established in 1957 as an ore processing facility for the nearby Copper Bluff mine. The sulfide ore was processed for copper, zinc and other precious metals. According to reports, wastewater was stored in settling ponds adjacent to the Trinity River. In 1962 discharges from the ponds to the River were reported. Subsequently the Department of Fish and Game issued Celtor citations for pollution and fish kills. Later that year the plant was abandoned for unknown reasons.

Physical Characteristics

The site is a 2.5 acre parcel that includes the plant site, a privately owned pasture and a shallow drainage ditch which may have once been used as a sluice trench during plant operation. At the time of the 1985 ROD, the plant site contained several concrete walls, slab floors and ruins of the former ore processing operations. The central part of the site is located 1000 feet south and 800 feet east of the Trinity River. The nearest residence is located approximately 500 feet to the south of the site. Approximately 100 homes are located 1,220 feet to the south of the site in the Norton Field Development; approximately 900 homes are located within 3 miles of the site. The site was identified because of its potential for contamination of groundwater and surface waters of the Trinity River. The Trinity River is classified as a scenic river under the National Wild and Scenic River system, and is also considered an important fish resource, including salmon and trout spawning grounds.

Land and Resource Use

The property on which the site is located is owned by the Hoopa Valley Indian Tribe. The Tribe's land is held in trust by the US Bureau of Indian Affairs (BIA). The land use for the area surrounding the site is rural residential. A cattle grazing pasture is located to the west of the former plant site. A gravel bar on the Trinity River at the northern end of the site provides access to a popular recreational fishing site. The former plant site is currently vacant open space, and the Tribe reports no plan for future development although it may be needed in the future as a staging area for remediation of the nearby Copper Bluff Mine.

Until as recently as 1985, residents of the Norton Field Development and other nearby homes drank water from a community well which tapped into the aquifer which flows beneath the site. At the time, that well was found to be free of inorganic contamination, except for iron. However, the Tribe reports that all residents in the vicinity of the site are now served by a treated public water supply system.

History of Contamination

In 1958, BIA leased the land to the Celtor Chemical Corporation on behalf off the Tribe. The Celtor Chemical Corporation processed sulfide ore taken from the Copper Bluff Mine. The plant, known as the Celtor Chemical Works Mill is believed to have used dissolved air flotation to extract copper, zinc, and precious metals from the ore. Attachment B shows a sketch of the site elements. The ore concentrates were trucked off-site for further processing. Some mine tailings

were stockpiled in the area of the plant site, however, most of the tailings were presumably sluiced down a drainage ditch to the Trinity River. The tailings may have been the cause of the numerous fish kills for which the California Department of Fish and Game have cited the Celtor Chemical Corporation.

In 1960 the Celtor Chemical Corporation became delinquent in its royalty payments to the Hoopa Valley Indian Tribe. By 1962 Celtor ceased operations and in March of 1993, the BIA, as trustee for the Tribe, canceled the leases of both the Copper Bluff Mine and the Celtor Chemical Works Mill.

After milling operations ceased, a very large pile of tailings was reported to have been left standing on a sand and gravel bar between the drainage ditch and the Trinity River, along with the tailings that are known to have been left at the plant site. Flooding in 1964 reportedly washed all traces of tailings that had been left on the sand and gravel bar into the Trinity River.

The remaining tailings in the plant area continued to be leached by acid runoff from the site. Elevated levels of metals in site soils were identified in samples collected by the California Department of Health Services in July 1981. In August of the same year, EPA received Notification of a Hazardous Waste Site under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The Site was placed on the California State Priority List in April 1982, and proposed for inclusion on the National Priorities List (NPL) in December 1982.

Initial Response

In December, 1983, EPA completed a Removal Action (also called initial remedial measure) in which all visibly contaminated material (tailings, non-concrete structures, and a portion of the adjacent pasture) were removed. Approximately 1,400 cubic yards of contaminated material were taken to the IT Corporation Class I hazardous landfill in Benicia, California.

The Remedial Investigation/Feasibility Study was completed on June 28, 1985, and a Record of Decision was signed by the Regional Administrator on September 30, 1985, which selected excavation and off-site disposal of the remaining contaminated soils.

Contamination

Prior to remediation, soil samples were collected from the main plant area to a depth of 20 feet. Cadmium, copper, lead and zinc were found in concentrations greater than the California Acid Metals Total Threshold Leachate Criteria (CAM TTLC). Although concentrations above background were found at depths up to 4.5 feet, maximum concentrations were found between the surface and 2.5 feet. The maximum concentrations were 600mg/kg arsenic, 310 mg/kg cadmium, 25,500 mg/kg copper, 1,680 mg/kg lead and 62,100 mg/kg zinc.

Ponded water and drainage in the drainage ditch was also found to be contaminated with cadmium, copper, lead, iron and zinc above the Maximum Contamination Levels (MCLs) as well as the Water Quality Criteria Action Level (WQCAL) in some cases. Maximum concentrations found in drainage and ponded water from the site prior to remediation were 241 μg/l cadmium, 9,920 μg/l copper, 16,600 μg/l iron, 7 μg/l lead and 48,300 μg/l zinc. The pH of the water was as low as 3.6. Sampling upstream and downstream of the site showed that the river was not detectably impacted by water discharges from the drainage ditch. The normal dilution factor for contaminants entering the Trinity River from the Celtor site was estimated at between 1:1000 and 1:5000; a worst case estimate based upon a first flush of contamination entering the river at low flow would be 1:500. The dilution estimates predicted that contaminants in the Trinity River would never rise above the WQCAL for more than a few hours.

Noxious sulphur odors had also been reported by community members as emanating from the site. No detectable concentrations of air pollutants were noted during sampling. Although there are still some occasional odor problems, the source has never been identified; it is possible the sulfur odors may be emanating from the nearby Copper Bluff mine rather than the Celtor site.

IV. Remedial Actions

A. Remedy Selection

The ROD for the Celtor Chemical Works site was signed on September 30, 1985. The primary human health threats posed at site were (1) direct contact with soils contaminated with arsenic, copper, cadmium and lead, and (2) consumption of surface water runoff from the site or in the drainage ditch, which sometimes exceeded MCLs for copper, iron, lead and zinc. The remedial action objective was to prevent human exposure to soil and water contaminated with arsenic, copper, cadmium zinc, mercury, selenium, cyanide and lead at concentrations that may pose a public health or environmental threat. The following site specific action levels were developed to achieve that goal.

Table 2: ROD Cleanup goals

Metal	Soils (mg/kg)	Surface and Groundwater (μg/L) [1]	Trinity River (μg/L) [2]
Arsenic	100	50	50
Cadmium	25	10	2.8
Copper	2,500	1,000	13.5 [3]
Lead	500	50	50
Zinc	5,000	5,000	47

Metal	Soils (mg/kg)	Surface and Groundwater (μg/L) [1]	Trinity River (μg/L) [2]
Mercury [4]	20		
Selenium [4]	100		
Cyanide [4]	200		

[1] Site specific action levels for on-site surface water and local groundwater are MCLs or Drinking Water (DWRs) as promulgated under the Safe Drinking Water Act.
[2] Site specific action levels for the Trinity River at the drainage ditch discharge point are the WQCAL, as promulgated under the Clean Water Act, and based upon a hardness of 75 mg/l as $CaCO_3$ except for arsenic and lead, where the more stringent MCL was used.
[3] This was the appropriate standard for freshwater aquatic life. The original ROD specified a standard of 2.6ug/L which was actually the standard for marine waters. The ROD was subsequently amended to reflect the appropriate standard.
[4] These standards were added in subsequent amendments to the 9/30/1985 ROD.

