PROPOSED PLAN
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
OPERABLE UNIT 1 - 881 HILLSIDE AREA

United States Department of Energy
(U.S. DOE)

May 1995
Golden, Colorado

DOE Announces No Action Decision For OU-1

The U.S. Department of Energy (DOE) has announced its preferred option to address OU-1 subsurface soil and groundwater at the Rocky Flats Environmental Technology Site (RFETS) Operable Unit 1 (OU-1) 881 Hillside Area. The RFETS is located in Jefferson County, Golden, Colorado, and is owned by DOE, the lead agency for the site. Note that OU-1 addresses only subsurface soil and groundwater contamination. Surface soil contamination is addressed under Operable Unit 2 (OU-2), while surface water and sediment contamination is addressed under Operable Unit 5 (OU-5).

No Action is proposed for OU-1 subsurface soil and groundwater based on the lack of a significant risk to human health or the environment. Guidelines under both the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) define a protective risk level as an excess latent cancer risk of one in a million (1×10^{-6}).

Because contamination in OU-1 subsurface soil and groundwater is not mobile, and because groundwater in the area will not be used for residential purposes based on the expected future land use of the RFETS site, there is no human health or environmental risk associated with OU-1. In addition, early installation of a ***French Drain***[1], part of the OU-1 ***Interim Measure/Interim Remedial Action*** (IM/IRA) constructed in 1992 to capture contaminated groundwater, has substantially depressed the groundwater table beneath the hillside, thereby reducing the mobility of any residual contamination within OU-1. Similarly, the early removal action conducted for removal of plutonium contaminated surface soils in the area has substantially reduced the risk originally published in the OU-1 ***Baseline Risk Assessment*** (BRA).

All interested parties are encouraged to read and comment on this ***Proposed Plan*** (PP), and to submit their comments to the persons identified below.

Mark Your Calendar: Opportunities for Public Involvement

Public Comment Period:
June 1, 1995 to July 31, 1995

Public Meeting Location:
Denver Marriot West
1717 Denver West Boulevard
Golden, Colorado

Public Meeting Time and Date:
6:30pm - 9:00pm
June 21, 1995

Send Comments to:
DOE's External Affairs Office
P.O. Box 928
Golden, CO 80402-0928

Information Repositories:
Rocky Flats Public Reading Room
Front Range Community College
Level B
3645 West 112th Avenue
Westminster, CO 80030

Colorado Department of Public Health and the Environment
Hazardous Materials and Waste Management Division
4300 Cherry Creek Drive South
Denver, CO 80222

Colorado Council on Rocky Flats
1536 Cole Boulevard, Suite 150
Denver West Office Park, Bldg. 4
Golden, CO 80401

Standley Lake Library
8485 Kipling
Arvada, CO 80005

EPA Superfund Records Center
999 18th Street, Suite 500
Denver, CO 80202

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[1]Words shown in ***bold italics*** on the first mention are defined in the glossary at the end of this document.

This PP has been prepared by DOE in cooperation with the Environmental Protection Agency (EPA) and the Colorado Department of Public Health and the Environment (CDPHE), pursuant to both RCRA through the Colorado Hazardous Waste Act (CHWA), and CERCLA. This PP meets the requirements of CERCLA section 117(a), and of the Rocky Flats Interagency Agreement (IAG), between DOE, EPA and CDPHE, dated January 1991.

No Action is DOE's recommended option for OU-1. However, DOE, EPA and CDPHE will make a final remedy selection decision after considering comments from the public. A summary of responses to all comments will be prepared and included in the ***Responsiveness Summary*** section of the ***Corrective Action Decision/Record of Decision*** (CAD/ROD). The CAD/ROD will be prepared and published by DOE following the public comment period.

PUBLIC INVOLVEMENT PROCESS

Community acceptance is one of the criteria that DOE and the regulatory agencies must evaluate during the process of selecting a final remedy. Evaluation of community acceptance can be accomplished through a formal public involvement program. DOE's program consists of 1) continuing dialogue with citizens on issues of concern such as the ***RCRA Facility Investigation/Remedial Investigation*** (RFI/RI), and 2) seeking citizen participation in the selection of a final remedy at the site. This latter component is why the PP is being issued for public review and comment. All supporting documentation is available in the ***Administrative Record*** which is maintained at the information repositories shown on Page 1. Public review of all documents is encouraged.

