TA16

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Los Alamos
NATIONAL LABORATORY
EST. 1943

Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: June 25, 2009
Refer To: ENV-RCRA-09-122
LA-UR: 08-07027, 09-03893

RECEIVED
JUN 2009
Hazardous Bureau

Mr. James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Dear Mr. Bearzi:

SUBJECT: TRANSMITTAL OF TECHNICAL AREA 16 SOIL SAMPLING REPORT AND STANDARD OPERATING PROCEDURES, LOS ALAMOS NATIONAL LABORATORY LANL), EPA ID NO. NM0890010515

The purpose of this letter is to transmit the enclosed report and operating procedures for Technical Area (TA) 16 as referenced above. This documentation is being submitted in response to requests for information associated with the continuing permit negotiations for the LANL Hazardous Waste Facility Permit.

Enclosure 1 consists of dioxin and furan data from samples collected on June 8, 2009 from locations identified during the tour of TA-16 of March 30, 2009. A risk assessment analysis is also included with the data that demonstrates that no potential ecological risks were found for any receptor following evaluations based on hazard quotient analysis, potential effects to populations, and comparisons to previous field and laboratory study results conducted in the canyons.

Enclosure 2 contains two standard operating procedures for the thermal treatment activities that occur at TA-16-388 and TA-16-399. These procedures were previously informally submitted during the permit negotiation meetings of November 6, 2008.

A compact disc is also included with this submittal that includes electronic copies of the documents discussed above.

31731

If you have questions regarding this letter and the enclosed memorandum, please contact Jack Ellvinger of the Water Quality and RCRA Group (ENV-RCRA) at (505) 667-0633.

Sincerely,

For

Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)

ARG:LRVH/LM

Enclosures: a/s

Cy: Michael B. Mallory, PADOPS, w/o enc., A102
J. Chris Cantwell, ADESHQ, w/o enc., K491
Sandra J. Powell, WT-5, w/o enc., C927
ENV-DO, file, w/o enc., J978
ENV-RCRA, File, w/enc., K490
IRM-RMMSO, w/enc., A150

Enclosure 1
LA-UR-09-03893

ECOLOGICAL RISK SCREENING ASSESSMENT

1.0 Introduction

The approach for conducting ecological assessments is described in the “Screening Level Ecological Risk Assessment Methods, Revision 2” (LANL 2004, 087630). The assessment consists of the following four parts: a scoping evaluation, a screening evaluation, an uncertainty analysis, and an interpretation of the results.

1.1 Scoping Evaluation

Six surface soil samples were collected in and around the area of the Open Burning Treatment Units (TA-16-388 and TA-16-399) and analyzed for dioxins and furans. Sample No. 3 is a background sample.

Site observations indicated that terrestrial receptors were appropriate for evaluating the potential ecological risk at the Open Burning Treatment Units (TA-16-388 and TA-16-399). The potential exposure pathways for terrestrial receptors in soil are root uptake, inhalation, soil ingestion, dermal contact, and food-web transport.

The potential risk was evaluated for ecological receptors representing several trophic levels and included the earthworm (detritivore), the deer mouse (mammalian omnivore), the montane shrew (mammalian insectivore), the desert cottontail (mammalian herbivore), and the red fox (mammalian carnivore). Avian receptors (American robin and American kestrel) were not evaluated because ecological screening levels (ESLs) for 2,3,7,8-tetrachlorodibenzodioxin (TCDD) are not available for these receptors.

The rationale for the receptors is presented in “Screening Level Ecological Risk Assessment Methods, Revision 2” (LANL 2004, 087630). The ESLs were derived for each receptor where toxicity information is available (Table 1). The ESLs are based on similar species and derived from experimentally determined no observed adverse effect levels (NOAELs), lowest-observed-adverse-effect levels (LOAELs), or doses lethal to 50% of the population. All relevant information necessary to calculate ESLs, including concentration equations, dose equations, bioconcentration factors, transfer factors, and toxicity reference values (TRVs) are presented in the ECORISK Database, Version 2.3 (LANL 2008, 103352).

1.2 Assessment Endpoints

An assessment endpoint is an “explicit expression of the actual environmental value that is to be protected, operationally defined by an ecological entity and its attributes” (EPA 1998, 062809). Assessments should include ecologically relevant endpoints that help to sustain the natural structure, function, and biodiversity of an ecosystem or its components. In a screening assessment, the assessment endpoints are attributes of ecological receptors that may be adversely affected by exposure to hazardous wastes from past operations (EPA 1997, 059370), wherein receptors are populations and communities (EPA 1999, 070086).

The ecological risk screening assessment is designed to protect populations and communities of biota rather than individual organisms, except for listed or candidate T&E species or treaty-protected species (EPA 1999, 070086). The protection of individual organisms within these designated protected species could also be achieved at the population level; the populations of these species tend to be small, and the loss of an individual adversely affects the species.

In accordance with this guidance, the Laboratory developed generic assessment endpoints to ensure that values at all levels of the food chain are considered in the ecological screening process (LANL 1999, 064137). These general assessment endpoints can be measured using impacts on reproduction, growth, and survival to represent categories of effects that may adversely impact populations. In addition, specific receptor species were chosen to represent each function group. The receptor species were chosen because of their presence at the site, their sensitivity to the chemicals of potential ecological concern (COPECs), and their potential for exposure to those COPECs. These categories of effects and the chosen receptor species were sued to select the types of effects seen in toxicity studies considered in the development of the TRVs. Toxicity studies used in the development of TRVs included only those in which the adverse effect evaluated affected reproduction, survival, and/or growth.

The selection of receptors and assessment endpoints are designed to be protective of both the representative species used as screening receptors and the other species within their feeding guilds and the overall food web for the terrestrial and aquatic ecosystems. Focusing the assessment endpoints on the general characteristics of species that affect populations (rather than the biochemical and behavioral changes that may affect only the studied species) also ensures applicability to the ecosystem of concern.

2.0 Screening Evaluation

The ecological risk screening assessment identifies COPECs based on the comparison of the exposure point concentration (EPC) to ESLs in accordance with Laboratory guidance (LANL 2004, 087630). The calculation of the EPC for the dioxin/furan congener data is conducted by using the toxicity equivalency factors (TEFs) to convert the congener results in each sample (Table 2) to the TCDD equivalent concentrations. The TEFs were obtained from 2005 World Health Organization guidance (available at http://www.who.int/ipcs/assessment/tef_update/en/index.html). Because sample No. 3 is a background sample it is not included in the calculation of TCDD equivalent concentrations or the screening assessment. The reported concentration of each congener is multiplied by the appropriate TEF and the TCDD equivalent concentrations are summed for each of the five remaining samples (Table 3). The sum of the equivalent congener concentrations is known as the toxicity equivalent concentration (TEC) (Table 3) and was compared to the ESLs for TCDD obtained from the ECORISK Database, Version 2.3 (LANL 2008, 103352). In addition, a mean TCDD equivalent concentration was calculated because a representative upper confidence limit (UCL) could not be calculated to represent exposure across the site.

The hazard quotient (HQ) is the ratio of the EPC to the ESL for each ecological receptor. The higher the contaminant levels relative to the ESLs, the higher the potential risk to receptors; conversely, the higher the ESLs relative to the contaminant levels, the lower the potential risk to receptors.

The ESL comparisons to the maximum and mean TCDD equivalent concentrations and the resultant HQs are presented in Table 4. The calculations indicate that all receptors, except the earthworm, have HQs greater than 1. The results are discussed further in the uncertainty section.

3.0 Uncertainty Analysis

The uncertainty analysis describes the key sources of uncertainty related to the screening evaluations. This section contains a qualitative uncertainty analysis of the issues relevant to evaluating the potential ecological risk at each site.

3.1 Chemical Form

The chemical form of the dioxin/furan congeners was not determined as part of this investigation. Toxicological data are typically based on the most toxic and bioavailable chemical species, which are not typically found in the environment. The COPECs are not generally 100% bioavailable to receptors in the natural environment due to the adsorption of chemical constituents to matrix surfaces (e.g., soils), or rapid oxidation or reduction changes that render harmful chemical forms unavailable to biotic processes. The ESLs were calculated to ensure a conservative indication of potential risk (LANL 2004, 087630) and the values are biased toward overestimating the potential risk to receptors.

3.2 Exposure Assumptions

The exposure assumptions used in the ESL derivations were conservative and not necessarily representative of actual conditions. These assumptions include maximum chemical bioavailability, maximum receptor ingestion rates, and minimum bodyweight. Most of these factors tend to result in conservative estimates of the ESLs, which may lead to an overestimation of the potential risk.

The EPCs used in the calculation of HQs are the TCDD equivalent concentrations for each sample and the mean TCDD equivalent concentration for the five samples collected from the site (sample No. 3 is a background sample and is not included in the screening assessment). The maximum concentration is a conservative estimate of exposure and overestimates the potential risk to receptors. The mean concentration is used because a UCL of the mean could not be calculated (the UCL calculated was higher than the maximum concentration) and the mean represents a more realistic exposure across the site. The sampling efforts focused on areas of suspected contamination, and receptors were assumed to ingest 100% of their food and spend 100% of their time at the site. These exposure assumptions for terrestrial receptors overestimate the potential ecological exposure and risk.

3.3 Toxicity Values

The HQs were calculated using ESLs, which are based on NOAELs as threshold effect levels; actual risk for a given COPEC/receptor combination occurs at a higher level, somewhere between the NOAEL-based threshold and the threshold based on the LOAEL. The use of NOAELs leads to an overestimation of potential risk to ecological receptors. ESLs are based on laboratory studies requiring extrapolation to wildlife receptors. Laboratory studies are typically based on “artificial” and maintained populations with genetically similar individuals and are limited to single chemical exposures in isolated and controlled conditions using a single exposure pathway. Wild species are concomitantly exposed to a variety of chemical and environmental stressors, potentially rendering them more susceptible to chemical stress. On the other hand, wild populations are likely more genetically diverse than laboratory populations, making wild populations, as a whole, less sensitive to chemical exposure than laboratory populations. The uncertainties associated with the ESLs tend to lead to an overestimation of potential risk.

