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CERTIFIED MAIL
RETURN RECEIPT REQUESTED

October 31, 2003

Ms. Radel Bunker-Farrah
Environmental Program Manager
National Aeronautic and Space Administration
White Sands Test Facility
P.O. Box 20
Las Cruces, New Mexico 88004-0020

SUBJECT: NOTICE OF DEFICIENCY, PART 1
RCRA PERMIT RENEWAL APPLICATION
NASA WHITE SANDS TEST FACILITY
EPA ID No. NM8800019434-1,-2
HWB-NASA-02-008

Dear Ms. Bunker-Farrah:

The New Mexico Environment Department (NMED) has reviewed the revised National Aeronautics and Space Administration (NASA) White Sands Test Facility (WSTF) Permit Renewal Application dated August 8, 2003, and has determined that NASA's Permit Application is technically deficient. NASA must address the comments in Attachment 1 within 90 calendar days of the receipt of this letter in order to complete the Permit Renewal Application. In addition, please include a response letter that indicates precisely where revisions have been made to the Permit Application, cross-referencing the NMED's numbered comments.

NMED has reviewed the information related to the Oxidizer Burners in the 300, 400, and 800 Areas and has determined that these units do not need to be permitted under the RCRA regulations. These units, as described, fall into the category of "industrial flares" and are regulated under the Clean Air Act (CAA) and, therefore, may need to be permitted by the NMED Air Quality Bureau.

If you have any questions regarding this letter, please contact Ms. Daniela Bowman at 505-428-2556.

Sincerely,

Sandra Martin
Acting Chief
Hazardous Waste Bureau

SM:dkb

Attachments (10)

Cc w/o attachments:
J. Kieling, NMED HWB
D. Cobrain, NMED HWB
D. Goering, NMED HWB
D. Bowman, NMED HWB
Mike Fowler, NMED AQB

Cc with attachments:
Laurie King, EPA 6PD-N
Reading File, [redacted] NASA-02-008

ATTACHMENT 1

Technical Comments

For the purposes of issuing the RCRA Permit, NASA must provide some of the documents in the Permit Application in addition as "hard copies". These documents are required because they will be attached to the RCRA Permit. A "hard copy" is a printed, physically available document in specified or optimal size. If NMED does not specify a size, then the document should be printed in the size of the original document, or in the optimal size that allows for best printing resolution of the document. When a document is requested in "hard copy", the document should be provided in the Permit Application for completeness, and additionally, in the required format (if specified), separately from the Permit Application.

Permit Application Part A

Comment 1 Section 2.1 Appendix 2-A
NASA must provide a hard copy of the Permit Application Part A.

Comment 2 Section 2.1 Appendix 2-A & Section 3.0
In accordance with 20.4.1.900 NMAC, incorporating 40 CFR 270.11(a)(3), all permit applications submitted by a municipality, State, Federal, or other public agency must be signed by the principal executive officer or ranking elected official. Therefore, the acceptable signatory for NASA WSTF's Permit Application is the WSMR Installation Commander who is Brigadier General Engle.

General Engle must sign NASA's Permit Application Part A.

Comment 3 Section 2.1 Appendix 2-A
NASA must correct the numeration of the pages (total of 7 pages, and mark page 6 as well) of the Permit Application Part A form. NASA failed to correct the process code for the Fuel Treatment Unit (FTU) on page 6.

NASA must revise Part A to amend these inaccuracies.

Comment 4 Section 2.1 Appendix 2-A
Permit Application Part A must clearly distinguish between the T01 process of the Evaporation Treatment Unit (ETU) and T01 process of the FTU. Please bold or italicize one of the codes to differentiate between the two units. NASA must specify in the Permit Application Part A whether the reported annual quantities are for each unit or for both units combined. If NASA uses the latter notation, provide an attachment that indicates a break down of the quantities for each unit (ETU and FTU).

Comment 5 Section 2.1 Appendix 2-A
NASA must submit the April 4, 1994 and July 26, 1994 correspondence referenced in Section 2.1 from EPA granting a determination of equivalency for the procedures in the 300, 400, and 800 Areas. NASA must also submit a process flow diagram describing in detail the waste management practices associated with the generation of wastes containing propellants and oxidizers during tests conducted in the 300, 400, and 800 Areas. In addition to the as-built or engineering drawings, NASA must submit diagrams that describe the routing of the different waste streams. Attach any waste analysis conducted (pH and other analyses) on these waste streams. Diagrams must clearly show which wastes are routed to the aspirators; vent drums, tanks, and those routed to the oxidizer burners. NASA must describe any neutralizing agents that are being added to wastes in the aspirators/scrubbers.

Multiple waste streams are disposed of in the ETU with hazardous waste numbers P076 and P078 (see Section 20.36), in addition to the dinitrogen tetroxide (the original product) and nitric acid (the final waste constituent of aspirating nitrogen oxides through water). Moreover, in most cases, the product, dinitrogen tetroxide, exists in equilibrium (80 percent N_2O_4 and 20 percent NO_2) with nitrogen dioxide at around 21 degree C, and therefore, it is a part of the product.

If NASA intends to dispose of waste associated with decontamination procedures or aspirating/scrubbing of dinitrogen tetroxide gases and liquids produced during tests in the ETU, then NASA must include the EPA hazardous codes P076 and P078 in Permit Application Part A. NMED will review the required additional information to determine if the aspirators (scrubbers) are equivalent to and as efficient as the treatment ADGAS. However, if NASA leaves out the EPA hazardous codes P076 and P078 from the Permit Application Part A, then NASA may not dispose of wastes with these codes in the ETU, regardless of the concentration of waste products.

NMED has provided in Attachment 2 a report and information obtained from the NASA Kennedy Space Center (KSC), where waste streams similar to NASA WSTF waste streams were described as hazardous waste streams containing dinitrogen tetroxide and byproducts NO_x. NASA must explain how the waste streams generated in WSTF are different in composition than the wastes described in Attachment 2 generated at NASA KSC.

Comment 6 Section 2.1 Appendix 2-A
NASA may not dispose of the waste streams containing the products associated with hazardous waste codes P068, U098, U099, and U133 in the ETU because these waste streams do not meet the treatment standards, specified in 20.4.1.800 NMAC, incorporating 40 CFR 268.40. As NASA pointed out, these waste streams are discharged

to the ETU where they are then treated. This treatment, however, does not meet the treatment standards specific to the wastes. The fact that the ETU sludge is incinerated every ten years is irrelevant because the wastes have already been treated and are not just stored in the ETU. Hydrazine and hydrazine derivatives are only slightly persistent in water, with a half-life of between 2 and 20 days[1] (the half-life of a pollutant is the amount of time it takes for one-half of the chemical to be evaporated/degraded). Considering the fast evaporation rate of these compounds, NMED has determined that treatment of these wastes is occurring in the ETU.

In addition, storage of wastes in the ETU with the hazardous codes listed above is a violation of 20.4.1.800 NMAC, incorporating 40 CFR 268.50.

NASA must remove the hazardous waste codes P068, U098, U099, and U133 from the Permit Application Part A. NASA must also immediately cease treatment of waste streams containing these products in the ETU. As an alternative, NASA may dispose of these wastes at the permitted FTU tanks or a RCRA approved off-site treatment facility.

Comment 7 Appendix 2-A Supplemental Table FTU
The supplemental table "FTU Hazardous Waste" lists as a part of the waste streams discharged to the FTU, the waste with WSTF Individual Waste Profile Sheet (WIWPS) number 20-04-49. This waste contains constituents other than hydrazine wastes for which the Unit is not permitted.

NASA must segregate this waste stream from the wastes discharged to the FTU and dispose of it appropriately.