The remedial actions of the 1985 ROD were:
- Demolition and removal of structures.
- Excavation of soils contaminated above action levels from all site areas.
- Import clean fill as necessary.
- Regrade and vegetate site.
- Install security fencing to protect new vegetation.
- No groundwater treatment was necessary because the aquifer was not contaminated.

Following signature the ROD was amended twice - the first corrected an error in the copper action level and the second added additional standards for mercury, selenium, and cyanide in soils. The additional cleanup standards were added as precautionary measures, subsequent sampling showed all three metals to be below action levels.

B. Remedy Implementation

In August 1986, EPA entered into an interagency agreement (IAG) with the U.S. Army Corps of Engineers for the remedial design. The Corps retained Aqua Resources, Inc. of Berkeley to plan the remedial action.

In March of 1987 a second IAG between EPA and the Corps was signed, under which the Corps advertised, awarded and managed the contract for remedial action. Between mid-July and August the Corps (Omaha District) negotiated an 8-A Small Minority Business Contract with the Small Business Administration. A contract was awarded to Environmental Health Research and Testing Inc. (EHRT) of Lexington Kentucky to perform the cleanup.

The remedial design was completed by Aqua Resources, and approved by EPA on June 9, 1987. The design plan was divided into six areas designated A-F to be excavated to various depths. After excavation, soil samples were to be taken at designated grid points for all the

contaminants of concern. It was estimated that 3,220 yards of soil and 890 tons of concrete were to be removed and transported to the Envirosafe Services RCRA approved Class I Landfill in Grandview, Idaho. However, shortly into the remediation, EHRT submitted a Value Engineering Change Proposal (VECP) to perform deeper and more thorough sampling to reduce the volume of soils excavated. This change was accepted and decreased the actual volume of soil excavated and transported to the Idaho Class I landfill to 1,163 cubic yards. Another post-design change was in the sampling depth of the concrete. In the remedial design concrete samples were to be core samples but core samples were biased towards being below the CAM TTLC levels, and wipe samples were biased towards being above CAM levels. It was finally agreed upon that a one-inch sample depth would be more indicative of the concrete contamination and analysis of these samples would determine which landfill would receive the concrete structures.

A notice to Proceed was given to EHRT, Inc on August 14, 1987, but actual on-site activities did not begin until October 22, 1987. Three work areas were staged: the Exclusion Zone, where most of the contamination was, the contamination Reduction Zone, and the Support Zone, located in a clean area. The perimeter fences were also constructed and background air samples taken.

On December 9, 1987 the site was closed down for the winter season, and activities resumed again on May 11, 1988. Testing within the exclusion zone began on July 9, and excavation began on August 6, 1988. The first off-site shipment of contaminated soils to the landfill went out on August 21, and the final shipment left the site on September 30, 1988, at which time excavation ended and backfilling and revegetation began. All backfilling and revegetation was completed on October 14, 1988, marking the beginning of a one year post-remedial maintenance period.

A rigorous sampling and analytical program was implemented during construction to protect on-site workers, off-site public and to confirm remedial action objectives, which included the following:

- Daily perimeter air monitoring for total particulate matter, respirable particulate matter, hydrogen sulfide, arsenic, lead, cadmium, and copper.
- Hourly real-time on-site and perimeter air sampling for total particulate matter.
- Soil sampling of the backfill source for EPA priority pollutants, organochloride pesticides and PCB’s.

At any location where contaminants were detected above action levels, additional soil was excavated and removed to the approved off-site landfill. The removal of contaminated material and subsequent confirmatory sampling of remaining on-site soils ensured that all contamination was removed from the site according to the guidelines set forth in the Quality Assurance Project Plan (QAPP). On February 20, 1989 the Corps sent the Final Technical Report to EPA describing all of the construction activities and the sampling data.

The first five-year review was completed on September 30, 1993. On December 5, 1995, the United States entered into a Consent Decree with Carmelo C. Celestre and Celtor Chemical Corporation for the settlement of response costs associated with site cleanup.

C. System Operations

The operation and maintenance (O&M) was performed for a one-year period by the US Army Corps of Engineers. O&M efforts included monthly site visits to inspect for evidence of erosion and problems with revegetation, and maintenance of the perimeter fence. The initial five year review conducted in 1993 found the site to be in good condition, with a healthy cover of vegetation and no evidence of erosion. A wood staked wire fence had been constructed around the pasture which had been remediated during the remedial action (see Attachment B). The 1993 review concluded that the site required little or no maintenance.

Table 3: Annual EPA Site Costs

Dates		Total Cost
From	To	
1/1/1993	12/31/1993	$ 77,415
1/1/1994	12/31/1994	$ 18,883
1/1/1995	12/31/1995	$ 62,121
1/1/1996	12/31/1996	$ 65,556
1/1/1997	12/31/1997	$ 615
1/1/1998	12/31/1998	$ 18,018

D. Progress since the last Five-Year Review

The 1993 Five-Year Review recommended no additional action at the site, however, the Hoopa Valley Indian Tribe subsequently raised concerns about residual contamination remaining at the site (as listed on the summary review form at the beginning of the document).

On September 20, 1995, EPA collected 14 biased samples from the site at the request of the Hoopa Tribe. Samples were collected from three distinct areas of the site, including the former facility hillside, the access road leading down to the river, and the gravel bar between the drainage ditch and the Trinity River where it was reported a large pile of mine tailings had once stood before they were washed away by the 1964 flood (see Attachment B).

During the 1995 sampling event one of six samples collected from the hillside/former plant site was found to contain concentrations of lead (702 mg/kg) and arsenic (170 mg/kg) above action levels. One of four soil samples collected from a river access road cut between the site and

river exceeded action levels for arsenic (316 mg/kg), cadmium (377 mg/kg), copper (9,910 mg/kg), lead (2,310 mg/kg), and zinc (95,100 mg/kg), (conflicting results were found when more extensive sampling was conducted in the same area in 1996. In 1996 no contaminants in the roadcut area were found above ROD cleanup criteria). A sample collected from the gravel bar between the drainage ditch and the Trinity River also contained arsenic (301 mg/kg) and lead (1, 190 mg/kg) in excess of the action levels. Of the 14 samples, 4 samples had levels of contaminants above the ROD clean-up goals.

1995 Results of samples with elevated levels of ROD cleanup standards mg/kg

ROD cleanup levels for soils	As 100	Cd 25	Cu 2500	Pb 500	Hg 20	Se 100	Zn 5000
1995 sampling event							
29 hillside	170	4	701	702	1.2	4	797
32 roadcut (tailings)	316	377	9910	2310	3.6	31	95100
34 precipitate	80	34	2070	78	0.3	2	8590
39 gravel bar	301	0.3	305	1180	8.9	5	420

On April 22, 1996 EPA's Emergency Response Team performed additional, more extensive sampling at the site to verify that the cleanup was complete. In addition to the hillside, river access road and gravel bar, samples were also collected from the drainage ditch running through the site, a borrow pit containing river sand that residents removed and used on their property, and several yellow and orange stained areas on the gravel bar (see Attachment G). A total of 26 soil and sediment samples were collected and analyzed by screening with the x-ray Fluorescence (XRF) spectrometer, and six soil samples were sent to a lab for confirmatory analysis. Soils were also analyzed for pH. Soils collected from the river access road cut area had a pH of 3.5; however, sediments collected from the drainage ditch were pH 7 and from the gravel bar had a pH of 6.4 and 6.8. The sampling data was summarized in the Celtor Chemical Works Site Assessment Report dated May 31, 1996. Hillside soil samples from the former plant site contained minimal levels of copper, and traces of copper were also found in the river access road cut area and the drainage ditch but samples at both sites were well below action levels for the site. No detectable contamination was found in samples collected from the borrow pit. However, analysis of samples collected from stained areas on the gravel bar indicated these sediments may have levels of copper, lead and arsenic in excess of the cleanup level; maximum concentrations found in the stained sediments were 360 mg/kg copper, 220 mg/kg arsenic, and 660 mg/kg lead.