3.4 Population Area Use Factors

In addition to the direct comparison of the EPC with the ESLs, area use factors are used to account for the amount of time that a receptor is likely to spend within the contaminated area based on the size of the receptor’s home range (HR). EPA guidance is to manage the ecological risk to populations rather than to individuals, with the exception of threatened and endangered species (EPA 1999, 070086). One approach to addressing the potential effects on populations is

to estimate the spatial extent of the area inhabited by the local population that overlaps with the contaminated area. The population area for each receptor is based on the individual receptor home range and its dispersal distance (Bowman et al. 2002, 073475). Bowman et al. (2002, 073475) estimate that the median dispersal distance for mammals is 7 times the linear dimension of the HR (i.e., the square root of the HR area). If only the dispersal distances for the mammals with HRs within the range of the screening receptors are used, the median dispersal distance becomes 3.6 times the square root of the HR ($R^2 = 0.91$) (Bowman et al. 2002, 073475). If it is assumed that the receptors can disperse over the same distance in any direction, the population area is circular and the dispersal distance is the radius of the circle. Therefore, the population area for each receptor can be derived by $\pi(3.6\sqrt{HR})^2$ or approximately 40HR.

The population area use factor (PAUF) is calculated by dividing the site area by the population area of the receptor (Table 5). The site area of the Open Burning Treatment Units (TA-16-388 and TA-16-399) is approximately 2.6 ha. The HQs for each receptor are adjusted by multiplying by the PAUFs. If the PAUF is greater than 1, the HQs are not adjusted for that receptor. The HQ for the earthworm is not adjusted by a PAUF because this receptor does not have an HR. The adjusted HQs for the maximum concentration and the mean concentration are presented in Table 6.

The adjusted HQs based on the maximum TCDD equivalent concentration are less than 1.0 for the earthworm, cottontail, and red fox (Table 6). The adjusted HQs based on the mean TCDD equivalent concentration are less than 1.0 for the earthworm, cottontail, and red fox (Table 6).

The adjusted HQ of the mean TCDD concentration (1.4) for the shrew is equivalent to 1, while the adjusted HQ of the mean TCDD concentration (3.6) for the deer mouse is slightly above 3 (Table 6). The adjusted HQ of the maximum detected concentration (6.2) for the shrew is above 1.0, but less than 10, and is above 10 for the deer mouse (15.7) (Table 6). Dourson and Stara (1983, 073474) conducted a study of uncertainty factors incorporated in calculating ESLs for ecological receptors. Based on their study, the LOAEL to NOAEL adjustment indicates that HIs up to 10 may not adversely affect ecological receptors. To maintain conservatism, they state that HIs less than 3 do not adversely affect ecological receptors. Therefore, the adjusted HQs using the mean concentrations for the shrew and deer mouse do not indicate potential risks to these receptors across the site. The adjusted HQ using the maximum concentration for the shrew also does not indicate a potential risk. The adjusted HQ using the maximum concentration for the deer mouse is above 10 but as indicated below studies have found no effects to small mammal populations at similar concentrations in the canyons.

Biota investigations have been conducted in canyon reaches in Los Alamos/Pueblo Canyon (LANL 2004, 087390), Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279), and Pajarito Canyon (LANL 2008, 104909). Field and laboratory studies included collection and analysis of soil, sediment, and water samples; cavity-nesting bird monitoring and analysis of eggs; small mammal trapping and analysis of whole organisms; earthworm bioaccumulation tests—measures of growth and survival, and analysis of whole organisms; and seedling germination tests. The studies found no effects from exposure to TCDD in any of the canyon reaches.

The TCDD equivalent concentrations reported in Kraig et al. (2002, 085536, Table 5 and Table A-6) ranged from 4.7×10^{-7} mg/kg to 3.5×10^{-6} mg/kg in samples from lower Los Alamos Canyon. These levels are similar to the TCDD concentrations in Los Alamos and Pueblo Canyons (LANL 2005, 091818); the range of concentrations is 1.71×10^{-10} mg/kg to 4.96×10^{-6} mg/kg. Dioxins and furans, therefore, appear to be present throughout the Los Alamos and Pueblo Canyons

watershed at levels exceeding the screening levels for small mammals. The field studies conducted in this watershed included four locations where small-mammal populations were evaluated, and two small-mammal study areas were in the Pueblo Canyon watershed (reaches AC-3 and P-3W). No difference in population density, sex ratio, or reproductive classes was noted between these small-mammal study areas (LANL 2004, 087390). Because adverse ecological effects to mammals were not identified by the ecological risk assessment, the assessment implicitly demonstrated that there are no adverse ecological effects from dioxins and furans. In addition, similar concentrations were detected in Pajarito Canyon (dioxins and furans were not analyzed for in Mortandad Canyon) as part of the canyon investigation and no adverse effects were reported (LANL 2008, 104909).

The mean site concentration for TCDD is 2.41×10^{-6} mg/kg and falls within the range of concentrations detected in Los Alamos, Pueblo, and Pajarito Canyons. Because no adverse ecological effects to mammals were identified following small mammal trapping and analysis of whole organisms in these canyons at similar concentrations, no adverse ecological effects are present within the Open Burning Treatment Units (TA-16-388 and TA-16-399).

4.0 Conclusions

No potential ecological risks were found for any receptor following evaluations based on HQ analysis, potential effects to populations, and comparisons to previous field and laboratory study results conducted in the canyons. These lines of evidence support the conclusion that there is no potential ecological risk within the Open Burning Treatment Units (TA-16-388 and TA-16-399) from dioxins and furans.

5.0 References

Bowman, J., J.A.G. Jaeger, and L. Fahrig, 2002. “Dispersal Distance of Mammals is Proportional to Home Range Size,” *Ecology,* Vol. 83, No. 7, pp. 2049-2055. (Bowman et al. 2002, 073475)

Dourson, M.L., and J.F. Stara, 1983. “Regulatory History and Experimental Support of Uncertainty (Safety) Factors,” Regulatory Toxicology and Pharmacology, Vol. 3, pp. 224–238. (Dourson and Stara 1983, 073474)

EPA (U.S. Environmental Protection Agency), December 1993. “Wildlife Exposure Factors Handbook,” Vol. I of II, EPA/600/R-93/187a, Office of Research and Development, Washington, D.C. (EPA 1993, 059384)

EPA (U.S. Environmental Protection Agency), June 5, 1997. “Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final,” Office of Emergency and Remedial Response, Washington, D.C. (EPA 1997, 059370)

EPA (U.S. Environmental Protection Agency), April 1998. “Guidelines for Ecological Risk Assessment,” EPA/630/R-95/002F, Risk Assessment Forum, Washington, D.C. (EPA 1998, 062809)

EPA (U.S. Environmental Protection Agency), October 7, 1999. “Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites,” OSWER Directive No. 9285.7-28 P, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 1999, 070086)

Kraig, D., Ryti, R., Katzman, D., Buhl, T., Gallaher, B., and Fresquez, P., March 2002. "Radiological and Nonradiological Effects after the Cerro Grande Fire," Los Alamos National Laboratory document LA-13914, Los Alamos, New Mexico. (Kraig et al. 2002, 085536)

LANL (Los Alamos National Laboratory), June 1999. “General Assessment Endpoints for Ecological Risk Assessment at Los Alamos National Laboratory,” report prepared for Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1999, 064137)

LANL (Los Alamos National Laboratory), April 2004. “Los Alamos and Pueblo Canyons Investigation Report,” Los Alamos National Laboratory document LA-UR-04-2714, Los Alamos, New Mexico. (LANL 2004, 087390)

LANL (Los Alamos National Laboratory), December 2004. “Screening-Level Ecological Risk Assessment Methods, Revision 2,” Los Alamos National Laboratory document LA-UR-04-8246, Los Alamos, New Mexico. (LANL 2004, 087630)

LANL (Los Alamos National Laboratory), December 2005. “Los Alamos and Pueblo Canyons Supplemental Investigation Report,” Los Alamos National Laboratory document LA-UR-05-9230, Los Alamos, New Mexico. (LANL 2005, 091818)

LANL (Los Alamos National Laboratory), September 2008. “Pajarito Canyon Investigation Report,” Los Alamos National Laboratory document LA-UR-08-5852, Los Alamos, New Mexico. (LANL 2008, 104909)

LANL (Los Alamos National Laboratory), October 2008. “Ecorisk Database (Release 2.3),” on CD, LA-UR-08-6673, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2008, 103352)

Table 1
Ecological Screening Levels for Terrestrial Receptors

Analyte	Carnivorous Kestrel	Omnivorous Kestrel	Herbivorous Robin	Omnivorous Robin	Insectivorous Robin	Red fox	Cottontail	Shrew	Deer Mouse	Earthworm	Plant
TCDD	na*	na	na	na	na	0.0000012	0.000048	0.00000029	0.00000058	5	na