Permit Application Part B

Comment 8 Section 2.2 Appendix 2-A
NASA must revise Section 2.2 to include a scale drawing with the locations of all past, present, and future treatment, storage, and disposal areas, and description of each area pursuant to 20.4.1.900 NMAC, incorporating 40 CFR 270.13(h)(1), even though NASA has provided as-built engineering drawings of the ETU and FTU. For example, the present ETU and FTU locations were used in the past for storage and treatment. NASA must explain the nature and duration of any past treatment and storage. Also, any thermal treatment locations (past and present) must be indicated on the scale drawing.

[1] http://www.iephb.nw.ru/~spirov/hazard/hydrazine.html

Comment 9 Section 2.4 Appendix 2-A
NASA must revise the submitted topographic map (titled Part A Topographic Map) to provide a good quality, readable topographic map. NASA must provide a hard copy of the revised topographic map as well.

Comment 10 Section 5.0
The analytical data from wastes in the ETU and FTU must be presented in an easy-to-review format:

1) Provide monthly and annual summary tables with detections for the ETU and FTU tanks. The tables must contain the detection limits for the corresponding sampling event and the name of the analytical laboratory.

2) The calculated total average volatile organics (VO) concentration for the Hazardous Waste Drain Line (HWDL) sump must be included in the tables.

3) NASA must list waste streams that were deemed obsolete (between 1994 and 2003) or for which the processes have changed since the initial start-up of the stream, and how it has changed.

4) NMED is concerned about the high detection limits associated with large dilution factors, incompatible duplicates, non-preserved samples, and the total quality of the data submitted by NASA (see Attachment 5 for examples). Part of the listed data for hydrazine and derivatives obtained by HPLC analysis (performed by the WSTF on-site laboratory) do not contain any QA/QC samples. Analytical data with no quality assurance or deficient quality is not representative of the waste, not legally defensible, and of limited use to any Project Plan. Poor QA/QC of the data or the absence of such must be clearly indicated in the tables.

5) NASA must list all unusual occurrences during the inspections of the ETU and FTU such as leaks (minor and major), spills (minor and major), overflows, replaced parts, hydrazine detections, or any other events associated with improper functioning of the system. The submitted inspection records indicate leaks and irregularities, but do not elaborate on the duration of the events or the quantity spilled.

6) NASA must submit the ETU liner disposal information from 1999. NASA submitted the 1998 information only. Also, NASA must include the 1998 and 1999 liner disposal information in the CD package of the revised Permit Application.

Waste Analysis Plan (WAP) Comments

Throughout this section, NMED refers to specific sections of the EPA guidance "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Wastes" (OSWER 9938.4-03, April 1994). The abbreviation "EPA's WAP" could be used to identify this guidance.

Comment 11 Section 6.0

NASA must provide a hard copy of its WAP.

Comment 12 Section 6.0

The WAP must be formatted as a separate document. Therefore, all pertinent information must be included in the WAP, without references to other sections in the Permit Application. The WAP must be a stand-alone document when submitted in hard copy.

Comment 13 Section 6.0

NASA's WAP fails to fully identify the waste characterization regulations applicable to the generation and treatment of hazardous waste. NMED considers the applicable regulations synonymous to data quality objectives (DQOs) of a WAP.

NASA must revise its WAP to include a section that references and thoroughly addresses the DQOs provided in Attachment 3. All waste characterization, whether performed using real-time sampling and analysis, acceptable knowledge (AK), or a combination of the two, must achieve the objectives of the WAP. NASA must include a section to address how the WSTF Environmental Department contractor personnel will perform a Quality Assurance/Quality Control (QA/QC) to ensure that all waste characterization has met the DQOs.

Comment 14 Section 6.0

NASA must revise the WAP to include a section describing the training requirements that the WSTF Environmental Department contractor personnel must have in order to ensure compliance with waste characterization regulatory requirements pursuant to 20.4.1.500 NMAC, incorporating 40 CFR 264.16. NASA's Training Plan and its modules should be referenced in this section.

Comment 15 Section 6.0

NASA must revise its WAP to include a QA/QC section that addresses the sampling, analyses, parameters, and the general characterization of the wastes in the operating units. NASA must include a Sampling Plan section for the waste streams and tanks in a form that conforms to the DQOs. The ETU analytical data indicates irreproducible analytical

results of duplicate samples (see Comment 10(4)), which do not meet the appropriate sampling requirements to ensure that representative samples are taken. NASA must use Section 2.3 of EPA's WAP and SW-846 references when developing a Sampling Plan.

Comment 16 Section 6.0
NASA must include a flow chart that explicitly describes how the WSTF Environmental Department contractor personnel will determine whether a waste stream is a hazardous waste, pursuant to 20.4.1.300 NMAC, incorporating 20 CFR 262.11. This flow chart should be a part of the QA/QC section.

Comment 17 Section 6.0
Pursuant to 20.4.1.900 NMAC, incorporating 40 CFR 270.14(b)(2), the Part B portion of the Permit Application must contain all relevant and applicable chemical and physical analyses of the hazardous wastes to be handled at the facility. NMED interprets this, using the definition of "facility" at 40 CFR 270.2, to mean *all* wastes, including all those generated by NASA within the boundaries of the White Sands Test Facility (WSTF). NASA's Part B Permit Application, Section 5.0, provides chemical and physical analytical data only on waste managed at the ETU and FTU. NASA must, at a minimum, provide a listing of *all* wastes generated at the facility during calendar years 2002 and 2003. The list must be similar to that provided as the supplemental tables (Appendix 2-A) "*ETU Hazardous Waste,*" with a unique WIWPS identification number, waste stream name, point of generation, EPA waste code, estimated volume generated per year, and waste accumulation/treatment area. Furthermore, the lists *ETU Hazardous Waste* and *FTU Hazardous Waste* must include information on *all* wastes to be managed at the ETU, because NMED will restrict NASA from managing any wastes not included on this list.

NASA must provide attachments to the WAP (titled "Hazardous Waste Generator Locations" and "Hazardous Waste Stream Inventory") with the information described above on all wastes generated within the boundaries of the WSTF as hard copies. These attachments must include maps showing the generator locations and the location of each Waste Accumulation Area (less-than 90-days, satellite accumulation areas, etc.).

Comment 18 Section 6.0
NASA must revise its WAP to include a section with the recordkeeping requirements for waste characterization documentation, supporting information, manifests and other necessary documents at the generator sites and the operating unit locations. Generating a table as described in Comment 19 will be satisfactory to address this requirement.

Comment 19 Section 6.0
After revising its WAP, NASA must fill out the table in Attachment 7, which will be added as an attachment to the WAP for inspection purposes. The table in Attachment 7 is just an example of the records NASA may list. NASA may alter/add more records and may change the descriptions or locations of the records as necessary.

Comment 20 Section 6.1
NASA WAP Section 6.1 states "[t]he WSTF International Organization for Standardization (ISO) 9001/14001 Management System Manual provides documentation of processes at WSTF and includes Waste Management." Because the Manual addresses NASA's compliance with New Mexico's Hazardous Waste Act and its implementing regulations, NASA must provide a copy of the waste management portion of this document as an attachment to the WAP.

Comment 21 Section 6.1
NASA must revise section 6.1 of the WAP to provide the information described in Section 2.1 of the EPA's WAP. Tables, flow charts, and process flow diagrams must be included.

Comment 22 Section 6.1
NASA must revise sections 6.1.1 and 6.1.2 of the WAP to include detailed discussions of the specific operating conditions and process constraints for the ETU and FTU (refer to Section 2.1.3 of EPA's WAP). For example, the ETU system is not designed for treatment of wastes containing metals or semi-volatile organics. These wastes are blended with other hazardous wastes within the HWDLs and stored in the ETU until they are incinerated at an off-site RCRA facility approximately every ten years. Another topic for discussion is how the D-wastes are rendered safer or neutralized in the ETU and FTU systems. If hazardous and non-hazardous wastes will be mixed or blended, the specifics of these activities should be described. In certain circumstances, the hazardous waste may continue to be regulated under the "mixture" or "derived-from" rules.