The sampling results were reviewed by Dr. Stanford Smucker, EPA toxicologist. Dr. Smucker recommended that use of the gravel bar for recreational purposes would be acceptable, provided that children under age 6 be supervised while playing there to limit possible contact with orange stained sediment. Attached is a memo from Dr. Smucker (Attachment E).

No stained sediments were found on the gravel bar during an EPA visit in 1998, or in 2001.

The Hoopa Tribe monitors site soils periodically. The last sampling event took place in 1999, when cadmium was found in concentrations above ROD cleanup goals. Concentrations of zinc were also above ROD clean-up levels, but TEPA claims they are consistent with background levels.

Table 4: Actions Taken Since the Last Five-Year Review

Action taken at site	Party responsible	Date of Action
Sampling event	EPA	9/20/1995
Sampling event	EPA	4/22/1996
5-Yr review site visit	EPA	8/10/1998
Sampling event	TAPA	8/3/1999
5-Yr review site visit	EPA	4/18/2001

V. Five Year Review Process

The Celtor Chemical Works five-year review was led by Beatriz Bofill, Remedial Project Manager for the Celtor Chemical Works site. The following team members assisted in the review:

- Bob Ulibari, Environmental Planner, TEPA office
- Carolyn D'almedia, EPA Project Manager
- Beatriz Bofill, EPA Project Manager
- Stan Smucker, EPA Toxicologist
- Jeff Inglis, EPA Site Assessment Manager & Project Officer, Tribes and Site Assessment Office
- Catherine McCracken, EPA Community Relations

This five-year review consisted of a review of relevant documents (see Attachment F), and a site inspection (see site inspection checklist, Attachment C). The completed report will be available in the information repository. Notice of its completion will be placed in the local newspaper.

VI. Five-Year Review Findings

A. Site Inspection

The site inspection for this Five-Year Review took place on April 18, 2001. A site tour was provided by Bob Ulibari who is a senior environmental planner for the Tribal Environmental Protection Agency for the Hoopa Tribe. The inspection included areas of continuing concern for exposure to contaminants, due to the proximity of the site to a popular public access road to the Trinity River.

- Orange stained sediments appear on the Trinity River's gravel bar on occasion. No stained sediments were seen during the site visit. Neither EPA nor the Tribe know if these stained sediments are associated with the Celtor Site, as there is no visible link between the site and these stains. The Trinity River flows through a highly mineralized area, and there are upstream mining operations that could be the source of the stains. The gravel bar is not within the site boundary, and no remedial actions ever took place here.

- There is an area on the former facility hillside where salts crystalize. Prior to the remediation work the area was level and contained the Celtor facility. Following remediation clean fill was used to create a slope and restore the area to a more natural setting. Salts of unknown origin crystalize at the base of the slope in a small patch during the hot summer months. Sampling of the soil has shown levels above ROD cleanup standards. The salts were not present during the 2001 site visit, but the area where they have been seen was void of any vegetative growth.

B. Site Interview

Bob Ulibari spoke of a seep located adjacent to the site that occasionally is an orange tint. The seep discharges into a drainage ditch that ultimately discharges to the Trinity River. Currently EPA has no data on the water from the seep, and no visual confirmation has been made by EPA of the seep having an orange color. The drainage ditch the seep discharges into has been sampled, and no elevated levels of contaminants have been detected. There is no evidence of an unknown source of contamination at the site that would contribute to this seep, or be the cause of the water turning orange. As mentioned before, the area in general is highly mineralized, and the colored seep could be a natural occurrence.

C. ARARs Review

The following standards were identified as applicable or relevant and appropriate requirements (ARARs) and to-be-considered (TBC) requirements in the ROD. They were reviewed for changes that could affect protectiveness

▸**Resource Conservation and Recovery Act** (RCRA) closure requirements for landfills and surface impoundments (40 CFR Parts 264 and 265) require the prevention or mitigation of any offsite migration of contaminants. As all contamination that posed a

threat to human health or that could migrate off-site was removed, the remedy remains in full compliance with RCRA.

▸ **Executive Order 11988** requires that a flood plain assessment be performed to consider the effects of all possible cleanup alternatives on community welfare and the environment. The assessment concluded that excavation and disposal of contamination to be the best course of action. The remedy remains in compliance.

▸ **The Clean Water Act** requires that discharges from the facility which enter a water body of the United States meet California Water Quality Standards. The Regional Water Quality Control Board acknowledged that zero discharges from the facility may be impractical or unfeasible, and specified that sampling on the Trinity River upstream and downstream of the site confirm that the discharges do not impact the Trinity. Although no confirmatory sampling was performed during this review, the flow from the site is very low in comparison to volume of the Trinity River, and is very unlikely to impact the river even before the contamination was removed. The remedy complies with the Clean Water Act.

▸ **Ground Water Protection System (GWPS)** was identified as a TBC for the site because the ground water beneath the site was designated as a class II groundwater source because it had been used for drinking water purposes in the past and could potentially be used again in the future. However, groundwater had not been impacted by the site at the time of the ROD and it would not be impacted after the contamination was removed. The remedy remains in compliance with GWPS.

VII. Assessment

The following conclusions support the determination that the remedy at the Celtor Chemical Works site is protective of human health and the environment.

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

The remedy is functioning as intended by the decision documents. Although sampling conducted in 1996 showed that a small number of samples had elevated levels of contaminants, there is no evidence to indicate that the contamination is a result of a deficiency in the remedy.

Question B: Are the assumptions used at the time of remedy selection still valid?

The assumptions used at the time of the remedy selection are still valid.

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

Subsequent sampling revealed some contamination is exceeding the cleanup levels for the site but it does not pose an acute threat, nor is there any evidence to indicate that it is

associated with the Celtor Site. Currently, the remedy remains protective of human health and the environment.

VIII. Deficiencies

Two sampling events have been conducted by EPA (in 1995 and 1996) since the previous five year review. During those two sampling events, five out of forty samples contained elevated levels of metals. One soil sample taken by TEPA in 1999 indicated that cadmium was detected above the cleanup goal in the former facility hillside soils.

- Stained sediments on the gravel bar of the Trinity River: Orange stained sediments appear on the Trinity River's gravel bar on occasion. However these stained sediments are not on the site, and it is unknown whether these stained sediments are associated with the Celtor Site. No visible connection to a source has been identified. Stains were sampled by EPA in 1996, but the stains were not present during the 1998 and 2001 site visits. Areas of the gravel bar were sampled to determine if contamination was present in the absence of the orange stains, and no elevated levels of contaminants were found. The Trinity River flows through a highly mineralized area, and there are upstream mining operations that could be the source of the stains.