Table 2
Dioxin and Furan Congener Concentrations in Samples Collected

Congener	Sample 09RCRA460 (mg/kg)	Sample 09RCRA461 (mg/kg)	Sample 09RCRA463 (mg/kg)	Sample 09RCRA464 (mg/kg)	Sample 09RCRA465 (mg/kg)
2,3,7,8-TCDD	Not detected	Not detected	Not detected	Not detected	Not detected
1,2,3,7,8-PeCDD	Not detected	Not detected	Not detected	Not detected	1.92E-06
1,2,3,4,7,8-HxCDD	4.19E-07	Not detected	Not detected	Not detected	5.38E-06
1,2,3,6,7,8-HxCDD	7.15E-07	Not detected	Not detected	Not detected	1.06E-05
1,2,3,7,8,9-HxCDD	7.26E-07	Not detected	Not detected	Not detected	1.14E-05
1,2,3,4,6,7,8,-HpCDD	2.08E-05	4.22E-06	4.41E-06	1.08E-05	2.92E-04
OCDD	1.41E-04	2.07E-05	2.70E-05	3.22E-05	1.55E-03
2,3,7,8-TCDF	1.83E-07	Not detected	Not detected	Not detected	2.01E-07
1,2,3,7,8-PeCDF	Not detected	Not detected	Not detected	Not detected	Not detected
2,3,4,7,8-PeCDF	Not detected	Not detected	Not detected	6.33E-07	7.15E-07
1,2,3,4,7,8-HxCDF	4.95E-07	Not detected	Not detected	7.30E-07	3.21E-06
1,2,3,6,7,8-HXCDF	5.39E-07	Not detected	Not detected	1.02E-06	3.96E-06
2,3,4,6,7,8-HxCDF	7.23E-07	Not detected	Not detected	1.09E-06	5.33E-06
1,2,3,7,8,9-HxCDF	Not detected	Not detected	Not detected	Not detected	Not detected
1,2,3,4,6,7,8-HpCDF	1.04E-05	1.63E-06	1.20E-06	5.09E-06	8.44E-05
1,2,3,4,7,8,9-HpCDF	5.35E-07	Not detected	Not detected	1.38E-06	5.95E-06
OCDF	1.77E-05	2.54E-06	2.83E-06	1.07E-05	1.87E-04

Table 3
Dioxin and Furan Congener Concentrations Converted Using the Toxicity Equivalency Factors

Congener	TEFs	Sample 09RCRA460 (mg/kg)	Sample 09RCRA461 (mg/kg)	Sample 09RCRA463 (mg/kg)	Sample 09RCRA464 (mg/kg)	Sample 09RCRA465 (mg/kg)
2,3,7,8-TCDD	1.00E+00	Not detected	Not detected	Not detected	Not detected	Not detected
1,2,3,7,8-PeCDD	1.00E+00	Not detected	Not detected	Not detected	Not detected	1.92E-06
1,2,3,4,7,8-HxCDD	1.00E-01	4.19E-08	Not detected	Not detected	Not detected	5.38E-07
1,2,3,6,7,8-HxCDD	1.00E-01	7.15E-08	Not detected	Not detected	Not detected	1.06E-06
1,2,3,7,8,9-HxCDD	1.00E-01	7.26E-08	Not detected	Not detected	Not detected	1.14E-06
1,2,3,4,6,7,8,-HpCDD	1.00E-02	2.08E-07	4.22E-08	4.41E-08	1.08E-07	2.92E-06
OCDD	3.00E-04	4.23E-08	6.21E-09	8.10E-09	9.66E-09	4.65E-07
2,3,7,8-TCDF	1.00E-01	1.83E-08	Not detected	Not detected	Not detected	2.01E-08
1,2,3,7,8-PeCDF	3.00E-02	Not detected	Not detected	Not detected	Not detected	Not detected
2,3,4,7,8-PeCDF	3.00E-01	Not detected	Not detected	Not detected	1.90E-07	2.15E-07
1,2,3,4,7,8-HxCDF	1.00E-01	4.95E-08	Not detected	Not detected	7.30E-08	3.21E-07
1,2,3,6,7,8-HXCDF	1.00E-01	5.39E-08	Not detected	Not detected	1.02E-07	3.96E-07
2,3,4,6,7,8-HxCDF	1.00E-01	7.23E-08	Not detected	Not detected	1.09E-07	5.33E-07
1,2,3,7,8,9-HxCDF	1.00E-01	Not detected	Not detected	Not detected	Not detected	Not detected
1,2,3,4,6,7,8-HpCDF	1.00E-02	1.04E-07	1.63E-08	1.20E-08	5.09E-08	8.44E-07
1,2,3,4,7,8,9-HpCDF	1.00E-02	5.35E-09	Not detected	Not detected	1.38E-08	5.95E-08
OCDF	3.00E-04	5.31E-09	7.62E-10	8.49E-10	3.21E-09	5.61E-08
Toxicity Equivalent Concentrations		**7.45E-07**	**6.48E-08**	**6.50E-08**	**6.60E-07**	**1.05E-05**

Table 4
Hazard Quotient Analysis

COPECs	EPC (mg/kg)	Carnivorous Kestrel	Omnivorous Kestrel	Herbivorous Robin	Omnivorous Robin	Insectivorous Robin	Red fox	Cottontail	Shrew	Deer Mouse	Earthworm	Plant
TCDD equivalent concentration (maximum)	1.05E-05	na*	na	na	na	na	**8.8**	0.2	**36.2**	**18.1**	0.000002	na
TCDD equivalent concentration (mean)	2.41E-06	na	na	na	na	na	**2.0**	0.05	**8.3**	**4.1**	0.0000005	na

Note: Bolded values indicate HQs greater than 1.0.

* na = Not available.

Table 5
PAUFs for Ecological Receptors

Receptor	Home Range[a] (ha)	Population Area[b] (ha)	PAUF[c]
Deer mouse	0.077	3.0	0.87
Desert cottontail	3.1	124	0.02
Montane shrew	0.39	15.6	0.17
Red fox	1038	41,520	0.00006

[a] Values from EPA 1993, 059384.

[b] Derived by 40HR.

[c] PAUF is calculated as the area of the site (2.6 ha) divided by the population area.

Table 6
Adjusted Hazard Quotient Analysis

COPECs	EPC (mg/kg)	Carnivorous Kestrel	Omnivorous Kestrel	Herbivorous Robin	Omnivorous Robin	Insectivorous Robin	Red fox	Cottontail	Shrew	Deer Mouse	Earthworm	Plant
TCDD equivalent concentration (maximum)	1.05E-05	na[a]	na	na	na	na	0.0005	0.004	**6.2**	**15.7**	0.000002[b]	na
TCDD equivalent concentration (mean)	2.41E-06	na	na	na	na	na	0.0001	0.001	**1.4**	**3.6**	0.0000005[b]	na

Note: Bolded values indicate HQs greater than 1.0.

[a] na = Not available.

[b] Earthworm HQ not adjusted.

PROJECT NAME _____ NOTEBOOK NO. _____

DATE: 6-8-09
TIME: 2:00
RFA# 2152

COST CODE: JUHD
PROGRAM CODE: 4000
COST ACCOUNT: 0000

PROJECT NAME:
PROJECT LOCATION: TA-16-Vigil-Holtermann
COLLECTORS NAME: TA-16-Burn ground
POSSIBLE SAMPLE HAZARD(S): Dustie Rick
ATTENDEES: Ash, soil, weeds
Connie Gerth, Elmer Velasquez, Lucianna Vigil-Holtem
WEATHER CONDITIONS 5 DAY JAT
SAMPLE HISTORY: SEE ATTACHED MAP for location markers
Less - Calm
2' diameter multi-increment from center of flag marker ~ 1 : 2" depth

#1 09RCRA460 soil dioxins/furans 250ml amber g
SAMPLE NO. SAMPLE TYPE ANALYSIS VOLUME:
#2 09RCRA461 2:10 soil dioxans/furans 250ml c
west of 388 - normal weeds, flowers (roses wild)
#3 09RCRA462 soil dioxan/furans 250ml a
(2:29) top of hill SW of 388. Burned or charred tree, visible charring on rocks : weed D.R. soil
#4 09RCRA463 soil dioxans/furans 250ml
2:30 charred trees around, soil from partial drain area, some soil DR pooling areas in multi-increment sample
#5 09RCRA464 soil dioxans/furans 250ml a
2:40 - beside SE of 388 - normal vegetation - soft soil
#6 09RCRA465 258 soil dioxans/furans 250ml
East of fenced area on soil shelf normal plants

6-8-09
D.R.