Comment 23 Section 6.1
NASA must revise section 6.1 to fully describe the goals of both treatment processes pursuant to 20.4.1.900, incorporating 40 CFR 270.13(i). NASA must identify if any of the following goals apply to either operating unit:

- Waste neutralization;
- Energy or materials recovery;
- To render waste non-hazardous;
- To make waste amenable to storage;
- Volume reduction; and/or
- Attainment of land disposal restriction treatment standards.

NASA must also identify if any of the treatment technologies specified in 20.4.1.800 NMAC, incorporating 40 CFR 268.42(a) Table 1, apply to either operating unit.

NASA must determine whether all waste placed in the ETU are legitimately amenable to the same type of treatment.

NASA must also describe whether the treatment goal of either is to attain (or perform) land disposal restriction (LDR) treatment standards specified at 20.4.1.800 NMAC, incorporating 40 CFR 268.40.

Comment 24 Section 6.1
NASA's WAP must describe the criteria used to determine when the evaporation and dilution processes are complete. NASA must describe whether the goal of either treatment process is to remove a particular characteristic hazardous waste code(s).

Comment 25 Section 6.1
Permit Application Section 11.2 states all wastes are diluted with site water to prevent hazardous conditions within the ETU. "This process ensures that all potentially reactive or ignitable waste are rendered non-hazardous prior to tank treatment by evaporation."

NASA must describe all points (sources, sinks, sump, etc.) where wastes are diluted prior to tank treatment and the purpose of performing this dilution in the "Generation Process" of each WIWPS (see Comment 24). NASA must explain the use of the expression "non-hazardous" in the quotation.

Comment 26 Section 6.1
NASA WAP Section 6.1.3 states "[c]ompliance with RCRA, and waste analysis requirements, for the WAAs (Waste Accumulation Areas) is demonstrated in WJI ENV-0061, "90-Day Waste Accumulation Area Regulatory Compliance" and therefore is not discussed in depth in this plan". Because the quoted document addresses NASA's compliance with New Mexico's Hazardous Waste Act and its implementing regulations, NASA must provide a copy of this document as an attachment to the WAP.

Comment 27 Section 6.1
As a generator, NASA must discuss in the WAP the controls associated with each waste generating process or how prescribed the waste generating process is. If the process results in a routinely or regularly generated waste, NASA must specify the process that generates waste. NASA must keep records of the materials that went into the "makeup" of the waste and the materials that the waste came in contact with.

At a minimum, NASA must revise the description of the generating process in the WIWPS database for each waste stream discharged to the operating units, in order to provide this information.

Comment 28 Section 6.3
The Facility must identify the frequency with which the initial analysis of the waste will be reviewed or repeated to ensure that the analyses are accurate and up to date pursuant to 20.4.1.500 NMAC, incorporating 40 CFR 264.13(b)(4). Section 6.3 of the WAP is unclear regarding the frequency of waste characterization. It is not clear whether the characterization and re-evaluation will happen for all wastes or just for the mixtures of waste in the ETU and FTU, as implied in Tables 6.1 and 6.2.

NASA's WAP discussion on the frequency of characterization must be revised so that it addresses *all* waste streams discharging to the treatment units at the point of generation, not just the mixture of wastes in the ETU and FTU.

Comment 29 Section 6.3
Table 1 of the WAP lists multiple parameters that may be indicative of changes in the waste stream(s). The purpose of the treatment in the ETU is *to change (treat) the waste stream(s)*. Therefore, analyses of wastes discharged to the ETU cannot confirm the composition of the waste present in the ETU. Table 6.1 does not list any other sampling point(s) other than the ETU itself; therefore, NASA must explain how the wastes entering the ETU would be re-evaluated to confirm waste composition before the wastes are actually treated.

NASA must also include confirmation sampling at the point of generation of each waste stream on a regular basis (see Comment, 28 and 38).

Comment 30 Section 6.3
Table 6.2 of the WAP lists only waste analyses for pH and hydrazine. NMED notes that the Flash Point for the neat products contained in these wastes are[2] –15 °C, 38 °C, 70 °C, and less than 23 °C. NASA must include Flash Point analysis of the wastes in the FTU or explain how the ignitability characteristic will be tested for or removed (see Comment 88).

NASA may store ignitable waste in the FTU if it complies with the requirements 20.4.1.500 NMAC, incorporating 264.198. However, NASA states in Section 11.4 and 22.2 that the wastes discharged to the FTU are non-ignitable, non-reactive, and

[2] HSDB. 1993. Hazardous substances data bank 1. National Library of Medicine, National Toxicology Information Program, Bethesda, MD.

non-characteristic. Therefore, the WAP analyses must demonstrate these properties of the wastes.

Comment 31 Section 6.3
NASA's current Hazardous Waste Operating Permit, Attachment IV-1B, *Evaporation Tank Unit Operations*, describes a process to identify and remove dense phase waste. The Permit Renewal Application does not address the issue of dual phases.

NASA must explain this omission.

Comment 32 Section 6.3
Section 20.4.1.900 NMAC, incorporating 40 CFR 270.14(b) requires that the Permit Application Part B contain a copy of the waste analysis plan (WAP), as required by 20.4.1.500 NMAC, incorporating 40 CFR 264.13(b). The identification in the WAP of the parameters for which each hazardous waste will be characterized and the rationale for the selection of that parameter is also required. NASA's WAP fails to identify the parameters for which *all* wastes at the facility will be characterized, despite the fact that NASA's WAP, Section 6.0 states "[t]his WAP covers waste streams which are hazardous as defined in ... and treated in permitted units at WSTF and/or transported off-site for disposal."

At a minimum, in addition to those identified in Tables 6.1 and 6.2, NASA must identify all appropriate waste *categories* (e.g., spent solvents, paint wastes, photographic wastes, corrosive liquid wastes, mercury waste, environmental restoration wastes), their associated characterization parameters and their rationale. Furthermore, the discussion of parameters must include a discussion of the identification of underlying hazardous constituents (UHCs) in characteristic wastes. This generally means that characterization for metals and volatiles must be expanded beyond those referred to in Table 6.1 as TCLP (i.e., toxicity characteristic constituents).

Comment 33 Section 6.3
Section 20.4.1 NMAC, incorporating 40 CFR 264.13 (a)(3)(i) and 268.7 (a)(3)(iii), both require additional waste characterization when the process that generates a waste changes. NASA's WAP must address these requirements.

NASA's WAP must be revised to specify the procedures that will be used to determine whether a routine waste generating process has changed sufficiently to warrant the creation of a new waste stream requiring characterization.

Comment 34 Section 6.4
Section 6.4 of the WAP states that off-site laboratories are selected based on, among other things, their Quality Assurance/Quality Control (QA/QC) programs. NASA's WAP must specify the laboratory QA/QC protocol that NASA requires of both on-site and off-site laboratories (see Comment 10(4)).

Comment 35 Section 6.4
Section 20.4.1 NMAC, incorporating 40 CFR 264.13(b)(2) requires the identification of the test methods which will be used to test for the waste parameters. WAP Table 6.3 lists the appropriate test methods. However, that Table must be expanded, at a minimum, to identify metals testing methods. The WAP's reference to "TCLP Metals and Volatiles" is inappropriate because it only references the sample preparation method (i.e., the leaching procedure, SW-846 method 1311) and not the analytical procedure. Metals are generally analyzed using SW-846 methods 6010B, 6020, and 7000 series.

Comment 36 Section 6.5
Section 6.5.7 of the WAP states: "[a]ll waste streams transported off-site for disposal at a permitted facility are assumed to not meet treatment standards." NMED interprets this to mean that NASA does not perform LDR status determinations.

Land disposal restriction (LDR) waste characterization requirements are not adequately addressed in NASA's WAP Sections 6.2 and 6.5.7. At a minimum, NASA must address the waste characterization provisions for complying with LDR requirements as specified in EPA WAP, Section 2.6.3. Specifically, the WAP must significantly elaborate on NASA's procedures for identifying underlying hazardous constituents (UHCs) and must specify how LDR treatment standards are determined for each waste code and UHC. NASA must also address the following requirements in Permit Application Section 18.0, *Land Disposal Restrictions*: 20.4.1.800 NMAC, incorporating 40 CFR 268.3, 268.7, 268.8, and 268.50.