The public comment period for this plan will be from June 1 through July 31, 1995. A public hearing will be held on June 21. Comments on the PP may be submitted orally or in writing at the public hearing, or mailed directly to the addresses shown on Page 1. Mailed comments must be postmarked no later than July 31, 1995.

Upon timely request, the comment period may be extended. Such a request should be submitted in writing to DOE postmarked no later than July 7, 1995. FAILURE TO RAISE AN ISSUE OR PROVIDE INFORMATION DURING THE PUBLIC COMMENT PERIOD MAY PREVENT YOU FROM RAISING THAT ISSUE OR SUBMITTING SUCH INFORMATION IN AN APPEAL OF THE AGENCIES' FINAL DECISION.

SITE BACKGROUND

Originally the RFETS was named the Rocky Flats Plant (RFP), but in July 1994 the plant was renamed to better reflect its new mission of environmental restoration and the advancement of new and innovative technologies for waste management, characterization, and remediation.

The RFETS is a DOE-owned facility, located approximately 16 miles northwest of downtown Denver, Colorado. The RFETS occupies approximately 6,550 acres of federally-owned land in northern Jefferson County, Colorado (see Figure 1).

The majority of the RFETS plant buildings are located within a 400-acre area referred to as the RFETS industrial area. The 6,150 acres surrounding the plant buildings provide a buffer zone around the secure industrial area.

Until 1992, the RFETS fabricated nuclear weapon components from plutonium, uranium, beryllium, and stainless steel. Parts made at the plant were shipped elsewhere for assembly. Support activities included chemical recovery and purification of recyclable transuranic radionuclides and research and development in metallurgy, machining, nondestructive testing, coatings, remote engineering, chemistry, and physics.

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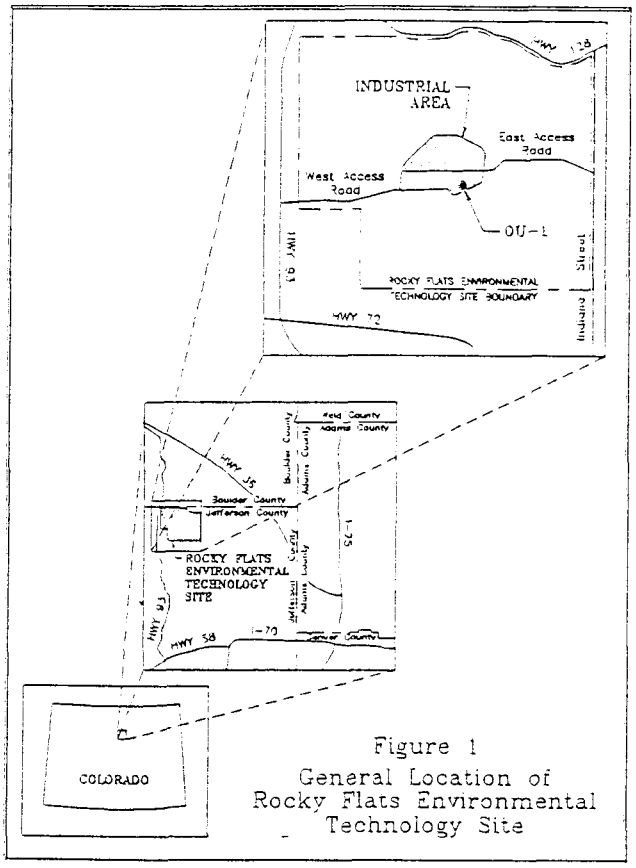

Figure 1
General Location of Rocky Flats Environmental Technology Site

The production process at the RFETS resulted in the generation of radioactive and non-radioactive wastes. On-site storage and disposal of these wastes has contributed to hazardous and radioactive contamination in soil, surface water, and groundwater. Due to the complex nature of the RFETS site, it has been divided into sixteen Operable Units (OUs). OU-1, the 881 Hillside Area, is the subject of this plan (see Figure 2).

The 881 Hillside Area is located just south and east of Building 881, where most of the contamination is thought to have originated. Building 881 was previously used for enriched uranium operations and stainless steel manufacturing. The laboratories in Building 881 were also used to perform analyses of materials generated during production of various components.

OU-1 includes 11 areas previously identified as *Individual Hazardous Substance Sites* (IHSSs), where past operational practices may have resulted in environmental contamination. Brief descriptions of the OU-1 IHSSs are presented below.