SIGNATURE _____ DATE _____ 20
READ AND UNDERSTOOD _____ DATE _____ 20

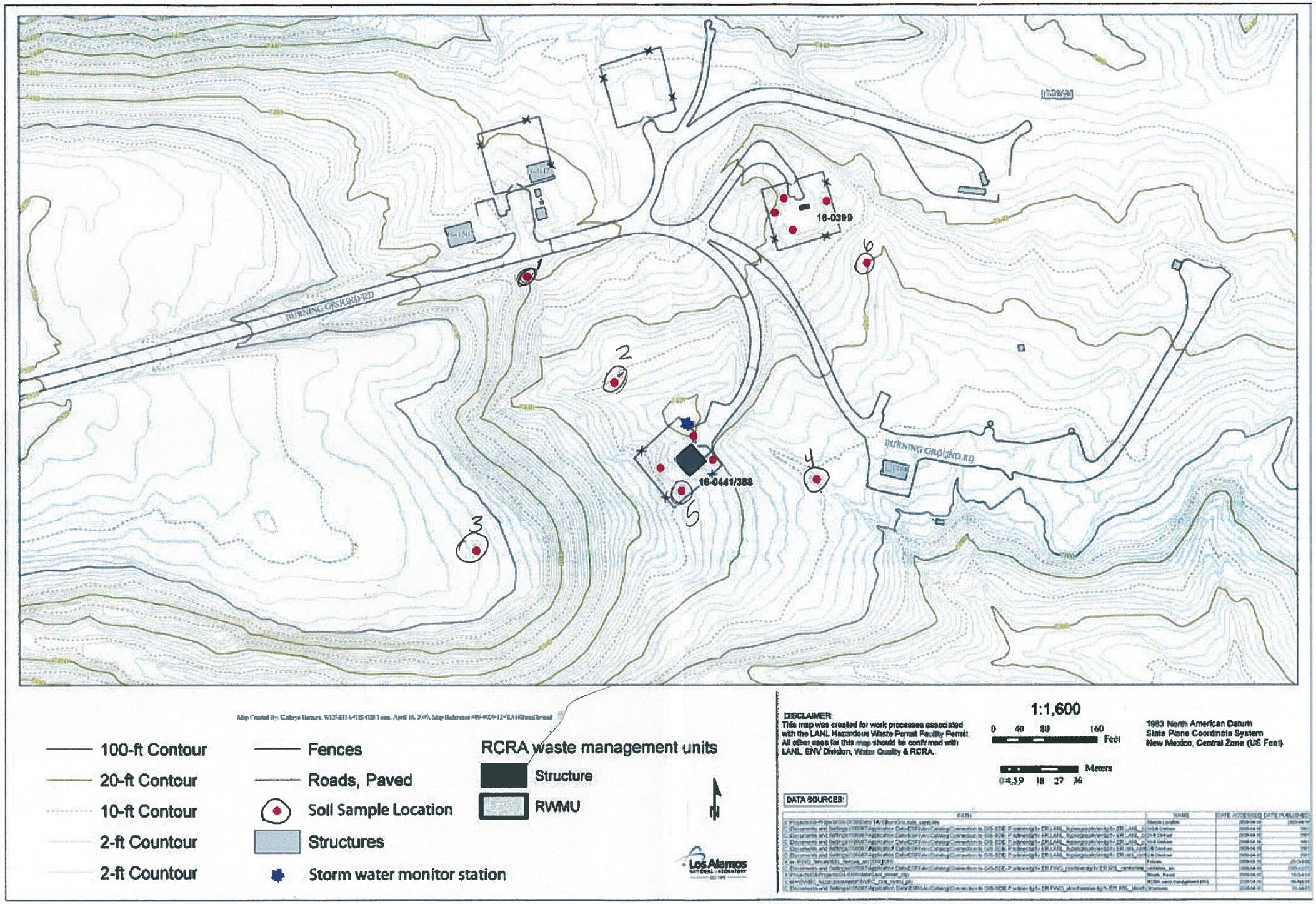

Figure 17: Technical Area 16 Baseline Soil Sample Locations and Location of Surface Water Monitoring Station for Open Burning Treatment Units (TA-16-388 and TA-16-399)

Method Blank **EPA Method 8290**

Matrix:	Soil	QC Batch No.:	2170	Lab Sample:	0-MB001
Sample Size:	10.0 g	Date Extracted:	11-Jun-09	Date Analyzed DB-5:	12-Jun-09
				Date Analyzed DB-225:	NA

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	Qualifiers
2,3,7,8-TCDD	ND	0.102		
1,2,3,7,8-PeCDD	ND	0.215		
1,2,3,4,7,8-HxCDD	ND	0.181		
1,2,3,6,7,8-HxCDD	ND	0.182		
1,2,3,7,8,9-HxCDD	ND	0.170		
1,2,3,4,6,7,8-HpCDD	ND	0.254		
OCDD	ND	0.209		
2,3,7,8-TCDF	ND	0.139		
1,2,3,7,8-PeCDF	ND	0.170		
2,3,4,7,8-PeCDF	ND	0.187		
1,2,3,4,7,8-HxCDF	ND	0.0633		
1,2,3,6,7,8-HxCDF	ND	0.0633		
2,3,4,6,7,8-HxCDF	ND	0.0686		
1,2,3,7,8,9-HxCDF	ND	0.0847		
1,2,3,4,6,7,8-HpCDF	ND	0.143		
1,2,3,4,7,8,9-HpCDF	ND	0.165		
OCDF	ND	0.180		

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	103	40 - 135	
	13C-1,2,3,7,8-PeCDD	101	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	98.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	87.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	105	40 - 135	
	13C-OCDD	96.0	40 - 135	
	13C-2,3,7,8-TCDF	101	40 - 135	
	13C-1,2,3,7,8-PeCDF	107	40 - 135	
	13C-2,3,4,7,8-PeCDF	97.6	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	82.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	75.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	77.3	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	79.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	75.6	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	86.0	40 - 135	
	13C-OCDF	81.0	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	98.1	40 - 135	

Totals		
Total TCDD	ND	0.102
Total PeCDD	ND	0.215
Total HxCDD	ND	0.178
Total HpCDD	ND	0.254
Total TCDF	ND	0.139
Total PeCDF	ND	0.178
Total HxCDF	ND	0.0695
Total HpCDF	ND	0.153

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 0

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).
The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: JMH

Approved By: Melanee A. Schuld 15-Jun-2009 14:22

OPR Results **EPA Method 8290**

Matrix:	Soil	QC Batch No.:	2170	Lab Sample:	0-OPR001		
Sample Size:	10.0 g	Date Extracted:	11-Jun-09	Date Analyzed DB-5:	12-Jun-09	Date Analyzed DB-225:	NA

Analyte	Spike Conc.	Conc. (ng/mL)	OPR Limits		Labeled Standard	%R	LCL-UCL	Qualifier
2,3,7,8-TCDD	10.0	8.26	7 - 13	IS	13C-2,3,7,8-TCDD	102	40 - 135	
1,2,3,7,8-PeCDD	50.0	37.1	35 - 65		13C-1,2,3,7,8-PeCDD	107	40 - 135	
1,2,3,4,7,8-HxCDD	50.0	39.9	35 - 65		13C-1,2,3,4,7,8-HxCDD	99.9	40 - 135	
1,2,3,6,7,8-HxCDD	50.0	40.8	35 - 65		13C-1,2,3,6,7,8-HxCDD	87.9	40 - 135	
1,2,3,7,8,9-HxCDD	50.0	40.7	35 - 65		13C-1,2,3,4,6,7,8-HpCDD	105	40 - 135	
1,2,3,4,6,7,8-HpCDD	50.0	42.1	35 - 65		13C-OCDD	96.9	40 - 135	
OCDD	100	84.2	70 - 130		13C-2,3,7,8-TCDF	102	40 - 135	
2,3,7,8-TCDF	10.0	8.63	7 - 13		13C-1,2,3,7,8-PeCDF	105	40 - 135	
1,2,3,7,8-PeCDF	50.0	41.4	35 - 65		13C-2,3,4,7,8-PeCDF	103	40 - 135	
2,3,4,7,8-PeCDF	50.0	42.7	35 - 65		13C-1,2,3,4,7,8-HxCDF	83.0	40 - 135	
1,2,3,4,7,8-HxCDF	50.0	42.0	35 - 65		13C-1,2,3,6,7,8-HxCDF	77.0	40 - 135	
1,2,3,6,7,8-HxCDF	50.0	40.8	35 - 65		13C-2,3,4,6,7,8-HxCDF	77.3	40 - 135	
2,3,4,6,7,8-HxCDF	50.0	42.2	35 - 65		13C-1,2,3,7,8,9-HxCDF	79.2	40 - 135	
1,2,3,7,8,9-HxCDF	50.0	41.7	35 - 65		13C-1,2,3,4,6,7,8-HpCDF	75.8	40 - 135	
1,2,3,4,6,7,8-HpCDF	50.0	43.2	35 - 65		13C-1,2,3,4,7,8,9-HpCDF	85.5	40 - 135	
1,2,3,4,7,8,9-HpCDF	50.0	42.4	35 - 65		13C-OCDF	83.7	40 - 135	
OCDF	100	82.7	70 - 130	CRS	37Cl-2,3,7,8-TCDD	96.7	40 - 135	

Analyst: JMH

Approved By: Melanee A. Schuld 15-Jun-2009 14:22

Sample ID: 09RCRA460 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	Los Alamos National Laboratory	Matrix:	Soil	Lab Sample:	31763-001	Date Received:	10-Jun-09
Project:	TA-16-Vigil-Hotterman	Sample Size:	10.5 g	QC Batch No.:	2170	Date Extracted:	11-Jun-09
Date Collected:	8-Jun-09	%Solids:	96.3	Date Analyzed DB-5:	12-Jun-09	Date Analyzed DB-225:	NA
Time Collected:	1400						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.132		
1,2,3,7,8-PeCDD	ND	0.223		
1,2,3,4,7,8-HxCDD	0.419			J
1,2,3,6,7,8-HxCDD	0.715			J
1,2,3,7,8,9-HxCDD	0.726			J
1,2,3,4,6,7,8-HpCDD	20.8			
OCDD	141			
2,3,7,8-TCDF	0.183			J
1,2,3,7,8-PeCDF	ND	0.149		
2,3,4,7,8-PeCDF	ND		0.295	
1,2,3,4,7,8-HxCDF	0.495			J
1,2,3,6,7,8-HxCDF	0.539			J
2,3,4,6,7,8-HxCDF	0.723			J
1,2,3,7,8,9-HxCDF	ND	0.0787		
1,2,3,4,6,7,8-HpCDF	10.4			
1,2,3,4,7,8,9-HpCDF	0.535			J
OCDF	17.7			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	102	40 - 135	
	13C-1,2,3,7,8-PeCDD	109	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	97.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	83.7	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	97.7	40 - 135	
	13C-OCDD	94.3	40 - 135	
	13C-2,3,7,8-TCDF	102	40 - 135	
	13C-1,2,3,7,8-PeCDF	112	40 - 135	
	13C-2,3,4,7,8-PeCDF	108	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	78.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	72.8	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	72.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	78.5	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	75.3	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	82.4	40 - 135	
	13C-OCDF	81.5	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	94.8	40 - 135	

Totals	
Total TCDD	0.349
Total PeCDD	0.661
Total HxCDD	9.99
Total HpCDD	46.9
Total TCDF	1.75
Total PeCDF	3.83
Total HxCDF	9.99
Total HpCDF	18.5