Comment 37 Section 6.5
Section 6.5.5 of the WAP states that the air emission control requirements in 40 CFR part 264 subpart BB do not apply to NASA. NMED requires that NASA re-evaluate the points of origination of all waste streams at the Facility including the ETU and FTU, before it claims an exemption from this subpart. NASA must confirm whether these standards do or do not apply at the ETU and FTU, or any other site(s) that generates hazardous waste.

NASA must provide the as-built engineering drawings of the hazardous waste drain system or a drain diagram depicting all drains where hazardous wastes are placed.

Comment 38 Section 6.5
Section 6.5.6 of the WAP does not include waste characterization of the waste streams at the point of origination. *Point of waste origination* is defined at 20.4.1.600 NMAC, incorporating 40 CFR 265.1081 as "...the point where a solid waste produced in a system, process, or management unit is determined to be a hazardous waste as defined in 40 CFR part 261." It appears that there are multiple points of waste origination for the ETU (Figure 21.4).

NASA must include waste determination procedures at the point of origination for each waste stream discharging to the ETU and FTU, and procedures to re-evaluate the waste by direct method or acceptable knowledge at least annually for the purposes of compliance with 20.4.1.500 NMAC, incorporating 40 CFR part 264 subpart CC. NMED prefers the term "acceptable knowledge" (AK) as defined in the EPA WAP guidance. The definition and a portion of NMED's policy on the use of AK are summarized in Attachment 6.

NASA's WAP must incorporate both the AK terminology and methodology, as described in Attachment 6.

Comment 39 Section 6.5.6
NASA uses process knowledge to ensure compliance with 20.4.1.500 NMAC, incorporating 40 CFR part 264 subpart CC. However, a review of the WIWPS database revealed that multiple WIWPSs have not been reviewed and updated for 4 - 5 years (some up to 10-12 years). NASA must explain how waste determination is re-evaluated, if at all, for these waste streams.

Comment 40 Section 6.5
Section 20.4.1.500 NMAC, incorporating 40 CFR 264.13(b)(6) and 264.17, requires the identification of the methods or procedures used to ensure that incompatible wastes are not mixed (see Comments 5, 7, and 57). NASA's WAP Section 6.5.1 indicates that Table 6.4 lists the analytical method used to determine the characteristic of incompatibility. Table 6.4 also states that incompatibility will be determined through "MSDS review and process knowledge." NASA's WAP does not sufficiently identify a process that would preclude the possibility of mixing incompatible wastes. NASA must include significantly more procedural commitments in the WAP to ensure proper waste management, and at a minimum, must list compatibility characteristics that the wastes will be evaluated for (e.g., acids, bases, reactive metals, reactive hydrides, alcohols, aldehydes, halogenated/nitrated hydrocarbons, cyanide/sulfide solutions, oxidizers). NASA must add to the WAP all waste characterization information included in Permit Application section 11.0 (*Incompatible, Reactive, and Ignitable Wastes).*

WIWPS Database Comments
Enclosure 3, Disk 6

Comment 41 ETU
The analytical data from the HWDL sump and ETU tanks show that Freon 113®, isopropyl alcohol, ethylene glycol, acetone, methyl ethyl ketone, methylene chloride, vinyl chloride, and iodomethane were present in high concentrations in the samples obtained from the HWDL sump. This list may not be complete. NMED could not identify any waste streams (from the WIWPS database) with these products draining into the HWDL sump.

NASA must provide a list with all waste streams containing these constituents with their appropriate WIWPS numbers for streams that enter the HWDL sump.

Comment 42 WIWPS
The WIWPS database submitted by NASA was not complete. The waste characterization (implemented through the WIWPS database by NASA) must be used to ensure that the Permittee meets the regulatory obligations as a generator and at the permitted hazardous waste treatment units. Several regulations require completeness of information in the WIWPSs (see Attachment 3). NASA must update and revise the WIWPS database for the waste stream to the ETU and FTU by addressing the following comments:

1) All fields in the WIWPS form should be filled out; those that are not applicable should be marked with n/a;

2) The approximate dates of initial completion of the form should be filled out, including the date of review and following updates;

3) The supporting analytical data should be included in the comments or other fields. Alternatively, a comment should reference the exact location of the supporting data in the WAP or Permit Application. Comment such as "analytical data attached" is not specific about the location in an electronic database;

4) Waste stream descriptions should include both the brand names of the product and the compounds/composition of the product. NASA must update the description of each waste stream. For example, WIWPS 20-05-01 is titled as "Spent Neutraclean 7." The product Neutraclean 7 is obsolete and was replaced by the product Neutraclean 68. NASA must update all descriptions by deleting obsolete products.

5) Waste streams containing fuels and oxidizers should include a description of the corresponding grade, including impurities and additives.

6) All UHC and EPA hazardous waste numbers must be included.

7) NASA must provide hard copies of the WIWPS for all waste streams entering the ETU and FTU as an attachment to the WAP.

8) The description of the "Generation Process" must be expanded to include all necessary information required in Comments 25 and 27.

9) NASA must ensure that all the required information listed in Table 2-11 of the EPA WAP reference is contained in the NASA's WIWPS fields. Since NASA is a generator and TSD Facility, all information in this table is required.

Comment 43 40 CFR Subpart CC

NASA claims that waste stream 20-04-72 is not subject to 20.4.1.500 NMAC, incorporating 40 CFR part 264 subpart CC. The basis for this claim is a letter stating that the Henry's Law constant for the compound dimethyl-2-azidoethylamine (DMAZ) is much lower than the cut off value 1.8×10^{-6} relying on the Boiling Point (BP) values of the compounds dimethyl formamide and N-nitrosodimethylamine. After reviewing the physical properties of DMAZ, N-nitrosodimethylamine and dimethylformamide, it is clear that the comparison of DMAZ to the latter compounds and the use of the BP as a measure for the Henry's Law constant are inappropriate. Instead, the properties listed in the table below must be compared.

Properties	Dimethyl Formamide	N-nitrosodimethyl amine	Dimethyl-2-azidoethylamine	Methyl Hydrazine
Vapor Pressure mmHg	3.7 @ 25 °C	2.7 @ 20 °C	11-50 @ 20 °C	50 @ 25 °C
Water Solubility mg/L	Miscible 10^6	Miscible 10^6	Slight $<1 \times 10^4$	Miscible 10^6
Henry's Law Constant (atm-m^3/mol) @ 25 °C	3.4×10^{-7}	$1.02 - 2.06 \times 10^{-6}$	Greater than MMH $>3.86 \times 10^{-6}$	3.86×10^{-6}

Henry's Law constant can either be directly measured or it can be estimated from the vapor pressure and water solubility of the compound of interest. The table above shows that the vapor pressure and water solubility of DMAZ, N-nitrosodimethylamine, and dimethyl formamide are not compatible. The vapor pressure for DMAZ is similar to the vapor pressure of methyl hydrazine but their water solubility is different. However, the Henry's Law constant of a compound increases as the vapor pressure increases and as the water solubility decreases. Therefore, the Henry's Law constant for DMAZ must be

greater than the Henry's Law constant for methyl hydrazine because the water solubility of DMAZ is much lower. Thus, the estimated Henry's Law value for DMAZ is greater than the cut-off value for compliance with 40 CFR part 264 subpart CC.

Considering the unusual and rare nature of the compounds used at NASA WSTF, for the purposes of showing an exemption or compliance with 40 CFR part 264 subpart CC, NASA must use the direct method (Method 25D), which does not require evaluation of the Henry's Law constant of the constituents in the waste stream.