- **IHSS 102, Oil Sludge Pit Site.** Area located approximately 180 feet south of Building 881, where 30 to 50 drums of non-radioactive oily sludge were emptied in the late 1950s. The sludge was generated during the cleaning of two No. 6 fuel oil tanks, designated as IHSSs 105.1 and 105.2 (listed jointly as IHSS 105 below). The area was backfilled when disposal operations ceased.

- **IHSS 103, Chemical Burial Site.** A circular pit located approximately 150 feet southeast of Building 881 was identified on 1963 aerial photographs. The area was reportedly used to bury unknown chemicals.

- **IHSS 104, Liquid Dumping Site.** A former (pre-1969) liquid waste disposal pond in the area east of Building 881. The exact location is uncertain due to the poor quality of 1965 aerial photographs.

- **IHSSs 105, Out-of-Service Fuel Oil Tank Sites (105.1 and 105.2).** Located immediately south of Building 881, these storage tanks were for No. 6 fuel oil. Suspected leaks occurred in 1972. The tanks were closed in place through filling with asbestos-containing material and cement.

- **IHSS 106, Outfall Site.** An overflow line from the sanitary sewer sump in Building 887 was used for discharge of untreated sanitary wastes in the 1950s and 1960s. Due to concerns about discharges from the outfall entering Woman Creek, several small retention ponds and an interceptor ditch were built in 1955 and 1979, respectively.

- **IHSS 107, Hillside Oil Leak Site.** Site of a 1972 fuel oil spill from the Building 881 foundation drain outfall. A concrete skimming pond was built below the foundation drain outfall to contain the oil flowing from the foundation drain, and an interceptor ditch was constructed to prevent oil-contaminated water from reaching Woman Creek.

- **IHSSs 119.1, 119.2, Multiple Solvent Spill Sites.** Former drum and scrap metal storage areas east of Building 881 along the southern perimeter road. The drums contained unknown quantities and types of solvents and wastes. The scrap metal may have been coated with residual oils and/or coolants.

- **IHSS 130, Radioactive Site - 800 Area #1.** Area east of Building 881 used between 1969 and 1972 to dispose of soil and asphalt contaminated with low levels of plutonium and uranium. IHSS 130 contains plutonium-contaminated soil and asphalt which came from contamination caused by a leaking drum in transit and soil removed from around the Building 774 process waste tanks in 1972.

- **IHSS 145, Sanitary Waste Line Leak.** A six-inch cast-iron sanitary sewer line that originated at the Building 887 lift station and that leaked on the hillside south of Building 881. The line had

conveyed sanitary wastes and low-level radioactive laundry effluent to the sanitary treatment plant from about 1969 to 1973.

Each of these IHSSs was originally identified as a potential source of groundwater contamination at OU-1. The Phase III RFI/RI, however, concluded that only IHSS 119.1 contains a significant source of contamination in the form of residual ***dense non-aqueous phase liquids*** (DNAPLs) assumed to be present in subsurface soil. Additional analysis has found that the contaminated area is self-contained and relatively small and immobile. Other IHSSs in OU-1 were not found to be source areas and do not contribute significantly to groundwater contamination.

Before OU-1 was fully characterized, a French Drain was constructed across a portion of the operable unit to protect Woman Creek while containing potentially contaminated groundwater suspected to be present in OU-1. The drain, along with an extraction well installed upon completion of the drain, collects groundwater flowing down the hillside and directly from IHSS 119.1. Collected groundwater is pumped to a UV/H_2O_2 and ion-exchange water treatment system located in Building 891.

Because current data indicates that no contaminated groundwater is currently reaching the French Drain, the existing collection system consisting of the drain and extraction well will not be operated upon implementation of *No Action*, although groundwater monitoring will be continued.

Note that one of the findings of the geotechnical investigation conducted in support of the French Drain installation, was that the hillside area was geotechnically unstable and that bedrock slumping was occurring at several points across the operable unit. This fact played a role in examining risks associated with land use at OU-1

SUMMARY OF SITE RISKS

As part of the Phase III RFI/RI conducted for OU-1, a BRA was prepared to identify any current or potential future risks to human health and the environment. The BRA evaluated health risks from surface water and sediments in Woman Creek, and surface soil, subsurface soil, and groundwater within the OU-1 boundaries.