Toxic Equivalent Quotient (TEQ) Data [e]	
TEQ (Min):	0.856

a. Sample specific estimated detection limit.
b. Estimated maximum possible concentration.
c. Method detection limit.
d. Lower control limit - upper control limit.
e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).
The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: JMH

Approved By: Rose Harrelson 15-Jun-2009 15:09

Sample ID: 09RCRA461 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	Los Alamos National Laboratory	Matrix:	Soil	Lab Sample:	31763-002	Date Received:	10-Jun-09
Project:	TA-16-Vigil-Hotterman	Sample Size:	10.4 g	QC Batch No.:	2170	Date Extracted:	11-Jun-09
Date Collected:	8-Jun-09	%Solids:	97.6	Date Analyzed DB-5:	12-Jun-09	Date Analyzed DB-225:	NA
Time Collected:	1416						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.119		
1,2,3,7,8-PeCDD	ND	0.190		
1,2,3,4,7,8-HxCDD	ND	0.356		
1,2,3,6,7,8-HxCDD	ND	0.372		
1,2,3,7,8,9-HxCDD	ND	0.342		
1,2,3,4,6,7,8-HpCDD	4.22			
OCDD	20.7			
2,3,7,8-TCDF	ND	0.153		
1,2,3,7,8-PeCDF	ND	0.223		
2,3,4,7,8-PeCDF	ND	0.214		
1,2,3,4,7,8-HxCDF	ND	0.0919		
1,2,3,6,7,8-HxCDF	ND	0.0922		
2,3,4,6,7,8-HxCDF	ND	0.105		
1,2,3,7,8,9-HxCDF	ND	0.126		
1,2,3,4,6,7,8-HpCDF	1.63			J
1,2,3,4,7,8,9-HpCDF	ND	0.177		
OCDF	2.54			J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	97.5	40 - 135	
	13C-1,2,3,7,8-PeCDD	104	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	94.7	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	84.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	95.2	40 - 135	
	13C-OCDD	92.7	40 - 135	
	13C-2,3,7,8-TCDF	97.7	40 - 135	
	13C-1,2,3,7,8-PeCDF	104	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	80.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	72.4	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	73.4	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	75.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	71.6	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	78.4	40 - 135	
	13C-OCDF	75.9	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	95.9	40 - 135	

Totals			
Total TCDD	0.547		
Total PeCDD	ND	0.190	
Total HxCDD	1.59		
Total HpCDD	8.18		
Total TCDF	ND		0.272
Total PeCDF	ND		0.246
Total HxCDF	0.985		1.15
Total HpCDF	1.63		2.59

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **0.0817**

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: JMH

Approved By: Melanee A. Schuld 15-Jun-2009 14:22

Sample ID: 09RCRA462 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	Los Alamos National Laboratory	Matrix:	Soil	Lab Sample:	31763-003	Date Received:	10-Jun-09
Project:	TA-16-Vigil-Hotterman	Sample Size:	10.7 g	QC Batch No.:	2170	Date Extracted:	11-Jun-09
Date Collected:	8-Jun-09	%Solids:	93.8	Date Analyzed DB-5:	12-Jun-09	Date Analyzed DB-225:	NA
Time Collected:	1429						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.0909		
1,2,3,7,8-PeCDD	ND	0.213		
1,2,3,4,7,8-HxCDD	ND	0.375		
1,2,3,6,7,8-HxCDD	ND	0.369		
1,2,3,7,8,9-HxCDD	ND	0.349		
1,2,3,4,6,7,8-HpCDD	1.83			J
OCDD	12.2			
2,3,7,8-TCDF	ND	0.141		
1,2,3,7,8-PeCDF	ND	0.163		
2,3,4,7,8-PeCDF	ND	0.163		
1,2,3,4,7,8-HxCDF	ND	0.114		
1,2,3,6,7,8-HxCDF	ND	0.116		
2,3,4,6,7,8-HxCDF	ND	0.123		
1,2,3,7,8,9-HxCDF	ND	0.157		
1,2,3,4,6,7,8-HpCDF	0.631			J
1,2,3,4,7,8,9-HpCDF	ND	0.142		
OCDF	1.17			J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	99.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	105	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	94.8	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	85.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	96.9	40 - 135	
	13C-OCDD	95.1	40 - 135	
	13C-2,3,7,8-TCDF	98.7	40 - 135	
	13C-1,2,3,7,8-PeCDF	106	40 - 135	
	13C-2,3,4,7,8-PeCDF	106	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	79.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	72.8	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	72.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	74.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	76.0	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	80.0	40 - 135	
	13C-OCDF	79.8	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	92.6	40 - 135	

Totals			
Total TCDD	0.761		
Total PeCDD	ND	0.213	
Total HxCDD	ND	0.364	
Total HpCDD	4.28		
Total TCDF	0.297		0.408
Total PeCDF	ND	0.163	
Total HxCDF	ND		0.291
Total HpCDF	1.15		

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 0.0380

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: JMH

Approved By: Melanee A. Schuld 15-Jun-2009 14:22

Sample ID: 09RCRA463 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	Los Alamos National Laboratory	Matrix:	Soil	Lab Sample:	31763-004	Date Received:	10-Jun-09
Project:	TA-16-Vigil-Hotterman	Sample Size:	10.5 g	QC Batch No.:	2170	Date Extracted:	11-Jun-09
Date Collected:	8-Jun-09	%Solids:	96.9	Date Analyzed DB-5:	12-Jun-09	Date Analyzed DB-225:	NA
Time Collected:	1438						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.115		
1,2,3,7,8-PeCDD	ND	0.244		
1,2,3,4,7,8-HxCDD	ND	0.362		
1,2,3,6,7,8-HxCDD	ND	0.369		
1,2,3,7,8,9-HxCDD	ND	0.343		
1,2,3,4,6,7,8-HpCDD	4.41			
OCDD	27.0			
2,3,7,8-TCDF	ND	0.154		
1,2,3,7,8-PeCDF	ND	0.142		
2,3,4,7,8-PeCDF	ND	0.146		
1,2,3,4,7,8-HxCDF	ND	0.120		
1,2,3,6,7,8-HxCDF	ND	0.120		
2,3,4,6,7,8-HxCDF	ND	0.136		
1,2,3,7,8,9-HxCDF	ND	0.163		
1,2,3,4,6,7,8-HpCDF	1.20			J
1,2,3,4,7,8,9-HpCDF	ND	0.155		
OCDF	2.83			J

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	96.7	40 - 135	
	13C-1,2,3,7,8-PeCDD	103	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	91.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	80.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	92.1	40 - 135	
	13C-OCDD	91.0	40 - 135	
	13C-2,3,7,8-TCDF	94.9	40 - 135	
	13C-1,2,3,7,8-PeCDF	101	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	75.6	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	68.8	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	69.6	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	73.3	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	71.8	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	77.6	40 - 135	
	13C-OCDF	77.1	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	95.9	40 - 135	

Totals			
Total TCDD	ND	0.115	
Total PeCDD	ND	0.244	
Total HxCDD	0.637		1.14
Total HpCDD	10.1		
Total TCDF	ND	0.154	
Total PeCDF	ND	0.144	
Total HxCDF	0.609		
Total HpCDF	2.73		

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): **0.0859**

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: JMH

Approved By: Melanee A. Schuld 15-Jun-2009 14:22

Sample ID: 09RCRA464 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	Los Alamos National Laboratory	Matrix:	Soil	Lab Sample:	31763-005	Date Received:	10-Jun-09
Project:	TA-16-Vigil-Hotterman	Sample Size:	11.4 g	QC Batch No.:	2170	Date Extracted:	11-Jun-09
Date Collected:	8-Jun-09	%Solids:	89.8	Date Analyzed DB-5:	12-Jun-09	Date Analyzed DB-225:	NA
Time Collected:	1440						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND	0.0914		
1,2,3,7,8-PeCDD	ND	0.176		
1,2,3,4,7,8-HxCDD	ND	0.621		
1,2,3,6,7,8-HxCDD	ND	0.630		
1,2,3,7,8,9-HxCDD	ND	0.587		
1,2,3,4,6,7,8-HpCDD	10.8			
OCDD	32.2			
2,3,7,8-TCDF	ND		0.144	
1,2,3,7,8-PeCDF	ND		0.222	
2,3,4,7,8-PeCDF	0.633			J
1,2,3,4,7,8-HxCDF	0.730			J
1,2,3,6,7,8-HxCDF	1.02			J
2,3,4,6,7,8-HxCDF	1.09			J
1,2,3,7,8,9-HxCDF	ND	0.194		
1,2,3,4,6,7,8-HpCDF	5.09			
1,2,3,4,7,8,9-HpCDF	1.38			J
OCDF	10.7			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	95.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	90.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	79.2	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	95.1	40 - 135	
	13C-OCDD	87.3	40 - 135	
	13C-2,3,7,8-TCDF	95.4	40 - 135	
	13C-1,2,3,7,8-PeCDF	97.8	40 - 135	
	13C-2,3,4,7,8-PeCDF	99.0	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	70.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	65.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	70.8	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	76.6	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	68.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	81.3	40 - 135	
	13C-OCDF	76.5	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	89.8	40 - 135	

Totals		
Total TCDD	0.275	0.583
Total PeCDD	ND	0.775
Total HxCDD	4.65	
Total HpCDD	37.9	
Total TCDF	5.73	7.76
Total PeCDF	5.50	9.58
Total HxCDF	9.87	10.9
Total HpCDF	11.6	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 0.816

