

APPENDIX N – OFFSITE WELL SURVEY

FINAL REMEDIAL INVESTIGATION REPORT
CASMALIA RESOURCES SUPERFUND SITE
CASMALIA, CALIFORNIA

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LIST OF ACRONYMS

CSC	Casmalia Steering Committee
USEPA	United States Environmental Protection Agency
URS	URS Corporation
RI/FS	Remedial Investigation/Feasibility Study
HHRA	Human Health Risk Assessment
Area	area defined by the three-mile radius from the boundaries of the Site
HSCER	Hydrogeologic Site Characterization and Evaluation Report
APN	Assessor's Parcel Number
Base	Vandenberg Air Force Base
DWR	Department of Water Resources
DHS	Department of Health Services
PLSS	Public Land Survey System
TRS	Township, Range, and Section
USGS	United States Geological Survey
ESRI	Environmental Systems Research Technologies
GIS	Geographic Information System
JPEG	Joint Photographic Experts Group
HSIR	Hydrogeologic Site Investigation Report
EPA	Environmental Protection Agency
PVC	polyvinyl chloride
ECD	electron capture detector
PID	photoionization detector
FID	Flame Ionization detector
bgs	below ground surface
SVOC	semi-volatile organic compound
HSU	Hydrostratigraphic Unit
ft	feet
WCCB	West Canyon Catch Basin
mg/kg	milligrams per kilogram
WAO	wet air oxidation
RCRA	Resource Conservation and Recovery Act
NTU	Nephelometric Turbidity Unit
RCF	Runoff Containment Facility
DQO	data quality objective
TD	Total Depth
μ V	microvolts
ft/min	feet per minute
mS/M	milliSiemens per meter
psi	pounds per square inch
kg/L	
mg/L	milligrams per liter
L/kg	liters per kilogram
TOC	total organic carbon

1.0 INTRODUCTION

The Casmalia Steering Committee (CSC) completed the Offsite Well Survey in accordance with the *June 2004 RI/FS Work Plan*, which was prepared by the CSC and submitted to the USEPA, Region IX (CSC, 2004).

URS Corporation (URS) conducted a survey to identify the groundwater supply wells that lie within a three-mile radius of the Casmalia Resources Superfund Site (Site) boundaries. The Offsite Well Survey was conducted as proposed in the approved RI/FS Work Plan, except as noted below in Section 2.2 – Deviations.

1.1 Purpose of Investigation

The purpose of the Offsite Well Survey was to identify and compile data regarding groundwater supply wells within a three-mile radius of the Site boundaries. This survey was conducted in preparation for an evaluation of “the potential for on-site chemicals to migrate to off-site wells” (RI/FS Work Plan, June 2004). The data also are to be used in the Human Health Risk Assessment (HHRA) to evaluate whether the potential exposure pathway for humans to contact contaminants through the use of potable water is complete.

1.2 Scope of Investigation

The Offsite Well Survey consisted of locating and corroborating groundwater supply well data within the area defined by the three-mile radius (Area) from the boundaries of the Site. These data were then sorted, compiled, and mapped to depict the current distribution of groundwater supply wells within the Area.

Previous reports concerning the Site offsite wells were reviewed and their data evaluated for inclusion in this appendix. The most recent survey was the *Hydrologic Site Characterization and Evaluation Report (HSCER), Casmalia Resources, Hazardous Waste Management Facility – Offsite Well Survey, Volume I, 1988* (Woodward-Clyde Consultants, 1988). Findings of the HSCER offsite well survey are contained in Attachment N-1, along with Figure 2-19 from the *Casmalia Site Remediation RI/FS Work Plan*, which shows wells located within a three mile radius of the Site (CSC, 2004)

2.0 METHODOLOGY

URS proceeded in a systematic, phased manner to ensure methodical collection of data. URS identified properties and owners within the Area, collected applicable well permit records, reviewed published water well studies and reports, mapped wells located within the Area, and contacted property owners to gather the most current well data.

2.1 Detailed Approach

Each phase of data collection and presentation are discussed in the following sections, which are arranged in the order of implementation.