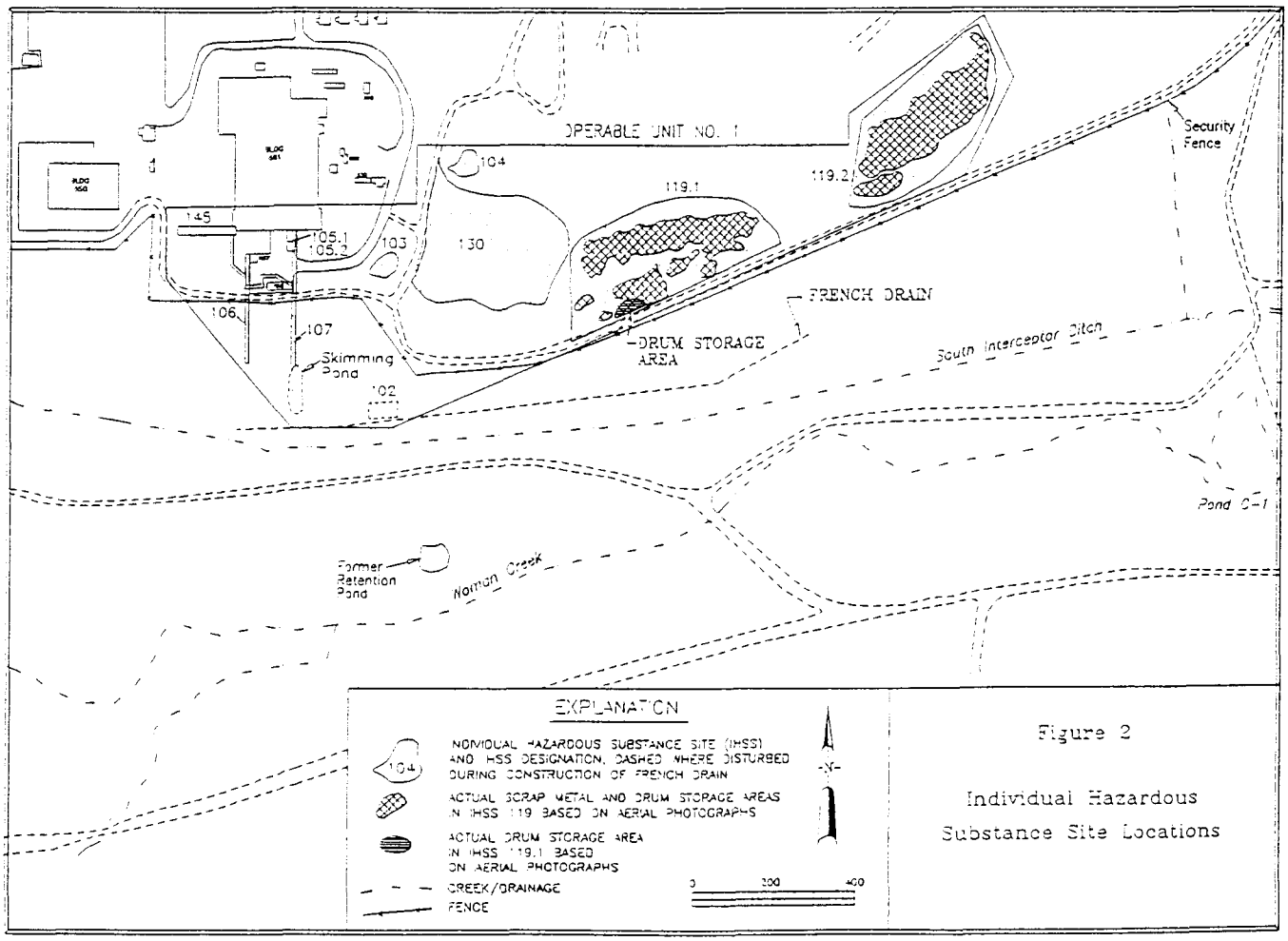

Figure 2

Individual Hazardous Substance Site Locations

Surface water and sediments, however, are being addressed under OU-5, while surface soil contamination is being addressed jointly with surface soil contamination in OU-2. Therefore, only subsurface soil and groundwater are now considered in OU-1.