- The hillside area where salts crystalize: Prior to remediation the Celtor facility was located in thes area and was on level ground. Following remediation clean fill was used to create a slope and restore the area to a more natural setting. Salts unknown origin crystalize in a small patch between the river access road and the base of the hillside during the hot summer months. Sampling of the soil has shown levels above ROD cleanup standards. The salts were not present during the 2001 site visit, but the area where they have been seen was void of any vegetative growth.

IX. Recommendations and Follow-up Actions

EPA will continue working with the Hoopa Indian Tribe to address the concerns described above. Communication between the EPA and the TEPA has been excellent and does an excellent job of monitoring and tracking contamination on tribal lands. The Tribe occasionally conducts soil sampling where contamination in the soil could affect water quality, funded in part by an EPA grant.

The Tribe should alert EPA when orange stains appear on the gravel bar. In this way EPA can continue to monitor these occurrences and perhaps identify their origin. Excavation on a case by case basis could be a possibility, but currently remediation is not possible because the stains are not present.

The hillside area where vegetative growth is absent will be sampled by EPA. If elevated levels of ROD contaminants are found, the area will be excavated and backfilled with clean fill. The excavated material will be disposed of appropriately.

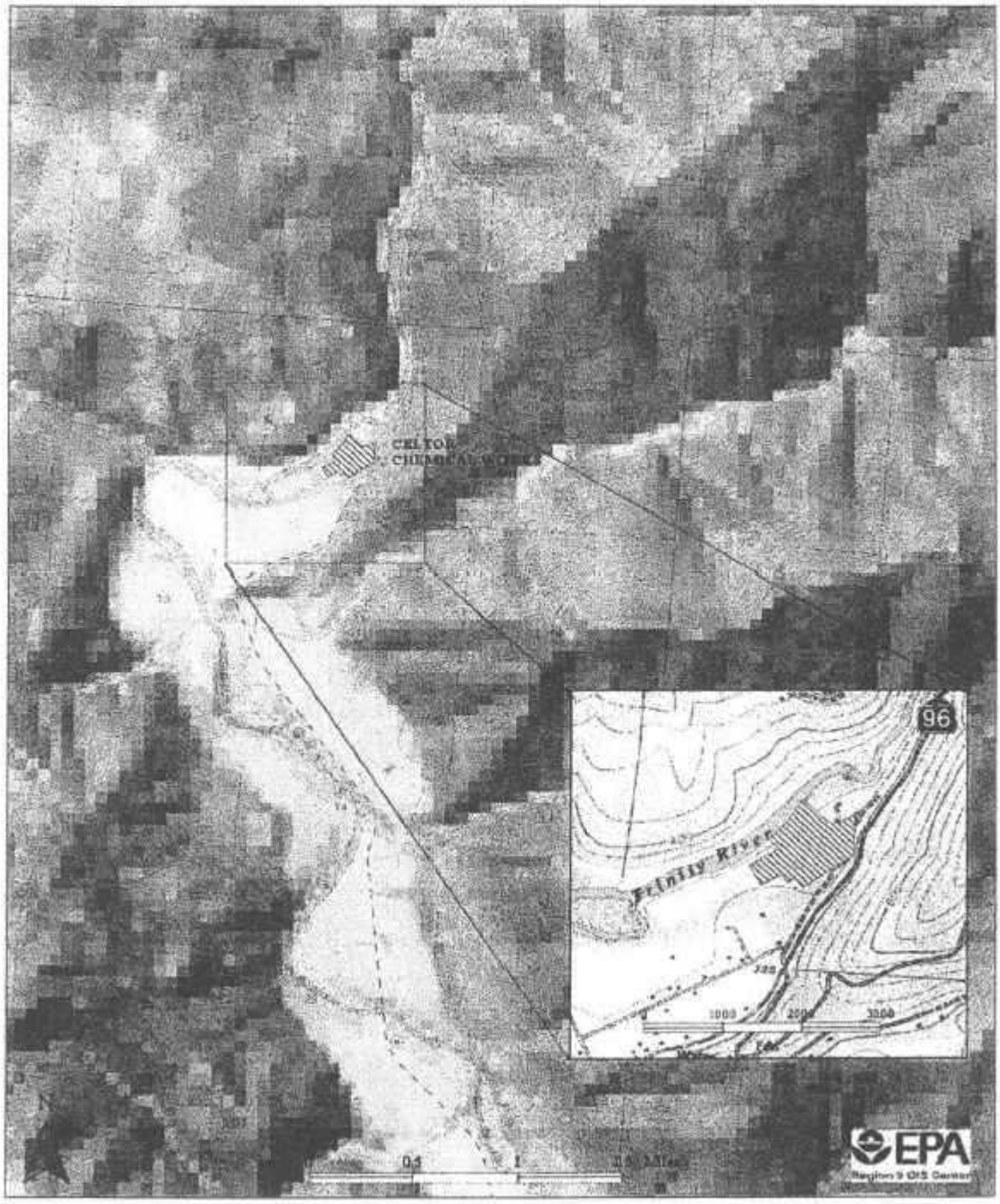
X. Protectiveness Statements

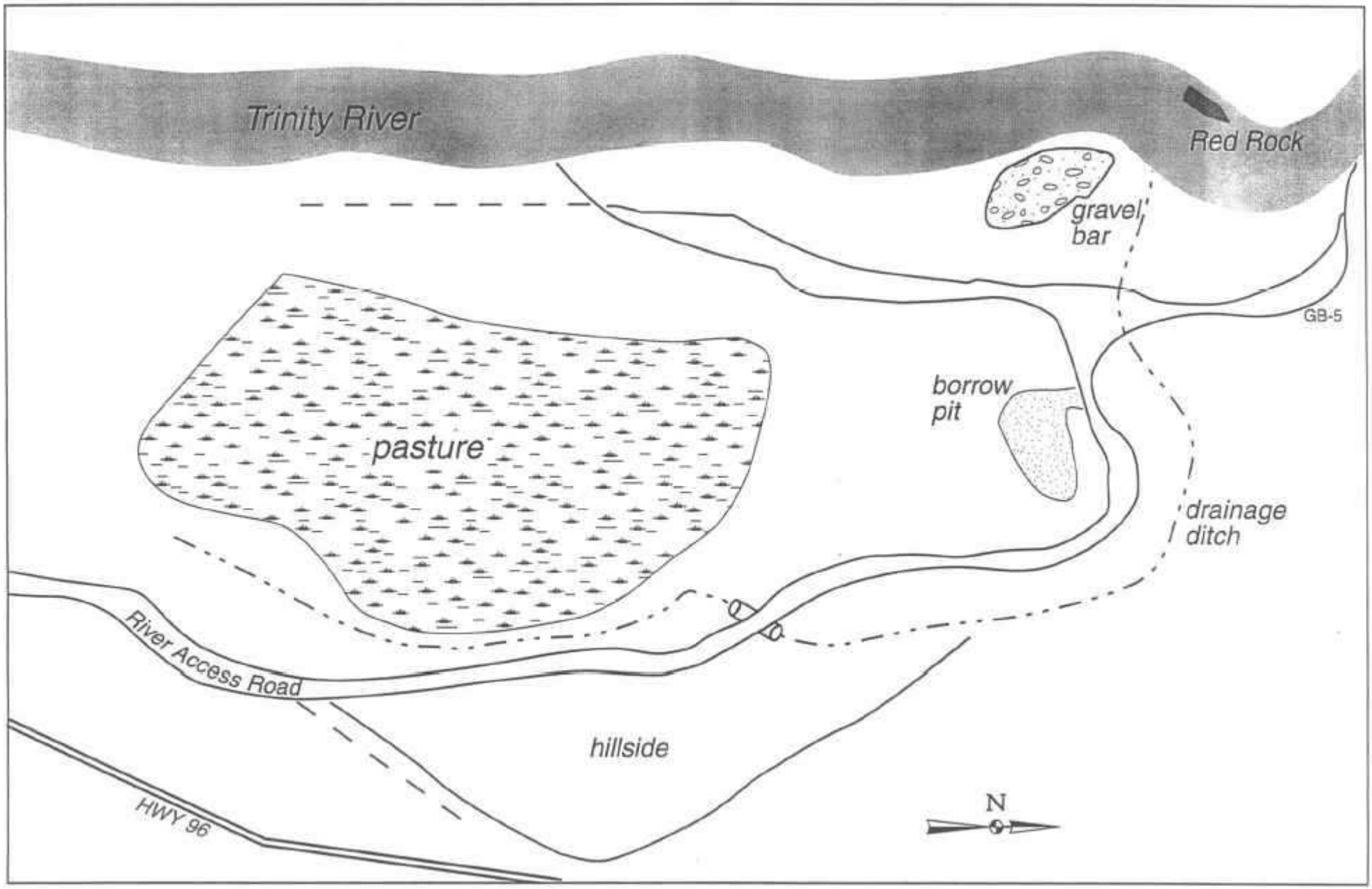
Currently the Celtor Chemical Works site is not a significant human health risk because the cleanup levels in the 1985 ROD were established for residential areas assuming lifetime exposure, and are believed to be conservative for the site. However, additional data is needed to determine if the site poses a future risk, e.g. in the event that residences could be built in the area. EPA will investigate those areas of concern at the site, and take appropriate actions to ensure that the site is protective of human health and the environment regardless of site use or exposure.

