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TRENCHES T-3 AND T-4
ISSUE PAPER
October 13, 1995

ADMIN RECORD

Representatives from DOE, CDPHE, EPA, and RMRS met October 3, 1995 to discuss the planned Source Removal at Trenches T-3 and T-4 at the RFETS During the course of that meeting, several issues were discussed RMRS was tasked with preparing an issue paper discussing plans for addressing those issues This paper is in response to that request

1. Waste Management and Debris Handling

As discussed in the meeting, the material excavated from the trenches will be handled in accordance with Colorado hazardous waste regulations For example, the container management regulations will apply, such as marking containers

As suspected from the historical reports, previous drilling events, and the geophysical survey, we anticipate encountering drums during the source removal from the trenches The Alternatives Analysis indicates 300 crushed drums were placed in the east trenches area Furthermore, drums were encountered during the characterization sampling effort for T-3 and T-4

According to discussions with McLaren/Hart about the thermal desorption unit (TDU) planned for use on the Ryan's Pit project, if the drums and other assorted debris are sized accordingly, the TDU will be able to accept the debris for treatment and comply with 6 CCR 1007 § 268 45 If the debris is too large to be treated by the TDU, mechanical means, i e high pressure spray, will be used to decontaminate the debris A portable decontamination unit is available at RFETS for this purpose

2. Worker Safety/Health Issues

The Alternative Analysis cites that implementation of the "Pump Liquids/Excavate Solids/Treat and Dispose On-site" method would entail "repeated handling of the waste and would constitute risk of exposure to humans and possible spread of contamination to the environment " However, handling of the waste will be kept to a minimum since handling costs money The material will be excavated and direct loaded into a conveyance system, i e roll-off containers or covered end dumps, and transported to the TDU The material will be directly loaded into the TDU for treatment, thereby reducing the risk potential to individuals in the area Proper PPE will be used during the excavation and treatment operations of the project which will minimize the risk to employees working on the project Water sprays will be used during operations as they were on Ryan's Pit to mitigate air emissions and reduce risk

The Alternative Analysis also states "If VOC control is not implemented, there is a potential risk for significant environmental contamination " This project must comply with the ARARs identified for this project which include substantive compliance with air emission standards for

process vents and equipment leaks, 40 CFR 265 Subpart AA and Subpart BB Thermal desorption units employ common air emission control equipment such as HEPA filters, activated carbon filters, condensers, and catalytic oxidation units In addition, compliance with the substantive requirements of RCRA container management will be done

The project will take full advantage of the lessons learned from the Ryan's Pit project For example, Ryan's Pit was conducted in level B PPE once excavation was initiated and air monitoring was performed continuously both in the exclusion zone and in the support zone using organic vapor detectors No one received any documented dose during the project However, this level of protection was determined to be appropriate based on direct-reading air monitoring results During excavation and sampling activities, organic vapor levels ranging from 0 to 35 ppm were found in the workers' breathing zones These levels occurred as peak levels which quickly dissipated, indicating very volatile compounds The compounds present in the trench, the number of different compounds, and the non-specific nature of the direct reading instrumentation, make supplied air respiratory protection the prudent choice for worker protection

As on Ryan's Pit, select employees will be equipped with personal air monitors to assess the dose they would have received during their efforts in the exclusion zone Results from the Ryan's Pit project show no exceedances for any chemicals based on time weighted averages

Carbon tetrachloride is present in the T-3 and T-4 trenches and represent a high risk to workers through skin absorption For this reason, workers who will be close to the excavation and treatment process will use Saranex for their level B skin protection Saranex is more effective than Tyvek for splash protection

3. Air Emissions

Currently, we are working with the RFETS Air Quality group to determine the air emissions that may be emitted during this project They are performing the calculations to show compliance with 1007-3, and the NESHAPs 40 CFR 61 Subpart H The CAP-88 modelling has been completed and shows that the excavation and operations will result in radionuclide emissions less that the 0 1 mrem/yr Also, we are planning to use water sprays during operations to mitigate air emissions and reduce risk, as was done on Ryan's Pit We will keep you posted on the outcome of the air emission calculations for the VOC and particulates