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: JMH

Approved By: Melanee A. Schuld 15-Jun-2009 14:22

Sample ID: 09RCRA465 **EPA Method 8290**

Client Data		Sample Data		Laboratory Data			
Name:	Los Alamos National Laboratory	Matrix:	Soil	Lab Sample:	31763-006	Date Received:	10-Jun-09
Project:	TA-16-Vigil-Hotterman	Sample Size:	11.0 g	QC Batch No.:	2170	Date Extracted:	11-Jun-09
Date Collected:	8-Jun-09	%Solids:	92.8	Date Analyzed DB-5:	13-Jun-09	Date Analyzed DB-225:	NA
Time Collected:	1458						

Analyte	Conc. (pg/g)	DL [a]	EMPC[b]	Qualifiers
2,3,7,8-TCDD	ND		0.325	
1,2,3,7,8-PeCDD	1.92			J
1,2,3,4,7,8-HxCDD	5.38			
1,2,3,6,7,8-HxCDD	10.6			
1,2,3,7,8,9-HxCDD	11.4			
1,2,3,4,6,7,8-HpCDD	292			
OCDD	1550			
2,3,7,8-TCDF	0.201			J
1,2,3,7,8-PeCDF	ND		0.366	
2,3,4,7,8-PeCDF	0.715			J
1,2,3,4,7,8-HxCDF	3.21			
1,2,3,6,7,8-HxCDF	3.96			
2,3,4,6,7,8-HxCDF	5.33			
1,2,3,7,8,9-HxCDF	ND	0.253		
1,2,3,4,6,7,8-HpCDF	84.4			
1,2,3,4,7,8,9-HpCDF	5.95			
OCDF	187			

	Labeled Standard	%R	LCL-UCL[d]	Qualifiers
IS	13C-2,3,7,8-TCDD	96.1	40 - 135	
	13C-1,2,3,7,8-PeCDD	105	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	94.3	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	81.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	96.6	40 - 135	
	13C-OCDD	96.5	40 - 135	
	13C-2,3,7,8-TCDF	94.2	40 - 135	
	13C-1,2,3,7,8-PeCDF	102	40 - 135	
	13C-2,3,4,7,8-PeCDF	102	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	76.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	71.9	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	71.2	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	80.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	73.5	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	81.1	40 - 135	
	13C-OCDF	84.7	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	91.1	40 - 135	

Totals		
Total TCDD	2.32	3.26
Total PeCDD	12.9	13.2
Total HxCDD	93.2	
Total HpCDD	501	
Total TCDF	4.95	5.31
Total PeCDF	18.1	19.4
Total HxCDF	79.3	
Total HpCDF	189	

Toxic Equivalent Quotient (TEQ) Data [e]

TEQ (Min): 10.9

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. TEQ based on (1989) International Toxic Equivalent Factors (ITEF).

The results are reported in dry weight. The sample size is reported in wet weight.

Analyst: JMH

Approved By: Melanee A. Schuld 15-Jun-2009 14:22

Enclosure 2
LA-UR-08-07027

Los Alamos NATIONAL LABORATORY	WEAPONS ENGINEERING TECHNOLOGY **Safe Operating Procedure**	
	Rev: A	
Title: 18.0.0 - Treatment of HE, HE Machining Waste and HE-Contaminated Waste at TA16-388, The Flash Pad		

1.0 SCOPE

High explosives (HE), HE machining wastes, and wastes contaminated with HE are treated at the TA-16-388 Flash Pad to remove the reactive characteristic of HE (Environmental Protection Agency Hazardous Waste Number D003). This procedure covers the treatment operations and required inspections and notifications.

2.0 LOCATION

The TA-16-388 Flash Pad is located at the S-Site Burning Grounds.

3.0 LIMITS

3.1 Personnel

A minimum of 2 and maximum of 4 people can be present during loading operations of HE contaminated materials or wet HE. A maximum of 2 Burn Ground Treatment Crew members and 1 Transportation worker can be present during loading of dry bulk HE and at least one worker must be stationed in the TA-16-389 Control Building observing the loading through the camera or periscope. A maximum of 5 people can be present during a burn at the TA-16-389 Control Building.

3.2 Explosives

The flash pad can treat solid HE, water-saturated HE machining waste, HE-contaminated combustible solids, HE-contaminated metals, HE suspended in or dissolved in solvents, and HE dispersed in solids. Limits for each are listed in the Waste-Specific Staging section.

4.0 ALLOWABLE EXPLOSIVES

Any explosive material listed in WT-5-SOP 1.1.0, Tables 1 and 2 and any experimental explosives/components listed in active High Explosives Development Procedures and Authorizations (HEDs). Radioactive materials, blasting caps, electric detonators, and HE units containing electric detonators or mild detonating fuse arrays WILL NOT BE TREATED at the Burn Ground.

5.0 FLASH PAD DESCRIPTION

The flash pad consists of a 22-ft by 22-ft concrete pad set on a polypropylene-lined secondary containment. The pad is slightly slanted lower toward the back. One-ft in from the edge of the concrete pad along the two sides and back is a 3-ft high, 8-in thick impervious concrete wall. The entire flash pad is covered with a retractable steel roof

when the pad is inactive. Storm water that falls on the flash pad collects in the back of the pad. If the Stormwater quantities are small, they may evaporate. If water quantities are large, they should be removed using the High Explosives Wastewater Treatment Facility (HEWTF) vacuum tank truck and treated at the HEWTF. Movable trays are placed on a 10 foot (ft) x 10 ft x 2 inch (in) steel plate placed on top of the concrete to prevent overheating and spalling of the concrete.

The heat sources for the flash pad are three 5-ft-long forced-air propane burners with adjustable mounts. A burner is mounted outside the walls on each side and back of the pad. One, two, or three burners can be used, depending on the amount and configuration of the material to be flashed. Each burner has a thermal output of 2,500,000 BTU per hour that is used to heat or ignite the material being flashed to temperatures sufficient to destroy all HE contamination, above 400°C.

6.0 WEEKLY BURN PLAN

By Thursday of the week before a planned burn, complete the Weekly Burn Plan form and distribute it to the e-mail addresses listed on the form. This notifies the HE Area Access Office when the Burn Ground will be closed and Transportation about when and where waste transfers are needed. If the schedule changes, notify the Access Office and Transportation of the changes as soon as possible. EM&R and the Fire Department are also notified of all burns, starting and ending times.

7.0 WASTE ACCEPTANCE CRITERIA

Before wastes can be accepted for treatment, the Burn Ground Treatment Crew Leader must receive an approved **TA-16 Burning Ground Treatment Request Form** accompanied by a current **Los Alamos National Laboratory Waste Profile Form** with its assigned number. These documents describe the type and amount of wastes, the location, other chemicals involved and their hazards, and the type of explosives involved. The HE Processing Team Leader or her designee must review these documents and, if a decision is made to accept the waste, the Team Leader or her designee must sign the request.

8.0 WASTE TRANSPORT AND STAGING

This section covers the transport and staging of waste on the Flash Pad. The configurations described below are the most common; however, other configurations may be used, as approved by the Burn Ground Treatment Crew Leader.

8.1 Clearing of Unauthorized Personnel

8.1.1. Before waste is transported to the Burn Ground, sweep the area to ensure no unauthorized personnel are present. Also herd away any animals in the area. Close the gate (Structure 349) on the access road to prevent unauthorized personnel from entering the area.

8.2 Transporting and Transferring HE to Burn Trays

8.2.1. Bulk HE (wet or dry) must be transported to TA-16-388 on the day of the treatment by personnel from the Transportation and Materials Control Team or properly trained personnel from the Burn Ground Treatment Crew. Waste can be transported to the Flash Pad before the day of a burn is if it is HE-contaminated material that takes more than one day to stage and is safe to leave on the pad overnight. During multi-day staging, the Flash Pad must be covered. The transporters must be instructed to close the gate behind them when they enter or leave the Burn Ground.

8.2.2. If any waste is spilled during transfer to a burn tray, it must be immediately wetted and transported to the HEWTF or picked up or swept up and placed in the burn tray. Only non-sparking tools can be used.

8.3 Waste Verification

When waste is delivered the operator must visually observe the waste and verify that it meets the description of the waste on the Treatment Request Form and attached Waste Profile Form.

8.4 Worker Protection

Before handling waste, workers must ensure that their personal protective equipment is adequate. Workers must wear (at a minimum) industrial safety shoes, safety glasses with side shields, and leather or other appropriate gloves. Operators should wear half face respirators with HEPA filter canisters when handling residues that become airborne. Depending on the composition of liquids being handled, splash shields, respirators with chemical-specific canisters, and special protective gloves or aprons may be required. See chemical-specific Material Safety Data Sheets and/or your industrial hygienist for additional information. When solvents or corrosives are treated, the portable eyewash in the garage must be moved to TA-16-388, and removed once the waste is staged.

8.5 Weight Restrictions on Waste Handling

- Items that weigh up to a nominal 50 pounds (lb) (18 kilograms (kg)) and can be securely gripped may be handled by one operator, provided the individual is comfortable lifting the given weight.
- Items that weigh up to a nominal 100 lb (36 kg) may be handled by two operators provided that the object can be firmly gripped and the weight is equally distributed.
- Items exceeding 100 lb must not be handled manually. These items will be maneuvered with the appropriate approved fixtures and the forklift or loader.

8.6 Waste-Specific Staging

8.6.1. Solid HE Pieces

No more than 200 pounds total of solid HE shall be treated at one time. The individual HE boxes must be unloaded from the truck onto the concrete in front of the 2ft ×10 ft tray. Sufficient amount of packing material must be placed on the tray surface to cushion the HE in the event it is dropped while removing it from its storage box to the tray. The pieces will be placed within 2 inches of each other. After loading, the boxes will be placed back into the transport vehicle. On its way out, the transporters must close the access gate behind them.

8.6.2. HE-Machining Scrap or Sludge Saturated in Water

No more than 200 pounds of HE machining scrap shall be treated at one time. The waste should be placed in the steel mesh cylinder, sitting inside the 2 x 4 foot steel tray.