XI. Next Review

This is the last five-year review planned for the site. The site is being considered for delisting. All items of concern in this review will be resolved before delisting occurs. The delisting documents will have a final discussion on the actions taken by EPA to settle these issues.

Attachment A
Site Map
Celtor Chemical Works, Hoopa, California





ATTACHMENT B

Site Elements

Celtor Chemical Works

Hoopa, California

Attachment C

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Celtor Chemical Works	**Date of inspection: 4/18/2001**
Location and Region: R/9 Hoopa, CA	**EPA ID: CAD980638860**
Agency office, or company leading the five-year review: EPA/Superfund	**Weather/temperature: sprinkling/55 degrees**

Remedy Includes: (Check all that apply)
- □ Landfill cover/containment
- □ Access controls
- □ Institutional controls
- □ Groundwater pump and treatment
- □ Surface water collection and treatment
- X Other: Excavation and removal

Attachments: □ Inspection team roster attached **(X)** Site map attached

II. INTERVIEWS (Check all that apply)

1. **Tribal EPA Senior Environmental Planner** **Bob Ulibari** **4/18/2001**
   Title Name Date

   Interviewed **X** at site **X** at office □ by phone Phone no. **530.625.5515**
   Problems, suggestions; □ Report attached: Some samples have elevated levels of contaminants. Would like to see area of hillside where salts percipitate during the summer, excavated and backfilled. No warning signs are posted at the site because of vandalism, several signs have been destroyed.

2. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency – **Same as above**_____
   Contact –
   Name Title Date Phone no.
   Problems; suggestions; □ Report attached

3. **Other interviews** (optional) □ Report attached.

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

□ O&M manual	□ Readily available	□ Up to date	(X) N/A
□ As-built drawings	□ Readily available	□ Up to date	(X) N/A
□ Maintenance logs	□ Readily available	□ Up to date	(X) N/A

Remarks – there is nothing on-site

2.	**Site-Specific Health and Safety Plan**	Readily available	□ Up to date	(X) N/A
	□ Contingency plan/emergency response plan	□ Readily available	□ Up to date	(X) N/A
	Remarks_____			
3.	**O&M and OSHA Training Records**	□ Readily available	□ Up to date	(X) N/A
	Remarks_____			
	_____			
4.	**Permits and Service Agreements**			
	□ Air discharge permit	□ Readily available	□ Up to date	(**X**)N/A
	□ Effluent discharge	□ Readily available	□ Up to date	(X) N/A
	□ Waste disposal, POTW	□ Readily available	□ Up to date	(X) N/A
	□ Other permits_____	□ Readily available	□ Up to date	(X) N/A
	Remarks –			
5..	**Gas Generation Records**	□ Readily available	□ Up to date	(**X**) NA
	Remarks_____			
6.	**Settlement Monument Records**	□ Readily available	□ Up to date	(**X**) N/A
	Remarks_____			
7.	**Groundwater Monitoring Records**	□ Readily available	□ Up to date	(**X**) N/A
	Remarks_____			
8.	**Leachate Extraction Records**	□ Readily available	□ Up to date	(**X**) N/A
	Remarks_____			
9.	**Discharge Compliance Records**			
	□ Air	□ Readily available	□ Up to date	(X) N/A
	□ Water (effluent)	□ Readily available	□ Up to date	(X) N/A
	Remarks –			
10.	**Daily Access/Security Logs**	□ Readily available	□ Up to date	(X) N/A
	Remarks			

IV. O&M COSTS

1.	**O&M Organization**	
	□ State in-house	□ Contractor for State
	□ PRP in-house	□ Contractor for PRP
	□ Other: No O&M costs	
	_____	

2. **O&M Cost Records**
□ Readily available □ Up to date
□ Funding mechanism/agreement in place
Original O&M cost estimate_____

Total annual cost by year in five-year review

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS (X) Applicable □ N/A

A. Fencing

1. **Fencing damaged** □ Location shown on site map □ Gates secured **X** N/A
Remarks–

B. Other Access Restrictions

l. **Signs and other security measures** □ Location shown on site map □ N/A
Remarks – **Signs are not posted because of prevalent vandalism**

C. Institutional Controls

1. **Implementation and enforcement**
Site conditions imply ICs not properly implemented □ Yes □ No (**X**)N/A
Site conditions imply ICs not being fully enforced □ Yes □ No (**X**) N/A
Type of monitoring (e.g., self-reporting, drive by)_____
Frequency_____
Responsible party/agency_____
Contact_____ _____ _____ _____
Name Title Date Phone no.
Reporting is up-to-date □ Yes □ No □ N/A
Reports are verified by the lead agency □ Yes □ No □ N/A

Specific requirements in deed or decision documents have been met □ Yes □ No □ N/A
Violations have been reported □ Yes □ No □ N/A
Other problems or suggestions: □ Report attached

2. **Adequacy** □ ICs are adequate □ ICs are inadequate (**X**) N/A
Remarks –

D. General

1. **Vandalism/trespassing** □ Location shown on site map □ No vandalism evident
Remarks – **Signs are no longer posted due to vandalism**

2. **Land use changes onsite** (X) N/A
Remarks –

3. **Land use changes offsite** □ N/A
Remarks –

VI. GENERAL SITE CONDITIONS

A. Roads (**X**) Applicable □ N/A

1. **Roads damaged** (**X**) Location shown on site map (X) Roads adequate □ N/A
Remarks– **River access road is in good condition.**