4 Soil Vapor Extraction Equipment at T-3

The SVE equipment previously used to extract VOCs from Trench T-3 will be removed prior to the start of excavation The removal activity will include

- disconnecting utility connections to the semi-trailer
- removing platforms attached to the trailer

- moving the trailer to the field operations yard
- sending above ground piping, the sandbags, the HDPE liner, and other debris to the landfill (or packaged as waste, if required)
- relocating the four above ground storage tanks to PU&D
- plugging the monitoring and extraction wells which penetrate the trench bottom per approved plant procedures

To avoid the possibility of contaminated liquids escaping the trench through existing wells, the wells extending below the trench will be plugged with bentonite clay in accordance with existing procedures to a depth above the bottom of the trench before excavation begins

5. Radiological Contamination

As the Alternative Analysis addresses, trench T-3 is a source for VOC contamination in groundwater and exceeds risk-based VOC PPRG level for commercial/industrial exposure The source removal from the trenches T-3 and T-4 is intended to lower risk to workers and the environment In addition to VOC contamination, the trenches contain uranium and plutonium radioactive particulates in the soils as shown below The measured concentrations are well below PPRGs for subsurface soils for those elements Therefore, these contaminants are not the primary concern of this source removal

Radionuclide	T-3 Maximum Activity Level (pCi/g)	T-4 Maximum Activity Level (pCi/g)	PPRGs (pCi/g)
Americium-241	0 5983	12 99	164
Plutonium 239/240	3 12	20 78	219/220
Strontium-89/90	1 1	1 08	3230/1240
Tritium (pCi/l)	400	500	971,000
Uranium-233/234	14 35	170 4	4080/1550
Uranium-235	7509	11 5	12 5
Uranium-238	26 37	288 4*	60 1
Gross alpha	34 0	15 2	NA
Gross beta	56 74	427 8	NA

* This is 1 sample out of 50 The next highest activity is 31 03 pCi/g, and the average activity level is 9 924 pCi/g

As reported in Technical Memorandum 4, a grab sample of liquid was collected from borehole 25194 in November of 1994 when the borehole was established This sample was submitted to an on-site laboratory where a radionuclide screen showed total Alpha activity of 749,000 pCi/L and total beta activity of 803,000 pCi/L A subsequent sample of this liquid was taken in December 1994 after the particles suspended in the liquid due to the boring activities had time to settle This sample was separated into oil and water phases and showed much lower radionuclide contamination The two phases were screened for radiological contamination separately with the following results The oil phase screening revealed total alpha activity of 28,250 pCi/L and total beta activity of 48,750 pCi/L The water phase screening revealed total alpha activity of 19,000 pCi/L and total beta activity of 42,000 pCi/L An isotopic breakdown was performed on the sample taken in December The individual radionuclides were found to be below PPRG's The discrepancy between the first and second samples may indicate that a minimal sludge layer with contaminated particulates exists in the vicinity of borehole 25194 However, the numerous samples taken of the subsurface soils in trench T-3 have shown no radionuclide contamination above PPRG values Therefore we believe that this individual sample, which does not necessarily indicate radiological contamination levels above PPRG's, is not a significant concern for the project

6. Free Liquids

Based on sampling data and experience gained during the characterization sampling effort, we believe that recoverable free liquids will be minimal Void spaces in the trenches are not believed to be interconnected The volume of free liquids is believed to be minimal Furthermore, most of the liquid is in saturated soils and is expected to remain in the soil when excavated During the process of excavation, as lenses or pockets of liquids are disturbed, it is expected that any free liquids will be immediately absorbed by surrounding soils Since the walls and bottoms of the trenches have high clay contents, any liquids not immediately absorbed during excavation will be captured and removed Any visibly stained or wet area will be excavated