Material Safety Data Sheets (MSDS) Comments
Appendix 21-F

Comment 44
NASA must provide the current MSDS for the products contained in every waste stream. MSDSs were not provided or are outdated for the following WIWPS 10-20-13, 20-01-11, 20-01-13, 20-01-18, 20-01-22 (incomplete), 20-01-36, 20-01-38, 20-01-37, 20-01-45, 20-01-50, 20-01-52, 20-02-08, 20-02-10 (lubricant), 20-02-14, 20-02-16, 20-02-30, 20-03-12, 20-03-15, 20-03-28, 20-04-02, 20-04-49, 20-05-01, 20-05-09, 20-13-01, 20-13-02, 20-13-03, 20-13-04, 30-02-10, 80-04-01, 80-04-21, and 80-04-23. This list may not be complete.

Multiple MSDSs are outdated and do not reflect the most recent composition of the product. NASA must provide only the MSDS from the current companies supplying the products to NASA. If a MSDS does not contain a clear description of the composition in the product (all 100 percent) including the cases when there is proprietary content, then NASA cannot use AK and must perform direct measurement (Method 25D) for determining average VO concentration.

Comment 45
NASA must provide hard copies of all MSDSs for each waste stream entering the ETU and FTU and attach them to the WAP.

Comment 46
NASA claims no organic content in multiple waste streams where the MSDS or other source indicates the presence of organic compounds. These include WIWPS 20-02-01, 20-01-52, 20-02-01, 20-02-20, 20-05-01, and 20-05-06. This list may not be inclusive. After the review of current MSDSs, additional waste streams with organic content may be identified.

NASA must revise Appendix 21-F to include description of all waste streams with organic content.

Comment 47
NASA must provide MSDSs or update them for the following streams: 20-03-10, 20-03-11, 20-03-12, 20-03-13; 20-03-14, 20-03-15, 20-03-16; 20-03-21, 20-03-22, 20-03-23, 20-03-24, 20-03-25; and 20-03-26, 20-03-27, 20-03-28. NASA must explain how the determination of these non-hazardous waste streams (except for 20-03-12, 20-03-15, 20-03-25, and 20-03-28) was made because many of these waste streams contain constituents described as being hazardous in Attachment 4 (EPA brochure).

Permit Application Part B (continued)

Comment 48 Section 8.0 Inspection Plan
NASA must provide the Inspection Schedule in hard copy.

Comment 49 Section 8.0 Inspection Plan
NASA must revise the Inspection Schedule to include blank inspection log sheets for each inspection location/unit. The blank forms should provide sufficient space for comments or notes on the inspected items, including space for any repairs and remedial actions taken in case of equipment malfunction detected during inspections.

Comment 50 Section 8.0 Inspection Plan
NASA's Inspection Plan is very general. NASA must revise its Inspection Schedule to include a map with the inspection route for each inspected unit listed in the plan. Each inspection item must be identified in a location-specific or item-specific manner (NASA's number, route number, location description, or other identification). For example, the "indoors piping" item in Table 8.1 should specify every location where piping is inspected. Number or location should specify the item "valves".

Comment 51 Section 8.0 Inspection Plan
NASA must revise its Inspection Plan to include inspection of the carbon filtering system for the FTU tanks.

Comment 52 Section 8.0 Inspection Plan
NASA must revise its Inspection Plan to include a table caption or a column to the tables that describes where the inspection records are stored for each unit on the schedule. Alternatively, NASA may place this information in the WAP attachment that NASA is required to generate in Comment 19. The Inspection Plan must reference the inspection records location.

Comment 53 Section 10.0 Contingency Plan
NASA must provide the Contingency Plan in hard copy.

Comment 54 Section 10.0 Contingency Plan
NASA's Contingency Plan and Emergency Procedures, titled as "WSTF Emergency Preparedness Plan" (Appendix 10-A, WSP 25-0009), lacks several principal parts. NASA must revise the WSTF Emergency Preparedness Plan (EPP) to include checklists or flowcharts to specify the essential steps necessary to initiate, conduct, and terminate an emergency response action. NASA must construct the text in such a manner that it contains references to appropriate sections of the supporting annexes for detailed guidance on specific procedures.

NASA must revise its EPP to follow the guidance provided in Attachment 8 with all the elements applicable to the RCRA Contingency Plan and Emergency Procedures as shown in the ICP Development Matrix in Attachment 2 of the reference (Attachment 8). For consistency, NASA should use the same terms and titles in its EPP, as used in the reference. NASA may revise its EPP as an Integrated Contingency Plan (ICP) or as a Contingency Plan used solely for the purpose of the submitted RCRA Permit Application.

NASA's EPP does not include the following plan elements as required under 20.4.1.500 NMAC, incorporating 40 CFR part 264 Subpart D:

1. Initial Response:
    - Procedures for internal and external notifications with references to the appropriate annexes that give details on the subject;
    - Establishment of a response management structure with references to the appropriate annexes that give details on the subject;
    - Preliminary assessment with references to the appropriate annexes that give details on the subject;
    - Establishment of objectives and priorities for response with references to the appropriate annexes that give details on the subject
    - Implementation of tactical plan; and
    - Mobilization of resources.

2. Termination of follow-up actions.

NASA has included multiple annexes in its EPP. However, since these annexes are not referenced in the core part of the document, their timing and place in the emergency response scheme is unclear.

Comment 55 Section 11.1
NASA must provide a description of the comparability of the ETU and the HWDL sump waste composition with the tank liners, in the form of ranges of the pH, flash point, chemical composition, concentration of reactive cyanide and sulfides concentrations, weight of the accumulated sludge, and other applicable parameters.

Comment 56 Section 11.1
NASA states in section 11.1 that the WIWPS information includes chemical composition, chemical concentration, reactivity, pH, flash point, density, solubility, physical description, and generation process. The review of the WIWPS database submitted by NASA does not include any information or contains limited information on the chemical composition and concentration of the constituents in the wastes; no information on the reactivity and solubility of the wastes (there are no fields describing these properties); flash point information is omitted in most cases; and the generation process description is not complete (see Comment 25 and 27).

NASA must revise its Permit Application in accordance with the comments on WAP and the WIWPS database described earlier.

Comment 57 Section 11.1 & 11.2
NASA's WIWPS database contains multiple wastes with very low and high pH values (corrosive characteristic). However, neither the Permit Application, nor the WIWPSs describe how these wastes are neutralized before they are discharged to the HWDL or the ETU tanks. For example, the analytical data for the HWDL sump shows multiple pH values of 1, 2, 13, and 14, which indicates that the wastes drained to the HWDL are not neutralized as a part of the waste generation process. Similarly, the oxidizer wastes with pH equal to 1 or pH less than 1 drained directly to the tanks are not neutralized. The dilution procedure used by NASA is not effective in changing the pH of an aqueous solution (and thus achieving non-corrosive characteristic). For example, to increase/decrease the pH of the HWDL sump (with a capacity of 370 gallons) with one unit, NASA must dilute the waste ten times, i.e. with 3,700 gallons of water.

NASA must explain the procedures used in the Facility that ensure the wastes are rendered non-reactive, non-ignitable, and compatible before being discharged to the unit (see Comment 40).

Comment 58 Section 11.2
NASA states that as a part of the ETU tanks, the system includes hydrazine detector(s) (called interscans). Please specify the location of these detectors. The treatment process in the ETU is evaporation and volatilization of the wastes entering the unit. As such, the "treatment" merely transfers wastes from a liquid phase into a vapor phase. The

analytical data submitted for the ETU tanks does not contain direct measurements and calculations of the average volatile concentration in the ETU tanks. The data contains limited results for the volatile organics measured by SW-846 Methods 8240/8260, which does not include the concentrations of all volatile organic compounds managed in the ETU.

NASA must explain how this treatment, which produces gases, ensures protection of the human health and the environment (air in this case). NASA must submit, at a minimum, air calculations or obtain an air quality permit in order to conduct this "treatment", pursuant to 20.4.1.500 NMAC, incorporating 40 CFR 264.17(b)(5).