2.1.1 APN and Owner Identification

URS started work by identifying all Assessor Parcel Numbers (APN), and associated owners within the Area. Two methods were used, as follows: (1) reviewing the Santa Barbara County's Assessor's Parcel Map Books (September 2004) to find the appropriate APNs; and (2) intersecting the APN with the three-mile radius in the Geographic Information System (GIS) databases provided by Santa Barbara County, (December 2004). Each method produced a slightly different list of APNs identified to lie within the Area, and from this a joint list of all APNs and property owners was produced. Even if only a portion of an APN intersected the Area, it was included in the list to ensure comprehensive coverage. Table N-1 contains this full list of the APNs and Owners.

2.1.2 Owner Query

To query property owners, URS mailed out letters requesting well information to all identified property owners. All letters were sent *certified – return receipt requested* via the US Postal Service. In the letter, owners were asked to “confirm whether you have any water supply well(s) on your property” by phoning URS. Attachment N-2 contains a copy of the letter template... URS contacted or attempted to contact all owners listed in Table N-1 by one of the following methods: by letter, by phone and by site visit. For those owners where it was unlikely to get a timely response from the letter, URS call and or visited. To gather data from Vandenberg Air Force Base (Base), URS visited the Base's Water Resources Program Manager and also spoke with Ms. Atta, who provided a map showing the locations of on-Base groundwater supply wells. A written record was completed for all phone calls and site visits with owners.

URS attempted to gather the most current well data, identify new information, and corroborate data collected from other sources during owner contact. If all other contact methods were unsuccessful, a visit was made to the property of interest.

2.1.3 Records Compilation and Mapping

Collection of water well permit records from agencies was initiated upon completion of the APN/Owner list. Both the Santa Barbara County Department of Health Services (DHS) and the California Department of Water Resources (DWR) were contacted to request access to the well permit files. Due to privacy concerns, both agencies chose to refuse to release any information until the USEPA confirmed URS' need for access. Once the necessary confirmation was provided by the USEPA, DWR sent the appropriate files to URS (DWR only allows in-house

personnel access to their files). The County of Santa Barbara requested that URS conduct its own review of their files and make copies of relevant records.

URS sorted through 82 sets of well permit records and eliminated wells found to be outside the Area through an initial evaluation. Pertinent water well data from the well permit records were used to complete a master water well information spread-sheet. This master spread-sheet assigned a unique URS Well ID to each well, and was designed to contain all data collected on water supply wells from all sources. Data contained in this master spread-sheet were used to complete the *Well Summary Data* forms (Attachment N-3), the *Summary of Offsite Well Data* (Table N-3), and a map of *Offsite Well Locations* (Figure N-1). Copies of these permits are contained in Attachment N-4. Those wells within the Area, or those with the potential to fall within the Area, were mapped. Wells with locations close to the radius limits, and in question, were mapped on the radius. The *RI/FS Work Plan Well ID* form has been slightly amended to clarify information and to make use of all the available information, and was then renamed the *Well Summary Data* form.

2.1.4 Map Production

Well locations were collected from owners and/or well permits. Mapped locations provided by owners were copied directly onto Figure N-1. Well locations were identified in the well permit records by one or more of the following factors:

- Public Land Survey System's (PLSS) Township, Range and Section (TRS);
- 40-acre subdivisions of PLSS sections;
- Measurements taken from roads or road intersections;
- Assessor's Parcel Number (APN);
- Hand drawn locations; and
- Well locations marked on topographic maps.

Using ESRI's ArcGIS Desktop version 9.1 software, multiple data layers were brought into ArcMap to locate water wells.

The primary methodology for mapping a well location was to identify the most reliable piece of location information, and then to confirm or narrow down the location with the supplemental information available. For example, a well with an APN, a hand drawn sketch and street offsets would be located by first identifying the parcel. The location within the parcel would then be narrowed by measuring offset distances in ArcMap, and then by confirming the resulting location to the sketch. In this example, the APN was the core piece of information that confirmed the vicinity, and the street offsets and sketch were supplemental information that refined and confirmed this location. In another example, a well with TRS subdivision information and TRS offsets would be located by first identifying the TRS subdivision. TRS measured offsets from the SE corner of the section would then be used to identify where within the subdivision the well should be located, and to confirm the TRS subdivision as well. In this second example, the TRS subdivision was the core piece of information confirming vicinity, and the TRS offsets refined and were a secondary confirmation of the vicinity. The core piece of location information varied with each case, depending on the combination of information available for a particular well.