8.6.3. HE-Contaminated Non-Combustible Waste

The majority of non-combustible wastes are metal items or soil. Items should be staged so that HE-contaminated surfaces are exposed directly to the flame, if possible. If not possible, the items can be reoriented for additional treatment after a minimum of 24 hours of cooling. If destruction of the HE cannot be visually verified, thermocouples or other temperature-sensitive methods should be used to ensure detonable HE is destroyed. Any residues must be sampled and analyzed for HE after treatment to ensure they are safe for release. Depending on the size of the waste item, it may be staged on trays, pipe racks, or steel pallets. After metal items are treated they are taken to metal recycle bin near TA-16-306.

8.6.4. HE-Contaminated Solid Combustibles

These materials primarily consist of HE-contaminated wipes and rags, gloves, and bags. To be treated at the Burn Ground, these materials must

contain detonable quantities of HE. These materials should be placed in the steel mesh cylinder, sitting inside the 2 x 4 foot steel tray.

8.6.5. HE-Contaminated Liquid Waste
Liquids will be treated in the 2 x 4 foot steel tray placed inside the 4 x 8 foot tray. These wastes are received in 5 gallon or smaller carboys. Up to 10 gallons can be treated in a tray that is set inside another secondary containment tray.

8.6.6. HE-Contaminated Non-Combustible Particulates
Soil contaminated with explosives, contaminated sands from the TA-16-401 and -406 sand filters, small batches of HE-contaminated activated carbon, and similar contaminated non-combustible particulate matter are treated in the same manner as liquids. Thermocouples may be set in the middle of the waste to monitor the temperature, if their use would be effective. If thermocouples are not used, the residues must be tested for HE to ensure a detonable quantity no longer exists.

9.0 PRE-BURN PROCEDURES

The following steps must be completed at the flash pad and propane tank pad before treatment can begin.

9.1 On the day of the burn, check:

- Weather conditions for wind, lightning, or rain. -- if these are forecasted during the burn period, cancel the burn.
- Fire danger ratings conditions in IWD 18.1 – "Treating Unclassified HE Wastes at 388." Burning cannot be conducted during Extreme or Red Flag Fire Danger conditions.
- Road conditions – if transport of HE would be dangerous due to road conditions such as ice, snow, or construction, the burn shall be cancelled.
- Personnel availability – if two members of the Burn Ground Treatment Crew are not available, the burn will be cancelled.

Notify the Access Office, Transportation, the HE Processing Team Leader, and other members of the Burn Ground Treatment Crew of a cancelled burn as soon as possible.

9.2 Workers must shelter in TA-16-389 during a lightning storm. At the discretion of the Burn Ground Treatment Crew Leader or HE Processing Team Leader, operations may be suspended when an electrical storm is threatening or imminent. Operations will be suspended if winds exceed 15 miles per/hour.

9.2.1. Should a lightning alert occur during a burning operation, the Burn Ground Treatment Crew Leader will allow the burn to progress to completion. Inspection of the burn pad, filter, and tray will occur after the electrical storm passes.

9.2.2. If the waste has been staged and a lightning alert then occurs immediately prior to burning, the Burn Ground Treatment Crew Leader or the HE Processing Leader will determine whether ignition should be started or postponed. Consideration will be given to the ESD sensitivity of the materials in place. In no instance should workers remove already staged materials during an electrical storm or when a lightning warning is given. After the electrical storm passes, the HE Processing Team Leader and the Burn Ground Treatment Crew Leader will decide whether the HE should be returned to storage or burned.

9.3 The key to the switch box that disables the burners at the 388 flash pad are kept locked in the key box at TA-16-389. That key must be carried by flash pad personnel when working or setting up for a treatment at the flash pad.

9.4 Check the level of the propane tank to assure sufficient fuel is on hand.

9.5 Check all valves between the propane tank and the burners for proper position.

9.6 Switch on the vaporizer by inserting and placing it on the START MODE to activate vaporizer pump.

9.7 Adjust the height of the burners and remove the cap covers from the burner tips.

9.8 The control panel on the propane tank pad must be checked for any "fail" light displays. Any "fail" light will prevent the flash pad from operating. The Equipment Services Unit must be called to check the flash pad if a "fail" light is displayed.

9.9 The roof of the flash pad must be fully retracted. First, check to see that all tie-downs are uncoupled at the flash pad. Second, do a visual check of both rails for debris, hang-ups, and to ensure the cover is on its tracks. Then pull out the emergency stop button for the roof retraction power and push the retraction button. When the roof is fully retracted, push in the emergency stop button.

9.10 Assure personnel limits are in compliance.

9.11 Check the key switches on the side of the control panel to see if they are switched on for the proper burners.

9.12 If thermocouples are to be used, place thermocouple wires into panel and check operation.

9.13 Proceed to TA-16-389, adjust the TV monitors for the treatment, then, with the key and turn the disabling switch to the "ON" position.

9.14 After the above steps have been completed, contact the HE Access Office and the Fire Department and notify them that the burn is about to commence.

10.0 FLASH PAD OPERATION PROCEDURES

10.1 After the pre-burn steps are complete and all personnel are inside TA-16-389, the operator will operate the flash burners, as follows:

- Open the key cabinet and get the Flash Pad key.
- Use the key to turn on the Flash Pad access box on the wall. Leave the key in the box.
- Turn on the computer.
- Click "Burn Pad Operation" icon.
- Click "OK" on pop-up screen.
- Type in operation description, such as "dry run", "HE sludge treatment."
- Click on the yellow Master start button.
- Click "saves" on the data file window.
- Switch on Fuel Valve switch and then Burner Flame switch for each burner used.
- When finished with the burners, switch off the Burner Flame switch and then the Fuel Valve switch for each burner in use.
- Click on the Stop button.
- Click "OK" in the pop-up window.
- Click the White Arrow on the top left margin of the screen.
- Click "OK" in the pop-up window.
- Click on the Start in the lower left margin of the screen.
- Click on "Shut Down."
- Switch off the Flash Pad access box and lock up the key in the key box.

10.2 In the case of a detonation during the burning of explosives, the Burn Ground Treatment Crew Leader will immediately notify the HE Processing Team Leader the WT-5 Group Office. All personnel will remain in Control Shelter 389 until

instructed by the HE Processing Team Leader or Group Office instructs the Burn Ground Treatment Crew Leader as to the procedure he should follow.

11.0 POST-BURN PROCEDURES AND RESIDUE MANAGEMENT

11.1 Contact the HE Access Office and Fire Department to let them know the burn is completed.

11.2 Open the gate (Structure 349) on the access road by inserting key and placing it on the opening position and removing.

11.3 Personnel may leave the control room shelter, at the Burn Ground Treatment Crew Leader's discretion, after all materials have been reduced to a smoldering condition as viewed through the cameras or periscope. However, the access gate should remain closed until no smoldering is observed to ensure unauthorized personnel do not approach the Flash Pad.

11.4 Barricade the road to the TA-16-388 Flash Pad with the barrels located part way down the road. No entry will be allowed past these barrels until eight (8) hours have elapsed or it can be determined visually that all explosives have been destroyed.

11.5 Unburned or partially burned explosives material remaining on the pad may be moved or repositioned for further burning. The material shall not be raked or otherwise insulted, until at least an 8-hour cooling period has elapsed. The burning operation will be repeated to destroy any remaining explosive waste.

11.6 At least twenty-four (24) hours must elapse before ashes are collected and the pad is prepared for another burn.

11.7 Place any treated scrap metal in the scrap metal recycling rolloff at TA-16-306. If the scrap metal is too large to be placed in the rolloffs, arrange for direct transport to KSL. Place other residues in buckets or drums, depending on the quantity of the residue.

11.8 Label the bucket or drum with the date of the burn and the WPF for the submitted waste. Fill out the appropriate New Mexico Special Waste (NMSW) or hazardous waste label.

11.9 If the waste has previously been profiled and is known to be non-hazardous and meets all Universal Waste Treatment Standards (i.e. it can be sent to disposal without additional treatment to meet other standards), it can be labeled as New Mexico Special Waste (NMSW) and placed in the NMSW accumulation area

under the small cover at TA-16-388. Manage the waste as described in SOP 18.4.0.

11.10 If the residue is known to be hazardous or the composition is not known, place the containers in the <90-day accumulation area at TA-16-386 and immediately contact the Waste Management Coordinator (WMC) to arrange for analysis and/or shipping. Manage the waste as described in SOP 18.4.0. If the analytical data shows the residue is not hazardous, it should be handled as NMSW unless the WMC advises otherwise.

11.11 Perform an inspection of the TA-16-388 and the <90-day accumulation area **each day they are used**. Or, if they are not used during a week, perform one weekly inspection. Document the inspections on the forms provided by the Solid Waste Regulatory Compliance Group (ENV-SWRC) and mail the forms at the end of each week to Geri Martinez at MS K490. Complete the **TA-16 Burn Ground Weekly Inspections and Notifications** form and e-mail it to the addresses on the form so that team members know the inspections have been completed. If the form is not submitted by Thursday afternoon, one of the other team members should assume the weekly inspections have not been completed and must perform the required inspections.

11.12 Before leaving at the end of the day, recover the Flash Pad. First, check to ensure the rails are free of debris, hang-ups, and the cover is on its tracks. Then push the forward button. When the roof is fully forward, push in the stop button. Connect and tighten the tie-downs.

12.0 TRAINING

12.1 Personnel who are both qualified and authorized per the Integrated Work Documents (IWDs) for High Explosive Treatment Operations and individual Employee Training Plans may engage in explosive treatment activities covered by this SOP.