Comment 59 Section 11.3
NASA indicates that compliance with 20.4.1.500 NMAC, incorporating 40 CFR 264.17(c) is provided in the record submitted in the CD-ROM "Analytical Data." Due to the extensive quantity of records, NASA must provide summary tables indicating compliance with this section (see Comment 10).

Comment 60 Section 11.4
NASA must provide the information required in Comment 5 indicating how the hydrazine wastes will be separated from the oxidizer wastes to ensure comparability with the FTU design.

Comment 61 Section 11.4
NASA must revise its Permit Application to indicate how "treatment" by dilution in the FTU renders the wastes non-reactive and non-ignitable.

Comment 62 Section 11.5
NASA states "the storage tanks and associated piping are a closed system..." and "[t]his ensures that hydrazine(s) fumes, mists, or gasses are not present in the atmosphere around the unit." According to the engineering drawing submitted by NASA, the FTU tanks are not a closed system. Each FTU tank contains a vent to the atmosphere equipped with a filtering system.

NASA must describe how the vents are monitored in order to show compliance with the 20.4.1.500 NMAC, incorporating 40 CFR 264.17(b) (see Comments 85 and 86). Please describe the frequency of replacing the carbon filter cartridges because the inspection records do not contain this information.

Comment 63 Section 11.6
NASA must present all documentation indicating compliance with 20.4.1.500 NMAC, incorporating 40 CFR 264.17(a) and (b) in a concise manner and table format for ease of

review of the information. The information must contain any spills (major or minor), documentation required in Comments 59 through 61 and 86, and any other pertinent information as listed in 20.4.1.500 NMAC, incorporating 40 CFR 264.17(c).

Comment 64 Section 13.0 100-year Floodplain Areas
NASA states that the Facility is not located at the 100-year flood plain according to Figure 13.1. Maps, produced by the Federal Insurance Administration (FIA), usually exclude areas of the floodplain less than 200 feet in width. Therefore, it is not technically appropriate for NASA to use this map as a reference to this section.

NASA must revise the Permit Application to correct the contradictory language of this section. NASA must provide the complete report "Special Flood Hazards Information, White Sands Test Facility, NASA" of the original study performed by the U.S. Army Corps of Engineers, including calculations, cross sectional areas of the drainages, and good quality copies of the original maps. This report must be provided in hard copy.

Comment 65 Section 14.2 Training Plan
Table 14.1 does not include a training module on the FTU operations. NASA must revise its Training Plan to include training on the FTU system or justify its absence from the training plan. NASA must provide this document as a hard copy.

Comment 66 Section 15.0 Closure Plans
NASA's Closure Plans for the ETU and FTU (section 15.1 and 15.2) lack the information required under 20.4.1.500 NMAC, incorporating 40 CFR 264.112(b) for both Units. The closure plans must describe, in detail, the necessary steps to perform final closure of the units.

Comment 67 Post-Closure Plans
NASA must revise its Permit Application to include a section with Post-closure Plans for the ETU and FTU pursuant to 20.4.1.500 NMAC, incorporating 40 CFR 264.197(b).

Comment 68 Section 16.0 Topographic Maps
All maps required under this section must be provided in hard copy, in the size of the original map.

Comment 69 Section 16.0 Figure 16.1, 16.2, and 16.3
NASA must revise its Permit Application to provide a good quality, readable, topographic map.

Comment 70 Section 16.2 100-year Floodplain Areas
NASA must revise its topographic map to show the extent of all 100-year flood plains within the boundaries of the Facility.

Comment 71 Section 16.3 Figure 16.4 and 16.5
The legend of Figure 16.4 and 16.5 depicts the locations of the arroyos in the Facility as equivalent to ephemeral streams. NASA must correct this inaccuracy.

NASA must revise its topographic maps to indicate the location and the extent of any intermittent (including ephemeral) streams that may appear at different times of the year in parts of the arroyos due to rainfall, snowmelt, storms, springs, or Facility discharges. The maps must clearly indicate with different markings than those used for the arroyos, only those areas of the arroyos where the intermittent (ephemeral) waters accumulate for any amount of time.

Comment 72 Section 16.0
Due to the poor quality of the maps submitted by NASA, NMED cannot comment on the rest of the items in this section. NMED will comment on the requirements under 20.4.1.900 NMAC, incorporating 40 CFR 270.14(b)(19) when NASA submits revised maps (see Comment 69).

Clarification
NMED will not comment on Section 20.0 at this time. The comments on this section will be contained in the NOD Part 2.

ETU Operating Unit

Comment 73 Section 21.1 Certified Written Assessment
The useful life of the steel structure of the ETU tanks has expired according to the engineering assessment from January 1991, submitted in Appendix 21-A. Throughout their useful life, the tanks lacked appropriate corrosion protection, as stated in the assessment submitted in Appendix 21-B of the Permit Application. According to Attachment PA-IV-5-2 of the current NASA Operating Permit, the steel structural components were approved for use only until the current NASA Operating Permit expired.

The 1997 corrosion protection assessment did not include an evaluation of the bottom of the tanks for which the useful life was expiring. Therefore, the condition of the structure in 1997 was not identified in order to warrant additional useful life for the ETU tanks.

However, if the proper corrosion protection was installed at the time of construction of the ETU tanks in 1988, their useful life could have been 25 years as indicated by the 1997 report.

NASA must perform an assessment of the integrity of the bottom of the tanks and submit an engineering assessment report describing the condition of the tanks pursuant to 20.4.1.500 NMAC, incorporating 40 CFR 264.191(b). This report must include all ancillary equipment to the tanks, including the HWDL sump, and a summary of the annual assessments of the plastic liners.

Comment 74 Section 21.1
NASA must provide all certification assessments as hard copies.

Comment 75 Section 21.1 Corrosion Protection Report
NASA must perform an evaluation of the current corrosion protection system and submit an engineering assessment describing the current state of this system pursuant to 20.4.1.500 NMAC, incorporating 40 CFR 264.191(b). The document submitted by NASA in Appendix 21-D is not the required report.

Comment 76 Section 21.3
NASA must correct Figure 21.4 in accordance with Comment 6, and provide it in hard copy. All figures in Section 21 must be provided in hard copy, printed in the size of the original drawings.

Comment 77 Section 21.3
NASA must explain how the drains to the ETU tanks operate, such as whether the flow through the HWDL sump is constant or through batches; whether the practice of filling up the tanks is simultaneous or sequential, etc. Indicate the location of the hydrazine detectors (interscans) around the unit (see Comment 58).

Comment 78 Section 21.3
The waste streams listed in the Piping Diagram (Figure 21.4) do not correspond to Appendix 21-F and to the supplemental table "ETU Hazardous Waste" (Appendix 2-A). NASA must revise the diagram, Appendix 21-F, and the supplemental table to list the same waste streams. The supplemental table "ETU Hazardous Waste" and the Piping Diagram must be provided as hard copies.

Comment 79 Section 21.7
NASA must provide the letter (including in hard copy) from the NMED Secretary warranting an additional useful life of the secondary containment, the plastic liner, as stated by NASA in this section.

Comment 80 Section 21.9
NASA states "[a]ny spills occurring during containerized waste transfers to the evaporation tanks will be contained by the pump stations concrete pad." Please explain whether this pad is bermed or has a sump that will collect spills.

Comment 81 Section 21.0
NASA must provide a copy of the 200 Area Evaporation Tank System Log Book for the calendar 2002 and 2003 years.

Comment 82 Section 21.11 Air Emission Control System
NASA states in this section that the ETU is exempt from air controls because the average volatile organic (VO) concentration of each waste stream is less than 500 ppmw. NASA performed a limited initial determination of part of the waste streams to the ETU at the point of generation in 1995 and 1996 using direct measurements, but none since that time. Three waste streams during this initial evaluation indicated VO concentrations greater than the exempt value.