The USGS topographic map was used in two ways: (1) to match location to wells already identified on a topographic map in the well permit application; and (2) to confirm features

identified in verbal descriptions or depicted in hand drawn sketches, such as a drainage feature, dirt road, plant facility, etc.

Accuracy for well placement was based on how closely the URS mapped location denotes the well's actual location. The accuracy category assigned to an individual well was determined by the core piece of location information and how the supplemental information supported the core information. Three categories of accuracy were used: High, Medium and Low. In general, similar types of core information fell into the same accuracy categories; however, supplemental information had the potential to move the accuracy up or down.

2.1.4.1 High Accuracy

The High accuracy category contained almost exclusively well location information based on owner responses or the Assessor's Parcel Number, while the supplemental information confirmed APN and narrowed the location within APN. The only exception within this category was the placement of a few wells based on a marked USGS topographic map. The High accuracy category denotes a well's mapped location to be within approximately 25 to 600 feet of the well's actual location.

2.1.4.2 Medium Accuracy

The Medium accuracy category contains wells located within a 40-acre area of a TRS subdivision, whether supplemental information existed to narrow down the location or not. Other methods of placement included TRS offsets and clearly defined street offsets. The Medium accuracy category denotes a well's mapped location to be within approximately 100 to 950 feet of the well's actual location.

2.1.4.3 Low Accuracy

Wells assigned the Low accuracy category were placed based on the PLSS 1-square mile section of TRS, with no supplemental information available to refine the placement. The only exception within this category was the placement of one well placed on the three-mile radius, as the APN crosses the radius and supplemental information provided conflicting information. The Low accuracy category denotes a well's mapped location to be within approximately 2,000 to 3,700 feet of the well's actual location.

The well symbols used on Figure N-1 to designate usage (e.g., domestic, irrigation), status (e.g., active, destroyed) and locational accuracy (high, medium and low) were derived from the well permit records, unless provided by the well owner. Figure N-1 presents all mapped well locations including 26 with High, 9 with Medium and 3 with Low accuracy.

2.1.5 **Contractors and Subcontractors**

The CSC contracted with URS to complete the well survey work. All work was conducted by URS personnel in the Santa Barbara, California office.

2.1.6 **Equipment and Tools**

The identification of well locations and subsequent mapping was completed using GIS. URS GIS personnel used ESRI's ArcGIS Desktop version 9.1 software to compile and process the

data layers needed for well location identification and to locate the wells using one or more of these data layers.

The data layers utilized in locating wells included: the Public Land Survey System's (PLSS) Township, Range and Section (TRS); PLSS 40-acre subdivisions; the Assessor's Parcel Boundary; street centerlines; and USGS 7.5' (1:24,000) topographic quadrangle maps. The USGS topographic maps are in a georeferenced Joint Photographic Expert Group (JPEG) format and were created using the National Geographic TOPO! Image Support extension for ArcGIS. The projection for the USGS topographic maps is Decimal Degrees NAD 27. All other data is in shapefile format and is projected into California State Plane Zone V, NAD 27, feet.

The PLSS TRS data layer was obtained from the State of California's Division of Oil, Gas and Geothermal Resources (DOGGR). DOGGR modified the original PLSS TRS data layer by projecting section lines into land grant areas using scanned USGS 7.5' (1:24,000) topographic quad maps containing USGS-defined projected section lines.

Where section subdivisions were identified in well location through the USGS well number, URS personnel created 40-acre divisions of sections in ArcMap using the Vector Grid function available from ET GeoWizards. The sections within the first eastern row (aligned North-South) of the projected sections are wider (6281 ft) than a standard section (5280 ft). The 40-acre subdivision was centered on these sections.

Street centerlines and the Assessor's Parcel Boundary were obtained from the County of Santa Barbara.

No other specialized equipment was used to complete this survey.