13.0 EMERGENCIES

13.1 The appropriate Building Emergency Plan and S-Site Evacuation Plan shall be followed during emergencies.

13.2 If a brush fire is created as the result of a burning operation, the Burn Ground Treatment Crew Leader will immediately call 911. They will then contact Access Control and WT-5 Group Office.

13.2.1. If it can be determined that explosives are not involved in the fire and it is safe to leave the shelter, the Burn Ground Treatment Crew Leader will immediately send someone to the entrance gate (Structure 349) to admit the Fire Department and brief them on the status of the HE involved.

13.2.2. If explosives are involved in the fire, all personnel must remain in the Control Shelter 389 until the WT-5 Group Office instructs the HE Processing Team Leader as to the procedure he should follow.

1.0 SCOPE

This is the procedure of burning solid high explosives (HE) at the HE Burn Tray, TA16-399, to remove the reactive characteristics of HE (RCRA Waste Code D003). The Disposal Unit Leader at the burn grounds supervise the work this procedure governs. The WT-5 HE Processing Team Leader oversees all operations at the burn ground.

2.0 LOCATION

2.1	HE Burn Tray	TA-16-399
2.2	Less-Than 90-day Storage	TA-16-386
2.3	Control Shelter	TA-16-389

3.0 LIMITS

3.1 Personnel

Area limits not to exceed (see individual SOP where applicable);

3.1.1. 4 at HE Burn Tray, 399. No personnel are allowed outside of 389 during treatment.

3.1.2. 5 at Control Shelter, 389

3.2 Explosives

1000 pounds, including 100 pounds of flake TNT, with no single piece or assembly exceeding 250 pounds, at HE Burn Tray, 399

4.0 ALLOWABLE EXPLOSIVES

Any explosive material listed in WT-5-SOP 1.1.0 Tables 1 and 2 and any experimental explosives/components listed in active High Explosive Development.

5.0 BURN TRAY OPERATION PROCEDURE

5.1 Before wastes can be accepted for treatment, the Burn Ground Treatment Crew Leader must receive an approved TA-16 Burning Ground Treatment Request Form accompanied by a current Los Alamos National Laboratory Waste Profile Form with its assigned number. These documents describe the type and amount of wastes, the location, other chemicals involved and their hazards, and the type of

explosives involved. The HE Processing Team Leader or her designee must review these documents and, if a decision is made to accept the waste, the Team Leader or her designee must sign the request.

5.2 Confirm that ENV-EAQ personnel have been notified that the burn will occur. Treatments can occur only during permitted hours. ENV-EAQ personnel must notify the NM State Environmental Department at least 24 hours prior to a burn.

5.3 The Disposal Crew Leader will determine that the firing controls are locked in the OFF position and keep custody of keys to initiating sources and squibs. In his absence, this custody may be delegated to his alternate or to the HE Processing Team Leader.

5.4 The squib, or electric match, firing system shall be tested prior to the delivery of HE waste.

5.5 Before waste is transported to the Burn Ground, sweep the area to ensure no unauthorized personnel are present. Also herd away any animals in the area. Close the gate (Structure 349) on the access road to prevent unauthorized personnel from entering the area.

5.6 The HE waste to be treated must be transported from their storage area to the HE Burn Tray by personnel who have received training equivalent to that of the Transportation and Materials Control Team. These personnel will judge if road conditions are sufficiently safe for transporting explosives. The transporting will be done on the day of the treatment.

5.7 The HE delivery truck will be backed into the fenced TA16-399 area, the engine is turn-off, and the loaded Colson Carts and individual HE boxes are unloaded from the truck onto the concrete platform in front of the HE Burn Tray.

5.8 A sufficient amount of packing material will be placed on the sand surface of the 4'x16' Burn Tray for providing flammable cushioning of the HE and cushioning in the event of dropping HE while removing it from its storage box to its position for the burn.

5.9 The boxes, one at a time, are placed on the Burn Tray. The HE is removed and set on the packing material. The pieces should be within 2" of each other. Boxes and their contents weighing more than 50 pounds require 2 people to handle them.

5.10 When all explosives have been unloaded, the carts with the boxes are loaded onto the truck, and the truck will leave the 399 fenced area. If the delivery personnel leave the Burning Ground the area, they will close the 349 gate behind them.

5.11 The Disposal Crew Leader will check the circuit breaker switch in the terminal box outside the 399 fence to see that it is in the GROUND position.

5.12 No more than two persons are to be involved in setting the ignition train and squibs when preparing to make a burn. Other personnel at the burning ground shall be in Control Shelter 389 during this operation. At least one person must be observing the ignition train set-up from 389 using the video camera or periscope. All personnel who are superfluous to the operation must be sent out of the area. The number of people exposed to the hazard will be kept to a minimum and within the personnel limits established in this SOP.

5.13 An ignition train of excelsior will be prepared by building a several foot "snake" from the site of ignition with the squib to the HE. The excelsior is then dampened with kerosene.

5.14 The Disposal Crew Leader will cut two lengths of wire and connect them to the their terminals in the box beside the Burn Tray. The circuit is then ready for two squibs to be spliced in parallel to the end of the wires. The spliced wires must be kept separated so they will not short. Use insulation tape to keep them apart.

5.15 The squibs will be placed approximately one inch from the excelsior so that the squibs, when fired, will light the ignition train.

5.16 The firing sequence is as follows

5.16.1. Throw the circuit breaker switch in the terminal box outside the 399 fence to the FIRE position

5.16.2. The Disposal Crew at 399 will now go to 389.

5.16.3. Unlock the firing controls and rotate the selector to the 399 position.

5.16.4. Switch the circuit breaker switch to the ON position.

5.16.5. Press the fire button.

5.16.6. With the TV monitor, observe the ignition.

5.17 The following steps will be taken if ignition fails.

5.17.1. Re-press the fire button

5.17.2. Observe the squibs and fire train for five minutes

5.17.3. The firing circuit breaker should be set in the OFF position and locked.

5.17.4. Outside the 399 fence, throw the circuit breaker switch to GROUND.

5.17.5. If the Disposal Crew leader considers the situation safe, the leader should return to 399 and inspect the wiring, the circuit breaker switch, and the squibs, replacing the squibs if needed.

5.17.6. Repeat the sequence from step 5.16 only once more.

5.18 If the squib firing fails again, have the HE truck return, repack the HE, and have it returned to waste storage. Then have Maintenance fix the problem.

5.19 Operations will not be conducted at the burning ground during an electrical storm or during a storm's approach, which is monitored by Access Control. Control Shelter 389 is considered a safe area during electrical storms. At the discretion of the Disposal Crew or HE Processing Team Leader, operations may be suspended when an electrical storm is threatening or imminent.

5.19.1. Should a lightning alert occur during a burning operation, the Disposal Crew Leader will allow the burn to progress to completion. Inspection of the HE Burn Tray will occur after the electrical storm passes.

5.19.2. Should a lightning alert occur after set-up, but immediately prior to burning, the Disposal Crew or the Processing Team Leader will determine whether ignition should be started or postponed. Consideration will be given to the ESD sensitivity of the materials in place.

5.20 No entry should be allowed into the disposal area until eight (8) hours have elapsed unless it can be determined visually that all explosives have been destroyed. Personnel may leave the control shelter when the crew leader gives approval after all explosives have been reduced to a smoldering condition as viewed through remote camera or periscope. The Burn Tray must not be approached until the appropriate cooling time has passed.

5.21 If a brush fire is created as the result of a burning operation, the Disposal Crew Leader will immediately call 911, then Access Control and the WT-5 Group Office.

5.21.1. If it can be determined that explosives are not involved in the fire and it is safe to leave the shelter, the Disposal Crew Leader will immediately send someone to the entrance gate (Structure 349) to admit the Fire Department and brief them on the status of the HE involved.

5.21.2. If explosives are involved in the fire, all personnel shall remain in the Control Shelter 389 until the Group Office instructs the HE Processing Team Leader as to the procedure he should follow.

5.22 In the case of a detonation during the burning of explosives, the Disposal Crew Leader will immediately notify the HE Processing Team Leader the WT-5 Group Office. All personnel will remain in Control Shelter 389 until the Disposal Unit Leader or Group Office instructs the Disposal Crew Leader as to the procedure he should follow.

5.23 Unburned or partially burned explosives material remaining on the pad will be repacked and moved to storage for later disposal.

5.24 At least twenty-four (24) hours shall elapse before ashes are collected and the pad is prepared for another burn.

5.25 Blasting caps, electric detonators, and HE units containing electric detonators or MDF arrays will not be destroyed at the HE Burn Tray.

5.26 HE pieces that contain metal or other materials that could produce shrapnel will not be burned at the HE Burn Tray.

5.27 All radio transmitters at the burning ground must be turned off when squibs are being handled and may not be turned on until the squibs have been fired or returned to storage.

5.28 The residual ash that remains after HE burns is to be sampled to determine if it must be treated and stored as a Hazardous Waste. Initially, all ash will be containerized and stored at the < 90 day storage facility prior to sampling as described in SOP 18.4.0. Storage and disposal of the ash will be performed in the following manner:

5.28.1. All ash will be collected and stored in approved hazardous waste containers and labeled as suspected hazardous waste. These containers will be controlled and stored at the < 90 day storage facility per SOP 18.4.0.

5.28.2. ENV-RCRA will be called to sample and characterize the ash as described in SOP 18.4.0.

5.28.3. If the sampling analysis confirms the ash to be **hazardous** waste, the appropriate label must be applied to the container and the ash must be stored and inventoried as described in SOP 18.4.0. Contact the Waste Management Coordinator (WMC) for disposal.

5.28.4. If the sampling analysis confirms the ash to be **non-hazardous** waste, the appropriate label must be applied to the container and the ash is stored in the < 90-day storage facility prior to disposal. Contact the Waste Management Coordinator (WMC) for disposal.