It is important to note, however, that the surface soil hotspot removal action conducted at OU-1 for plutonium contamination reduced the risk from this contaminant group and medium by approximately two orders of magnitude. This contaminant group contributed the highest risk to a human receptor in the OU-1 BRA, prior to its administrative transfer to OU-2. Outside of surface soils, the primary contaminants identified in the Phase III RFI/RI in subsurface soil and/or groundwater were:

- *carbon tetrachloride (CCl_4)*
- *1,1-dichloroethene (1,1-DCE)*
- *tetrachloroethene (PCE)*
- *1,1,1-trichloroethane (1,1,1-TCA)*
- *trichloroethene (TCE)*
- *selenium*

The BRA identified potential health risks from these contaminants associated with current and possible future exposure scenarios at OU-1. The scenarios originally examined in the OU-1 BRA are listed below. As previously discussed, not all of these scenarios are considered valid or currently possible.

- current on-site commercial/industrial
- current off-site residential
- future on-site commercial/industrial
- future on-site ecological reserve
- future on-site residential

Preliminary information provided by the Rocky Flats Future Site Use Work Group, consisting of participants from DOE, EPA, CDPHE, and major stakeholders, suggests that the future on-site residential land use scenario should not be considered, and that the commercial/industrial scenario is unlikely to occur in the area of OU-1. The commercial/industrial scenario is additionally unlikely at OU-1 due to the instability of the hillside as a building foundation. The added costs necessary to ensure a sound building foundation on the hillside would not be warranted when other building sites are available nearby. Deed restrictions would be used if necessary to enforce a building limitation.

Health risks associated with the ecological reserve and open space park scenarios are not impacted by OU-1 subsurface soil or groundwater. There are no exposure routes available under these scenarios for either medium, therefore there are no health risks calculated for OU-1 contaminants under these scenarios.

Environmental risks were likewise insignificant as identified in the Phase III RFI/RI and therefore environmental risks do not warrant further examination. Overall, the BRA, along with the information provided by the Future Site Use Work Group, and the physical location of OU-1, indicates that there are no significant risks to human health or the environment from OU-1 subsurface soil or groundwater contaminants, assuming no future on site residential development.

PREFERRED REMEDY

DOE recommends *No Action* at OU-1. However, this option includes continued monitoring of the site to determine if any changes occur to the mobility of contaminants, and to monitor the effectiveness of natural degradation processes. It is expected that the toxicity, mobility, and volume of OU-1 subsurface and groundwater contaminants will be reduced through natural processes such as ***dispersion***, ***biodegradation***, and ***volatilization***. The French Drain will remain in place under this option, so in the unlikely event that conditions change at OU-1, the drain could be pumped and collected water treated through the existing water treatment system.

Up to six monitoring points will be used to monitor groundwater as a component of this proposed decision. Up to four new wells will be installed upgradient of the French Drain, and possibly two additional wells below the drain and upgradient of Woman Creek. Geological and geophysical support, such as photographic lineament analysis, and/or three-dimensional seismic surveys, could be used to assist in the placement of the wells. This would enable paleochannels and faulted zones to be clearly identified prior to well placement.

In addition to well samples, samples will be collected from the french drain sump. Samples will be collected semiannually and analyzed for organic and inorganic contaminants. Analysis of individual species of inorganic contaminants will also be performed, to identify individual metal species which have the potential to bioaccumulate. This additional analysis requirement will only be performed occasionally in the sampling program.

Costs associated with the *No Action* option range from $370,000 to $1,800,000 depending on the length of the monitoring period (three to thirty years is presented) required. This option includes implementation of a CERCLA five-year review to determine if site conditions have altered the basis for the *No Action* decision, if monitoring is no longer required, or if deed or zoning restrictions are appropriate to limit future building construction on the hillside.

GLOSSARY

Administrative Record. The record of documents including correspondence, public comments, technical reports, etc., upon which the agencies based their remedial action selection.

1,1-Dichloroethene (1,1-DCE). 1,1-DCE is used in the manufacture of 1,1,1-TCA and as a cleaning solvent and degreaser. It is usually in the form of a colorless liquid with a chloroform-like odor. 1,1-DCE is considered a highly volatile and is classified as a Class C carcinogen.

1,1,1-Trichloroethane (1,1,1-TCA). 1,1,1-TCA is used as an industrial solvent and in consumer products. It is considered a volatile organic compound and is classified as a Class D carcinogen.

Baseline Risk Assessment (BRA). An assessment of the risks to human health and the environment at a site. BRA methodology utilizes contaminant concentrations and potential exposure routes to quantify risks associated with present and future site conditions.