2.2 Deviations from the RI/FS Work Plan

Deviations from the Work Plan are noted below:

- While the Work Plan had noted the well locations would be surveyed, no survey field work was conducted to confirm well locations or conditions as part of this analysis. Roughly half of the well locations lie near the edge of the 3 mile radius, and are not likely to be considered quantitatively in the risk assessments (making more exact well locations than the survey already provides unnecessary); and
- Because available data from the wells or well owners was largely insufficient for the purpose, we were not able to develop any estimates for well volumes or production rates.

3.0 INVESTIGATION RESULTS

URS identified a total of 190 APNs, 92 owners and 38 groundwater supply wells located within the Area. Table N-1 lists each APN and its owner within the Area, and Figure N-1 depicts the groundwater wells identified within the Area.

3.1 Owner Responsiveness

A total of 88 owners were sent letters by *certified mail-return receipt requested*, which allowed URS to track who received letters and who did not. The reduced number of owners relative to the number of APNs is a reflection that many were listed in association with two or more parcels. In addition, six owners were not sent letters, but contacted directly by phone or email due to the unavailability of an address or if the available address was the tax department. URS received 73 return receipts (82 percent response), and 18 return phone calls. Two letters were returned as undeliverable, and 15 receipts were not returned. URS contacted or attempted to contact by phone those owners, for who (1) no receipts were received, (2) no appropriate addresses were found, and (3) were identified after the mailing.. Those owners who could not be contacted by letter or phone received a visit to their property. Table N-2 summarizes these efforts and the data collected. The largest land owner within the Area is Vandenberg Air Force Base (Base). Telephone discussions with, and a map provided by, Base personnel indicate there are no water supply wells located within three miles of the Site's boundaries.

3.2 Well Identification

A total of 38 wells were identified during the survey, of which 8 are active, 10 are inactive, 6 are abandoned and 14 are unknown. Unfortunately, owners were often unable to clarify well locations between APNs or even within an APN. No conflicts were found between owner responses and well permit records. URS sorted through 82 sets of well permit records, identifying a total of 38 mappable wells within the Area. Pertinent data collected from available sources was entered into the master spread-sheet. Whenever available, well data and/or locations were added or modified based on owner-provided data.

Available well specific construction data are summarized in Table N-3, while the more comprehensive *Well Summary Data* forms are contained in Attachment N-3.

3.2.1 Previous Offsite Well Survey Data

Both the HSCER and the HSIR were reviewed for offsite well survey information; the HSCER contained a discussion of offsite wells in Sections 6.3, 6.4 and 6.5. These sections reference one figure (6.3-1) and one table (6.3-1). The table contained data on only six water wells; four wells located adjacent to Casmalia Creek directly west of the Site, and two wells located near the Lompoc Casmalia Road and the railroad east north-east of the Site (the Righetti and the Curletti wells). The Casmalia Creek wells are discussed below in section 3.2.2.2.

The Righetti well (RD-1), the Curletti well (CI-1), and the N1 well (not discussed in HSCER text or table), as shown on Figure 2-19 (Attachment N-1), are now owned by one of the following: the Pyshe 2000 Trust, the Whipple 2001 Family Trust, and/or Betteravia Properties. Each of these owners received the letter requesting information on existing water supply wells,

discussed in section 2.1.2. Since no calls, or any other contact, were received, it was assumed no water wells currently exist on these properties. Consequently these wells are not recorded on Figure N-1.

3.2.2 Well Details

In response to EPA's request, additional details are presented with regard to the Casmite Well, the Casmalia Creek Wells, and wells in proximity of the town of Casmalia.

3.2.2.1 Casmite Well

The Casmite well, operated by the Casmite Corporation, is a municipal water supply well serving the town of Casmalia. As a small water supply system, reports to the local Environmental Health Department are required and provided the following information.

This well was drilled sometime in the 1940's to a depth of 420 feet below grade. Pump capacity is reported at approximately 200 gallons/minute. No other information concerning this well's construction or water production was found. The Casmite system services 78 connections, as permitted in June 1, 1978.

Well Summary Data form URS Well ID #032 presents this information for the Casmite well.