The majority of the waste streams discharged to the ETU were evaluated by NASA to have average VO concentrations less than 500 ppmw (the exempt value) using knowledge of the waste. However, NASA failed to provide the required information under 20.4.1.600 NMAC, incorporating 40 CFR 265.1084(a)(4)(i) and (ii). In Part B Permit Application NASA refers to the WIWPS database where the waste streams are described. This WIWPS database is incomplete, inaccurate, and outdated (see Comments 27, 39, 42, and 56).

Using the limited information provided by NASA in the WIWPS database, NMED researched MSDSs obtained by the manufacturers of many products contained in the waste streams to the ETU and generated the table in Attachment 9. This table contains thirty-one waste streams that discharge to the ETU. NMED used knowledge of the waste and the generation process to estimate the average VO concentration of each waste stream. All but one waste streams indicated VO concentrations greater than the exempt value. The table in Attachment 9 may not be inclusive.

Due to the disagreement between NASA and NMED concerning the exemption of the ETU from subpart CC, NASA must perform direct measurements in order to determine the average VO concentration for all wastes listed in Attachment 9 at the point of origination, and any other waste streams pursuant to 20.4.1.600 NMAC, incorporating 40 CFR 265.1084(a)(4)(iv). NASA must submit a schedule with exact dates and specific waste streams that will be sampled (including all streams in Appendix 9) at the corresponding event, in order to show that it qualifies for the exemption from the air

emission controls pursuant to subpart CC. The schedule must also contain a Sampling and Analysis Plan (SAP) for approval by NMED before conducting the sampling because NASA's current WAP does not include this waste evaluation. This SAP may be submitted as a part of the revised WAP. NASA must also review the updated WIWPS database, the updated MSDSs, and the generation process descriptions to determine which other waste streams may contain organics, and add these wastes to the sampling schedule.

NASA's long-term practice of dilution of the wastes at the ETU and at the multiple sinks, drainages, pipes, or others cannot be performed for the purposes of determining the average VO concentration. The waste streams must be sampled at the point of origination before they have been "pretreated" or diluted with water. Dilution of the waste streams for the purposes of avoiding compliance with the air emission controls under 40 CFR part 264 subpart CC is prohibited.

Alternatively, NASA may propose a schedule for an installation of air emission controls to the ETU or NASA may claim an exemption by a modification to the ETU design that will reduce the organic content of the mixed wastes by any of the means described in 20.4.1.500 NMAC, incorporating 40 CFR 264.1082(c)(2).

FTU Operating Unit

Comment 83 Section 22.1
NASA states "the FTU is operating as a tank storage unit (Part A Code S02)." This information contradicts the Part A Permit Application.

NASA must revise the language of this section to reflect the correct process code for the Unit.

Comment 84 Section 22.1
NASA must submit an updated engineering assessment of the FTU tanks describing the condition of the glass lining of the tanks, which may have been subject to a corrosive waste. NASA must explain whether there is an annual re-certification performed for the FTU tanks and the ancillary equipment of the system. All engineering assessments must be provided in hard copy.

Comment 85 Section 22.1 Appendix 22-A
NASA submitted the written assessment of the FTU dated March 31, 1994. Appendix B of the assessment includes a subsurface soil investigation dated March 1988 from the 200

Area. The FTU system is located at the 500 Area. NASA must explain this inconsistency.

Appendix F of the assessment contains the Hazard Analysis Report. The table in the report lists as hazard 2 (pdf page 1003) the "detonation or deflagration" of the contents of the tanks. The concentration of the liquids in the tanks must be less than 10 percent hydrazine in order for the hydrazine vapor phase to be less than the low explosive limit (LEL) of 2 percent. NMED reviewed the calculations submitted on pdf page 1011, and requests the following information:

- NASA must provide an excerpt from the quoted report and explain all the symbols used in the formula (log p^{sat}=...) and the associated units;
- NASA must specify the hydrazine compound for which these calculations were made;
- NASA must revise its calculations and the corresponding units: the pressure units must be in *psi*, *kPa*, *atm* or *mmHg* only, not *psia*;
- NASA must have the calculations dated and the person performing the calculations listed on the attachment;
- NASA must include calculations of the evaporation rate of the aqueous mixture; and
- The calculation must also contain a computation of the vapor organic concentration (which could be identical to the hydrazine vapor phase numbers), which according to the recommendations in Appendix 22-C must be less than 25 percent of the LEL (2 percent).

Comment 86 Section 22.1 Appendix 22-C

NASA submitted the memorandum dated August 16, 1993, that describes the proposed design of the air emission controls for the FTU. NASA states that the numbers presented in this evaluation "are preliminary estimates and may require further review."

NASA must provide a final calculation if the current design of the system is different than this preliminary design.

NMED notes several problems in Appendix 22-C: the maximum concentration in the air emission stream is listed as being 6,500 ppmv when the current maximum concentration is greater than 100,000 ppmv (the references used to estimate this number are provided in

Attachment 10); the estimates were conducted for MMH instead of UDMH; and the working and breathing losses per EPA AP-42 were estimated to be 5 lbs per year when the actual number is greater than 500 lbs per year using the reference in Attachment 10.

NASA must revise the calculations for the air emissions in the FTU and evaluate the current filtering system against the updated design data.

The conclusions of the memorandum in Appendix 22-C were that this preliminary design carbon filtering system is not adequate to meet the requirements of the RCRA air emission regulations. NASA must describe how the current carbon filters meet these requirements. NASA must describe the organic vapor efficiency of the carbon filters/canisters used by the system, filter performance as listed by the manufacturer including the adsorption capacity, and the total annual amount of carbon currently used by the FTU filtering system.

Comment 87 Section 22.2
NASA states that "[u]nder no scenario of individual or mixtures of waste, at 10% fuel, does the volatile organic content exceed 500 ppmw." Concentrations of 10 percent hydrazine and derivatives are equivalent to 100,000 ppm. Three of the hydrazines handled in the Unit are volatile organic compounds. The wastes in the FTU do exceed 500 ppmw, and therefore, they are subject to the air emission controls under subpart CC.

NASA must revise this section to correct the inaccuracy.

Comment 88 Section 22.2
NASA states that the hydrazine(s) wastes handled at the FTU are non-characteristic waste. Please explain how this determination was made (specific direct measurements, knowledge of properties, etc.).

Comment 89 Section 22.3
NASA states in this section that another route of disposal after treating the wastes in the FTU is to be "mixed with water to 330 ppmw or less and transferred to the ETU for treatment." The treatment of hydrazine wastes (see Comment 6) by dilution, evaporation and volatilization violates the treatment standards, pursuant to 20.4.1.800 NMAC, incorporating 40 CFR 268.40.

NASA must immediately cease "treatment" by dilution of any hydrazine wastes in the ETU regardless of the concentration of these compounds in the wastes, and correct the erroneous language in the Permit Application.

Dilution for safety reasons may be appropriate for the treatment in the FTU. However, dilution of any wastes for the purposes of avoiding the air control emissions (in this case in the ETU) under 40 CFR part 264 subpart CC is prohibited. For any waste the average VO concentration must be determined at the point of origination, not after dilution. If the average VO concentration of the wastes at the point of origination is greater than 500 ppmw, "adjustment" of this concentration is inappropriate.

The review of the analytical data submitted for the wastes at the FTU shows that no hydrazine wastes should be discharged in the ETU because their volatile organic concentration is greater than 500 ppmw. NASA must immediately cease discharging of hydrazine waste to the ETU.

Comment 90 Section 22.3
NASA states that the FTU record "includes the fluid level in the storage tank(s), the name of the waste, its WIWPS number, its origin, volume, fuel concentration, and the date of the transfer."

NASA must provide this record and copies of the manifests compiled at the times that the waste was shipped to an off-site facility.

Comment 91 Section 22.4 Diagrams
All as-built drawings of the FTU system must be provided in hard copy in the same size as the original drawings. NASA must provide as-built drawings for the tanks as well.