Biodegradation. The breakdown of contaminants to other chemical or physical forms by bacteria, fungi, and other microorganisms. Biodegradation can be applied in situ or ex situ and can be used under aerobic or anaerobic conditions.

Carbon Tetrachloride (CCl_4). CCL_4 is used as an industrial solvent which is most often used as a cleaning fluid. It is considered a volatile organic compound and is classified as a Class D carcinogen.

Corrective Action Decision/Record of Decision (CAD/ROD). A document that explains which cleanup option(s) are selected at a RCRA/CERCLA site. The CAD/ROD is based on information obtained from the RFI/RI, the CMS/FS, and community participation.

Proposed Plan (PP). A public document that first introduces the lead agency's preferred option for addressing a contaminated site. The PP is produced through the cooperation of the lead and regulatory agencies and is reviewed by the public.

Dense Non-Aqueous Phase Liquids (DNAPLs). DNAPL contamination can be in either free-phase (immiscible liquid) or residual form in the subsurface. Residual DNAPL is typically confined to soil pore spaces both above and below the water table. DNAPLs are more dense than water and therefore have a tendency to accumulate in low points.

Dispersion. The distribution of contamination within a larger volume resulting in lower concentrations throughout as the plume disperses and expands. Similar to dilution.

French Drain. An underground drain consisting of loose stones or gravel covered by soil which serves to collect groundwater in sumps, or divert the flow of groundwater in a particular direction.

Individual Hazardous Substance Site (IHSS). An area which has been identified as being potentially contaminated as a result of previous operations.

Interim Measure/Interim Remedial Action (IM/IRA). An early action taken to control a release or threatened release of hazardous substances. IM/IRAs are typically conducted prior to full characterization of a site as they are actions intended to limit future contamination.

RCRA Facility Investigation/ Remedial Investigation (RFI/RI). An RFI/RI involves collecting and analyzing information to determine the nature and extent of contamination that may be present at a site. This may include risk assessment and modeling activities.

Responsiveness Summary. The portion of the CAD/ROD that summarizes public and agency review comments and provides responses to these comments.

Selenium. Selenium is an inorganic (metal) nutrient whose toxicity is related to its chemical form. Selenium is classified as a Class D carcinogen. Selenium is naturally occurring at varying concentrations throughout the Rocky Flats Environmental Technology Site area.

Tetrachloroethene (PCE). PCE is an industrial solvent used widely in the dry cleaning and textile industries. It is also used as a degreaser and has a variety of commercial applications. PCE is considered a volatile organic compound and is classified as a Class D carcinogen.

Trichloroethene (TCE). TCE, like PCE is an industrial solvent that is considered a volatile organic compound. Toxicity data is not available for TCE, therefore it is typically not included in risk assessment calculations.

UV/H_2O_2. A treatment which combines exposure of contaminated water to ultraviolet light (UV) with the addition of hydrogen peroxide (H_2O_2). Both provide free radicals which catalyze the breakdown of contaminants to innocuous chemicals.

Volatilization. The process of changing from a liquid state to a gaseous state. This action can be accelerated through the addition of heat or through reducing ambient pressure conditions.

We are transmitting copies of the Operable Unit 1 (881 Hillside) Final Proposed Plan. This satisfies the May 25, 1995, Interagency Agreement milestone. You will note a change in the preferred remedy from that presented in the Draft Proposed Plan dated February, 1995. It is our belief that a No Action preferred remedy in conjunction with monitoring points as discussed in the submitted plan is in the best interest of taxpaying public.

The reason for that change is an increased understanding of the groundwater system at Operable Unit 1 which resulted from an examination of the data previously contained in the Remedial Investigation for Operable Unit 1. That information led us to the conclusion that use of a Soil Vapor Extraction system or attempts to dewater the 881 Hillside would be unsuccessful. These conclusions have recently been developed after in-depth consideration of all groundwater data. It is unfortunate that these conclusions were not rendered earlier in the process, but we feel that decisions must be based on this information.

Responses to the comments received on the proposed plan which were received from the Environmental Protection Agency on May 2, 1995 have been incorporated into this document. In addition, comments received during the meeting of May 15, 1995 have been incorporated into the document where possible. The beginning of the public comment period has been delayed until June 1, 1995 to allow for additional time to discuss this project with you.

We would like to meet with you at the earliest opportunity to discuss the proposed plan.

DRAFT