3.2.2.2 Casmalia Creek Wells

There are five wells located along Casmalia Creek, URS ID#015, 028, 029, 030 and 031. Permit records indicate that well URS ID #015 was destroyed in 1982 when the other four wells were drilled. The well was destroyed by infilling the casing with grout to six feet below grade, cutting the casing at that depth and then backfilling the remaining portion of the former well bore with clay. The four new wells were drilled and completed by Hoover & Associates, Inc (Hoover, 1982). Installation and testing of these four wells is documented in Hoover & Associates' *Water Well Completion Report, Casmalia Resources Wells, Casmalia, California*, dated August 2, 1982. A copy of this report is contained in file *urs028-031* (Attachment N-4).

A total of six exploratory borings were advanced by Hoover using an 18-inch bucket auger to facilitate identification of water bearing zones. While bedrock was reportedly not encountered, the borings were terminated when clay believed to represent weathered Sisquoc Shale was identified at 35 to 55 feet below grade (depending on the well location). Hoover stated that the shale is unlikely to produce usable groundwater.

Four of the six exploratory borings were completed with 8-inch PVC casing. Screened intervals ranged from between 10 to 20 feet in length, depending on the depth and extent of the sand and gravel beds encountered. Sisquoc gravel was used for the filter pack, and the remaining annular space of each well was sealed with grout from grade to a depth of 20 feet.

Well #029 is the only currently active well and is used for irrigation at the Site. This well can produce up to 20,000 gallons a week if needed for a short period. Typical use for this well is approximately 2,000 to 3,000 gallons a week.

Well Summary Data forms URS Well ID #015, 028, 029, 030, and 031, present information on the Casmalia Creek wells.

3.2.2.3 Wells in Proximity of the Town of Casmalia

During this offsite well survey a total of 18 wells were located within proximity of the town of Casmalia. Proximity was defined as all wells located within 1.25 miles of the approximate middle of the town of Casmalia. Phone calls and or site visits with owners and tenants confirmed 15 wells, of which six are active, four are inactive, one is unknown, and four are destroyed or abandoned. Both the active and inactive wells are being or would be used for agricultural purposes, except of URS ID #011, which the owner did not indicate future use. Discussions with owners have not resolved the status of the last three wells located within proximity of the town of Casmalia, URS Well ID # 003, 004 and 008.

There are no well construction or production data available for these wells.

For additional information refer to *Well Summary Data* forms URS Well ID #003, 004, 008, 010, 011, 013, 022, 023, 024, 025, 026, 027, 033, 034, 035, 036, 037, and 038.

3.3 **Conclusions**

Of the 38 known wells, the closest active well to the Site is situated approximately 1/3 mile northwest of the western Site boundary, along Casmalia Creek (URS Well ID #29). This well is owned by the former site operator and is currently under the control of EPA and the CSC. The well is currently used by the Site as non-potable water supply. The only other wells proximal to the site are also located along Casmalia Creek (URS Well ID #28, 30 and 31; all inactive). The next closest wells are towards the south and southeast, located within or adjacent to the town of Casmalia. These wells lie at distances of between 1.2 to 1.7 miles from the nearest Site boundary. These wells are owned primarily by private parties and used for agricultural purposes. The rest of the identified wells, to the north, south and east, are located at least two miles away from the Site boundaries.

Table N-4 (below) distills the well status and usage information within the 3-mile radius. Agricultural and irrigation uses predominate (21 wells), followed by domestic (3 wells). It is important to note that 34 owners were spoken to, confirming 13 properties with no wells and 14 properties with 34 existing wells. URS has received no owner conformation regarding the status of the remaining four wells; however permit records indicated that two of these wells were abandoned.

Offsite well survey findings can be used in conjunction with findings regarding groundwater contaminant fate and mobility during the Human Health Risk Assessment (HHRA) to evaluate whether the potential exposure pathway for humans to contact contaminants through the use of potable water is complete.

4.0 EVALUATION OF THE ADDITIONAL DATA NEEDS

Available data for approximately half the identified wells are insufficient to establish accurate location, status, or use. At present the CSC does not consider this to be a data gap or an issue for the risk assessments. Depending upon results of the ongoing groundwater contaminant fate and transport modeling, collection of additional well-specific information may be warranted for the few wells located within the three mile radius of the site that we do not have sufficient information for.

5.0 REFERENCES

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