B. Other Site Conditions

Remarks –

VII. LANDFILL COVERS □ Applicable (**X**) N/A

A. Landfill Surface

1.	**Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident Areal extent_____ Depth_____ Remarks	
2.	**Cracks** ☐ Location shown on site map ☐ Cracking not evident Lengths_____ Widths_____ Depths_____ Remarks	
3.	**Erosion** ☐ Location shown on site map ☐ Erosion not evident Areal extent_____ Depth_____ Remarks	
4.	**Holes** ☐ Location shown on site map ☐ Holes not evident Areal extent_____ Depth_____ Remarks	
5.	**Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress ☐ Trees/Shrubs (indicate size and locations on a diagram) Remarks	
6.	**Alternative Cover (armored rock, concrete, etc.)** ☐ N/A Remarks	
7.	**Bulges** ☐ Location shown on site map ☐ Bulges not evident Areal extent_____ Height_____ Remarks	
8.	**Wet Areas/Water Damage** ☐ Wet areas/water damage not evident ☐ Wet areas ☐ Location shown on site map Areal extent_____ ☐ Ponding ☐ Location shown on site map Areal extent_____ ☐ Seeps ☐ Location shown on site map Areal extent_____ ☐ Soft subgrade ☐ Location shown on site map Areal extent_____ Remarks	
9.	**Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability Areal extent_____ Remarks	
B. Benches ☐ Applicable ☐ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	**Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay Remarks	
2.	**Bench Breached** ☐ Location shown on site map ☐ N/A or okay Remarks	
3.	**Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay Remarks	
C. Letdown Channels ☐ Applicable ☐ N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1.	**Gas Treatment Facilities** □ Flaring □ Thermal destruction □ Collection for reuse □ Good condition □ Needs O&M Remarks
2.	**Gas Collection Wells, Manifolds and Piping** □ Good condition □ Needs O&M Remarks
3.	**Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings) □ Good condition □ Needs O&M □ N/A Remarks
F. Cover Drainage Layer	□ Applicable □ N/A
1.	**Outlet Pipes Inspected** □ Functioning □ N/A Remarks
2.	**Outlet Rock Inspected** □ Functioning □ N/A Remarks
G. Detention/Sedimentation Ponds	□ Applicable □ N/A
1.	**Siltation** Areal extent_____ Depth_____ □ N/A □ Siltation not evident Remarks
2.	**Erosion** Areal extent_____ Depth_____ □ Erosion not evident Remarks
3.	**Outlet Works** □ Functioning □ N/A Remarks
4.	**Dam** □ Functioning □ N/A Remarks

H. Retaining Walls □ Applicable □ N/A

1. **Deformations** □ Location shown on site map □ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks

2. **Degradation** □ Location shown on site map □ Degradation not evident
   Remarks

I. Perimeter Ditches/Off-Site Discharge □ Applicable □ N/A

1. **Siltation** □ Location shown on site map □ Siltation not evident
   Areal extent_____ Depth_____
   Remarks

2. **Vegetative Growth** □ Location shown on site map □ N/A
   □ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks

3. **Erosion** □ Location shown on site map □ Erosion not evident
   Areal extent_____ Depth_____
   Remarks

4. **Discharge Structure** □ Functioning □ N/A
   Remarks

VIII. VERTICAL BARRIER WALLS □ Applicable (X) N/A

1. **Settlement** □ Location shown on site map □ Settlement not evident
   Areal extent_____ Depth_____
   Remarks

2. **Performance Monitoring** Type of monitoring_____
   □ Performance not monitored
   Frequency_____ □ Evidence of breaching
   Head differential_____
   Remarks

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable (**X**) N/A			
A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A			
1. **Pumps, Wellhead Plumbing, and Electrical** ☐ Good condition ☐ All required wells located ☐ Needs O&M ☐ N/A Remarks –			
2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs O&M Remarks –			
3. **Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remark –			
B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☐ N/A			
1. **Collection Structures, Pumps, and Electrical** ☐ Good condition ☐ Needs O&M Remarks			
2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs O&M Remarks			

3. **Spare Parts and Equipment**
□ Readily available □ Good condition □ Requires upgrade □ Needs to be provided
Remarks

C. Treatment System □ Applicable □ N/A

1. **Treatment Train** (Check components that apply)
□ Metals removal □ Oil/water separation □ Bioremediation
□ Air stripping □ Carbon adsorbers
□ Filters
□ Additive (e.g., chelation agent, flocculent)
□ Others –
□ Good condition □ Needs O&M (minor)
□ Sampling ports properly marked and functional
□ Sampling/maintenance log displayed and up to date
□ Equipment properly identified
□ Quantity of groundwater treated annually
□ Quantity of surface water treated annually
Remarks

2. **Electrical Enclosures and Panels**
□ N/A □ Good condition □ Needs O&M
Remarks –

3. **Tanks, Vaults, Storage Vessels**
□ N/A □ Good condition □ Proper secondary containment □ Needs O&M
Remark –

4. **Discharge Structure and Appurtenances**
□ N/A □ Good condition □ Needs O&M
Remarks –

5. **Treatment Building(s)**
□ N/A □ Good condition (esp. roof and doorways □ Needs repair
□ Chemicals and equipment properly stored
Remarks –

6. **Monitoring Wells**
□ Properly secured/locked □ Functioning □ Routinely sampled □ Good condition
□ All required wells located □ Needs O&M □ N/A
Remarks –

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   □ Properly secured/locked □ Functioning □ Routinely sampled □ Good condition
   □ All required wells located □ Needs O&M □ N/A
   Remarks_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).
The remedy was designed to excavate and properly dispose of all soil and concrete structures with contaminants above the ROD cleanup criteria. Overall the remedy seems to be working properly, except for one area onsite where elevated levels of contaminants have been detected, and on an area offsite that on occasion has had orange colored spots that contain levels of contaminants above the cleanup criteria.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C. Early Indicators of Potential Remedy Failure

	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MEMORANDUM:

Date: August 22, 2001

Subject: Celtor Chemical Works Site Five Year Review

From: **Stanford Smucker, Ph.D.**
Regional Toxicologist (SFD-8-B)

To: **Beatriz Bofill**
Remedial Project Manager (SFD-7-2)

As part of the five year review of Celtor Chemical Works site, you requested that I make a determination whether USEPA has met soil "action levels" established in the "Record of Decision for Remedial Action at the Celtor Chemical Works Superfund Site" (ROD), dated September 30, 1985. In an effort to make this determination, I have referred to my field notes and available documents, including post-ROD sampling and analytical data obtained in 1995 and 1996 by USEPA and a 1999 sample analysis submitted by the Hoopa tribe.

Post-ROD samples were collected from five general locations in coordination with Larry Oetker, Environmental Planner for the Hoopa tribe. These areas include the hillside, river access road, the drainage ditch, and the borrow pit. In addition, samples were collected from a gravel bar located in the Trinity River. Please refer to Attachment G of the "Five-Year Review Report" (August, 2001) for sample locations.

Although the majority of samples collected in 1995/1996 contained heavy metal concentrations below the site-specific action levels, there were a few exceedances reported in samples taken from the hillside/roadside area and the gravel bar. These areas and follow-up recommendations are discussed briefly below.

Based on the sample results that I reviewed, I am unable to make a final determination as to whether soil "action levels" have been achieved at the site. However, it would appear that making this determination in the future should be relatively straightforward with the collection of some additional focused sampling in the hillside/roadside area where the former Celtor Chemical facility existed. Perhaps this could be conducted by the Hoopa under one of their existing environmental grants.

Hillside/Roadside Samples

A total of 40 samples were collected from the hillside and access road locations in 1995/1996. Most of these samples (analyzed by X-ray fluorescence and/or laboratory analytical methods), were below the site-specific action levels. However, there were a few samples that contained heavy metal concentrations above the ROD cleanup levels for soils that were reported in 1995 (see Table).