7. Performance Standard for Returning Soils to the Trenches

As was done on the Ryan's Pit project, RMRS is proposing to continue using delisting values as the performance standard for this project where appropriate When the delisting values are more conservative than the universal treatment standards (UTS) for the contaminants of concern, they will be used Otherwise, the UTS standards will be used

Contaminant	Delisting Value (mg/kg)	UTS (mg/kg)
1,1,1-Trichloroethane	222 9	6
1,1-Dichloroethene	127	-
1,2-Dichloroethane	0 371	6
Acetone	517	160
Benzene	0 8879	6
Carbon tetrachloride	1.408	6
Chloroform	0 4968	-
Ethylbenzene	4984	10
Methylene chloride	8255	30
Tetrachloroethene (PCE)	3.43	6
Toluene	11,730	10
Trichloroethene (TCE)	1.146	6
Hexachlorobutadiene	5 139	5 6
Hexachloroethane	2 956	30

8. Cleanup Standard for the Excavation of the Trenches

The cleanup standard for the excavation of the trenches is based on reducing the future impact to groundwater and on the protectiveness of human health Immobile or slightly mobile contaminants, such as metals and radionuclides, will be cleaned up to the subsurface soil PPRGs Mobile contaminants, i e the volatile organic hydrocarbons and chlorinated solvents, will be cleaned up to soil concentrations that are being established by the groundwater strategy working group The basis for the site-wide approach includes utilizing RFETS specific values for soil

types, hydraulic gradients, hydraulic conductivity, and source size to back calculate the allowable soil concentration for a specific impact to groundwater

The proposed soil cleanup values and the technical basis for them will be faxed to the agencies on October 16, 1995, and presented on the groundwater strategy meeting on October 17, 1995

9. Asphalt Planking

The thermal desorption unit will be able to process asphalt planking by breaking the material into pieces small enough to be processed The surrounding soils will be stained during treatment, but the asphalt will not be melted at normal operating temperatures for the TDU The VOC's will be removed from the material in the same manner as from the soils

10. Unexpected Problems

Based on the findings of the Ryan's Pit project, it was requested that RMRS prepare contingency plans for unexpected scenarios Although not every possibly scenario can be planned for, several potential scenarios were evaluated and presented below as contingency ideas

- Groundwater

  Based on hydrogeological data in Technical Memorandum 4, the normal depth to groundwater in the area of the trenches ranges from 20 to 35 feet below ground surface During periods of unusually high groundwater, the depth to groundwater ranges from 10 to 15 feet below the ground surface If groundwater is encountered during the excavation of the trenches, a sump pump will be placed in the trench to collect the groundwater in a tank The water will then be sent to the Building 891 facility or the Site-wide Consolidated Water Treatment Facility for treatment

- Excavation Shoring

  Shoring is not expected to be required during the excavation of the trenches Based on borehole data and historical photographs of the trenches while in service which show the trenches open with straight walls, the clay and silt content of the soils is expected to be high enough to make the soil cohesive Although borehole data exist which indicates the soil in the area is high in gravel and sand content, these data are not representative of the existing conditions for the following reasons The suspect data are from boreholes drilled before 1993, when there was no SOP for the site for borehole logging In 1993 a site-wide SOP was implemented and laboratory analysis was instituted for soil characterization The latter results show typical clay contents for the trench area to range from 40 to 50 percent

- Compressed Gas Cylinders

If a compressed gas cylinder is uncovered, it would be set aside in an isolated location Access to the area could be restricted by barriers until expertise could be brought in to handle the cylinder It is beyond the scope of the project to dispose of an unidentified compressed gas cylinder

- Classified Shapes

Although extremely unlikely, should a classified shape be encountered, it would be set aside and covered with a tarp Security would be notified to establish control over the item Then site authorities would need to decide how to address the item It is beyond the scope of the project to dispose of a classified shape

- Glove Box or Other Equipment

If a piece of equipment, such as a glove box, is encountered, it will be set aside and isolated by controlling access with barriers The item would have to be characterized to identify any risks It would then be disposed of according to the proper protocol