Hillside and Roadside Samples that Exceed ROD Standards, mg/kg

ROD cleanup levels for soils	As 100	Cd 25	Cu 2500	Pb 500	Hg 20	Se 100	Zn 5000
1995 sampling event							
hillside soil sample	170	4	701	702	1.2	4	797
roadcut (tailings) sample	316	377	9910	2310	3.6	31	95100
“precipitate” sample taken from hillside	80	34	2070	78	0.3	2	8590

The specific locations of these samples are unclear from the hand drawn maps, but they appear to be taken in the general area of the former Celtor Chemical Works facility, where soil removal/remediation activities took place. There apparently were no soil samples obtained in the 1996 event that contained measurable levels of these metals above the ROD standards, although it is noted that the detection limit for cadmium (using XRF) was above the ROD cleanup level for soils.

More recently (1999) the Hoopa have submitted a single unverified lab result to the Agency that reports elevated cadmium (210 ppm) in a salt-like “precipitate” sample taken from the hillside of the site. This apparently was taken from an area where there is little vegetative growth and where salts reportedly crystallize during the hot summer months. It is unclear whether the lack of vegetation could be attributed to the presence of heavy metals, however, it is noteworthy that cadmium is well known for its toxicity to plants.

Given that sporadic hits of arsenic, cadmium, and lead above the ROD cleanup levels have been observed in post-ROD samples in the general area where remediation took place, some additional sampling is recommended in this area to ensure that the remedy is protective. It should be noted that the samples that have been collected after the ROD were, in all cases, judgemental samples that focused on getting a “worst-case” result. For example, if a “precipitate” material and/or tailings were observed, these were preferentially sampled. These may not be representative of the typical concentrations that are present at the site after the remedy was implemented. If future sampling of this area is carried out, a sampling strategy should be designed to better assess what is

representative of exposures, not necessarily what is the worst possible case.

Gravel Bar Samples

In response to the Hoopa Tribe's concern, USEPA (1995 and 1996) sampled small yellow-orange patches of sediment (approximately 3-7 inches in diameter) located on a gravel bar in the Trinity River. It is not known what the origin of the stained areas are. It is possible that they could be due to past Celtor Chemical Works operations or they may be natural in origin given that the geology in the area is represented by highly mineralized formations. When I visited the site in the Spring of 1996, there were only a few colored spots that were visible on the gravel bed, and when USEPA personnel visited the site in August 1998 and April 2001, apparently no spots were observed.

Sediment samples collected in the gravel bed during 1996 were taken from both stained areas and non-stained areas to determine if the colored material contained heavy metals at higher concentrations than non-stained areas. In all cases, non-stained sediments contained heavy metal concentrations that were well below soil cleanup standards established in the ROD. However, one-third (2 out of the 6) of the stained sediment samples contained arsenic and lead above the soil cleanup criteria (see Table). Each of these samples exceeded the soil action levels by roughly a factor of two or three.

Gravel Bar Samples that Exceed ROD Standards, mg/kg

ROD cleanup levels for soils	As 100	Cd 25	Cu 2500	Pb 500	Hg 20	Se 100	Zn 5000
1995,1996 sampling event							
stained sediment sample, 1995	301	0.3	305	1180	8.9	5	420
stained sediment sample, 1996	220	ND	--	660	--	--	--

Although comparisons are being made between concentrations observed in stained sediments and ROD soil cleanup levels, there are important reasons why this comparison is probably not appropriate. According to the ROD (1985), the soil standards for arsenic and lead assume daily contact would occur over an extended period of time. This level of chronic exposure would not be expected for the gravel bar, unless the sediments were removed and used by local residents to amend soils on their private property. The Hoopa should be discouraged from doing this.

There are a number of factors that would tend to limit human exposures to colored sediments in

the gravel bed of Trinity River. These factors would argue against applying the ROD residential soil standards to these sediments. First, the colored spots on the gravel bed do not consistently appear. As mentioned, there were no spots observed in the two most recent visits by USEPA staff. In contrast, the ROD soil standards are based on the assumption of continuous exposure for many years. Secondly, Superfund Risk Assessment guidance (RAGS 1989) advises against evaluating areas (or media) with residential standards, where exposures would be limited due to the physical setting. With respect to the gravel bed, it would not be reasonable to assume that a home could be built here because of its location in the Trinity River. Thirdly, when present, the spots are quite small in relation to the surrounding unstained areas of the gravel bed. They could not be considered to be representative of the average concentrations of heavy metals in the gravel bed. This was also illustrated by comparing these colored samples with non-colored sediment samples which were, in all cases, well below the soil standards in the ROD.

Based on the above considerations, it is probably not appropriate to apply the residential soil standards to the colored sediments to determine whether the remedy is protective. Given that the colored sediment samples with the highest measured heavy metal concentrations are only a factor of 2 or 3 higher than the ROD residential soil standards, that they are small in size, transient in nature, most likely present as sulfides which would be expected to have reduced bioavailability, and are relatively inaccessible due to their location on a gravel bed in the Trinity River (a location that is not near any homes), there appears to be a very low probability that these spots (when they exist) could pose a significant human health risk.

However, at least one tribe member was concerned that the colored spots could present an attractive nuisance to young children. It is because of this concern, that I would advise that young children playing in the area should be supervised as a safeguard to prevent some child from deliberately ingesting the colored material. In addition, because the colored sediments are easy to observe, the tribe could continue to monitor the gravel bed for the reappearance of the orange/yellow sediments and conduct removals as they see fit.

If you have any questions regarding my comments, I can be reached at (415) 744-2311.

Please note that my comments focus solely on public health concerns and do not address possible ecological impacts which I did not evaluate.

Attachment F

List of Documents Reviewed

"Celtor Chemical Works Site Assessment, Hoopa, California," prepared for US EPA Region IX, by Ecology and Environment inc., May 31, 1996.

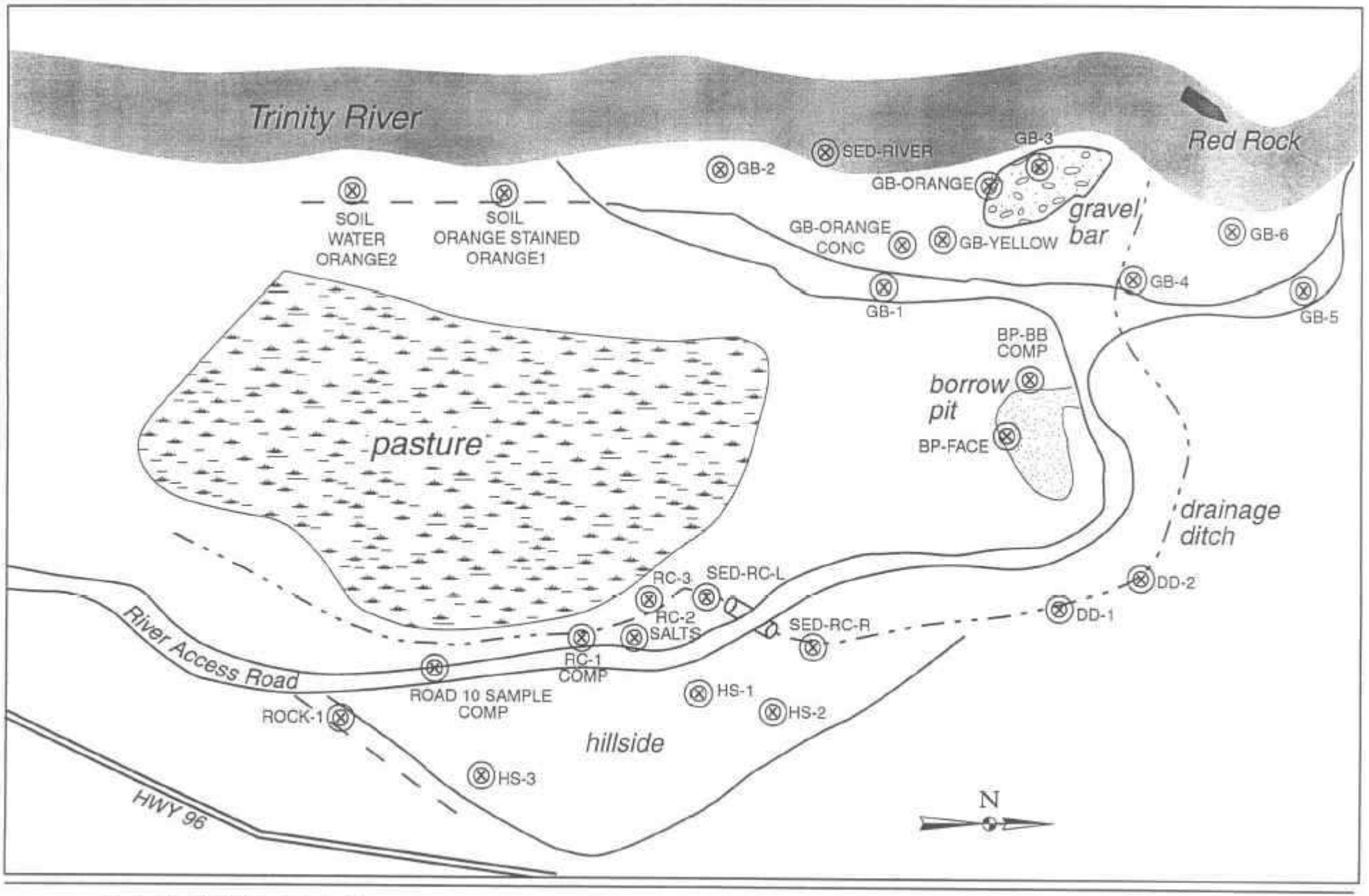
Record of Decision for Remedial Action at the Celtor Chemical Works Superfund Site, CA September 30, 1985.

"Superfund Site Close Out Report Celtor Chemical Works, Hoopa Valley Indian Reservation Humboldt County, California," US EPA Region IX, September 29, 1989.

"Potential Adverse Health Effects from Several Hazardous Waste Sites on the Hoopa Valley Indian Reservation" Prepared by the Agency for Toxic Substances and Disease Registry U.S. Public Health Service, April 18, 1997.

"Memorandum, Review of Analytical Data for Celtor Chemical Site," from Joe Eidelberg, US EPA Region IX QAMs to Hedy Ficklin, January 12, 1996.

"Memorandum, Celtor Chemical Works Site Five Year Review," from Dr. Stanford Smucker US EPA Region IX to Kathi Moore, May, 2000.



ATTACHMENT G
Sample Location Map
1996 Sampling Event
Celtor Chemical Works
Hoopa, California

GB = Gravel bar
HS = Former facility hillside
RC = Roadside
DD = Drainage ditch
BP = Barrow pit

⊗ Sampling location

Figure 1 Hillside with areas that do not support vegetation (photo taken 1998)

Figure 2 End of drainage ditch (photo taken in 1998)

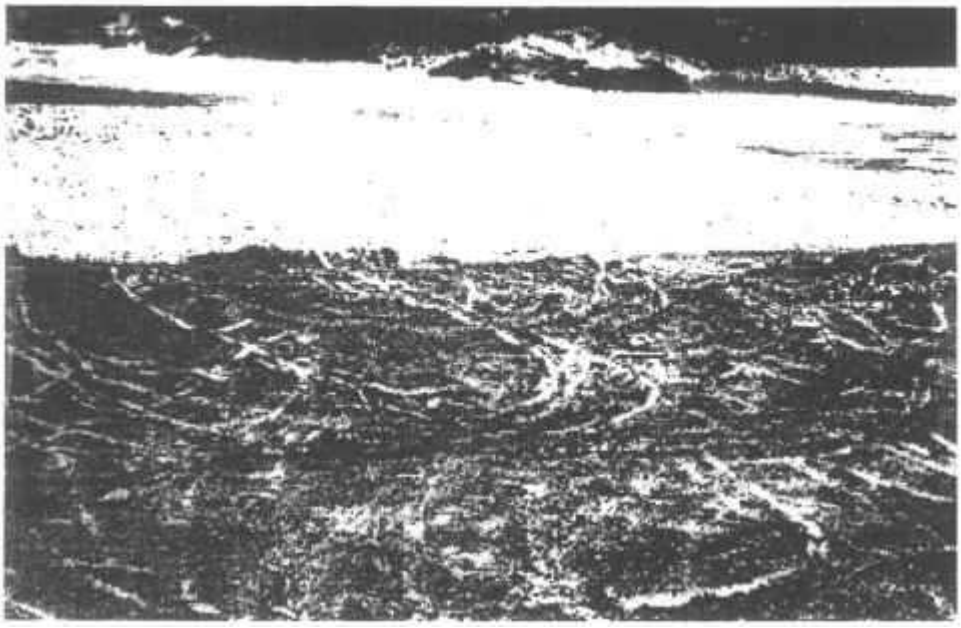


Figure 3 Gravel bar area (photo taken in 1996)

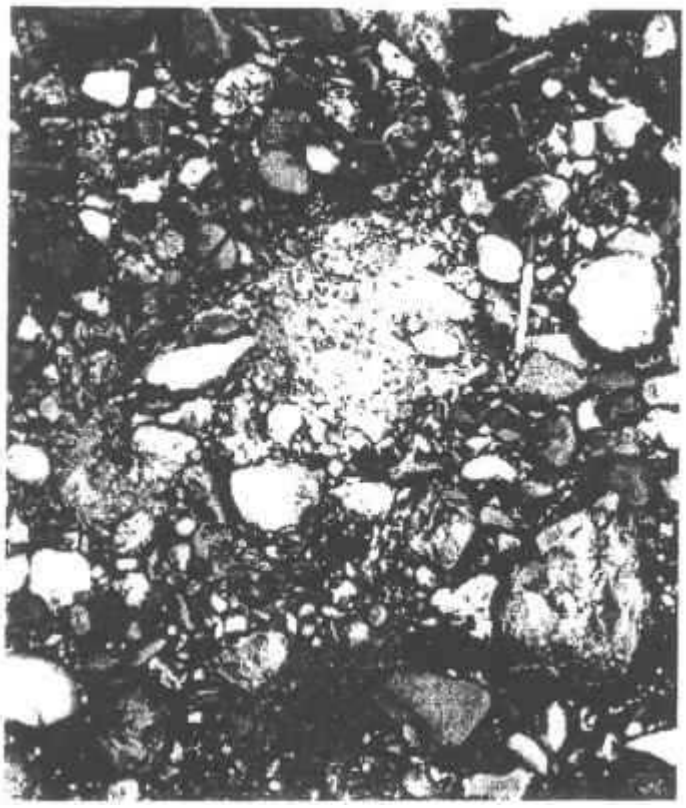


Figure 4 Orange stain (photo taken 1996)