Comment 92 Section 22.4 Diagrams
The listed waste streams in Figure 22.9 do not correspond to the waste streams listed in supplemental table "FTU Hazardous Waste" in Appendix 2-A (pdf pages 55 - 57). Multiple waste streams listed in the supplemental table do not contain the corresponding EPA hazardous waste numbers. NASA must revise its Permit Application to correct these inconsistencies. The supplemental table "FTU Hazardous Waste" and Figure 22.9 "Process Flow Diagram" must be provided in hard copy.

Comment 93 Section 22.11 Air Emission Control System
NASA states that the air emission controls for the FTU system are conducted using Tank Level I controls. However, while the maximum organic vapor pressure for the tank system may require Tank Level I controls, the design of the system, as it is constructed falls in the category of Tank Level II controls.

NASA must either change the design of the FTU system by closing the vent to the atmosphere if it chooses to apply Tank Level I controls, or NASA must revise the language of its Permit Application to list the FTU system as using Tank Level II controls for the air emissions from the Unit.

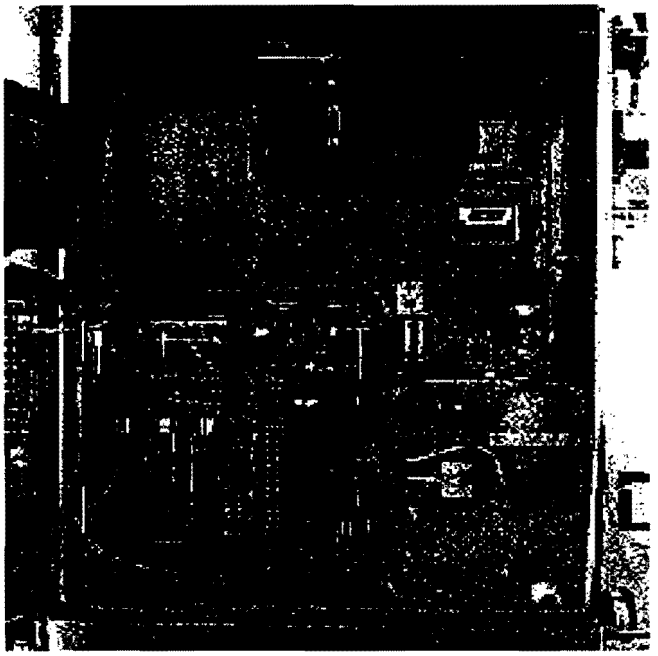
Technical Comments
RCRA Permit Renewal Application
NOD Part 1

ATTACHMENT 2

Dinitrogen Tetroxide Hazardous Waste Stream
NASA Kennedy Space Center

NASA Success Story

Improved Nitrogen Oxide (NOx) Scrubber



NASA and I-NET Inc. (the former Engineering Support Contractor now held by Dynacs Engineering Co.), jointly developed an innovative control system and process which converts hypergolic oxidizer waste to a useful fertilizer, which can be used by KSC. It was necessary to design a control system that integrates a new hydrogen peroxide controller, pH controller, and a potassium nitrate conductivity monitor into a system that converts waste nitrogen tetroxide, the hypergolic oxidizer, into fertilizer. When fully implemented, control systems will be installed on several oxidizer scrubbers at KSC. The control system has potential for use at any location where the quantity of oxidizer requires a scrubber, including Launch Complex 40 at Cape Canaveral Air Station, Vandenberg Air Force Base in California, and White Sands Test Facility, New Mexico. Any commercial industries where oxides of nitrogen are released, such as metal finishing operations, could also use the technology.

NASA Involvement Space Shuttle steering rockets use nitrogen tetroxide as their propellant, a highly toxic substance. Pipeline residuals are purged through scrubbers to capture the nitrogen tetroxide and byproducts to avoid atmospheric pollution. The scrubber liquor is a hazardous waste requiring careful disposal. In an effort to eliminate a waste stream of 250,000 gallons per year, NASA participated in the development of a control system to convert hazardous nitrogen oxide scrubber liquor to a useful, beneficial, and marketable fertilizer. No commercial controller exists that can provide hydrogen peroxide in the concentration range of 0.5 to 5.0 percent. The development

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Prepared by Dynacs, Inc.
Success Story ID # 1985
August 2000

NASA Success Story

Improved Nitrogen Oxide (NOx) Scrubber (Continued)

of the hydrogen peroxide controller was the primary technical accomplishment. It was necessary to design and build a controller that could handle the difference between hydrogen peroxide and the oxides of nitrogen. A controller was designed that used the oxidation of hydrogen peroxide with sodium hypochlorite (bleach) to produce oxygen; then the resulting pressure was measured. Since the pressure is directly proportional to the hydrogen peroxide concentration, the controller monitors pressure and adds hydrogen peroxide as required to maintain the required concentration. Other requirements were to integrate the pH controller, scrubber liquor level controller, system diagnostics, output of system status, and remote control of the system from the operations control panel.

Social/Economic Benefit The process eliminates KSC's second largest waste stream (and the associated waste disposal costs), replaces 10 percent of the potassium nitrate fertilizer purchased, and does not add significantly to the raw material costs. The overall cost savings is approximately $80,000 per year. The Scrubber also provides safety and environmental improvements by reducing workers risk of exposure to toxic nitrogen oxide emissions by a factor of 10 to 200. When fully implemented, control systems will be installed on several oxidizer scrubbers at KSC.

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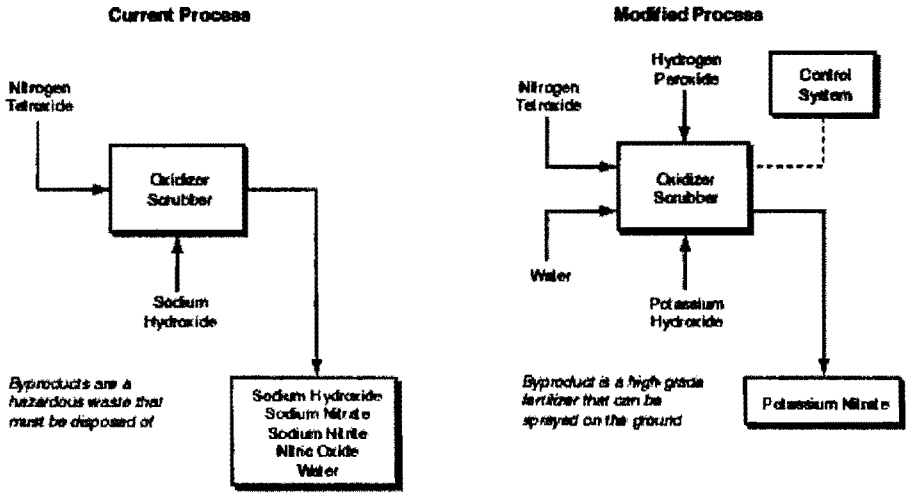
Installation of a New Scrubber Liquor for the Nitrogen Tetroxide Scrubbers That Produces a Commercial Fertilizer

NASA, in conjunction with Dynacs Engineering Co., Inc., and United Space Alliance, is installing a prototype of the new scrubber-liquor control system that converts nitrogen tetroxide (the hypergolic oxidizer) to a fertilizer. The fertilizer produced by this process will be used on the citrus groves at KSC. This project is in Phase V of a five-phase program to comply with Executive Orders 12856 and 12873, the Right-to-Know Laws, and the Recycling and Waste Prevention Law. Hypergolic propellants are used in spacecraft such as the Space Shuttle, Titan IV, Delta II, and other vehicles and payloads launched at KSC and Cape Canaveral Air Station. Monomethylhydrazine (MMH), nitrogen tetroxide (N2O4 or NTO), and hydrazine (N2H4 or HZ) are the main propellants of concern. Fueling and deservicing spacecraft constitute the bulk of operations in which environmental emissions of nitrogen oxide (NOx) occur. The scrubber liquor waste generated by the oxidizer scrubbers (approximately 311,000 pounds per year) is the second largest waste stream at KSC. The disposal cost for this oxidizer scrubber liquor waste is approximately $0.227 per pound or $70,600 a year.



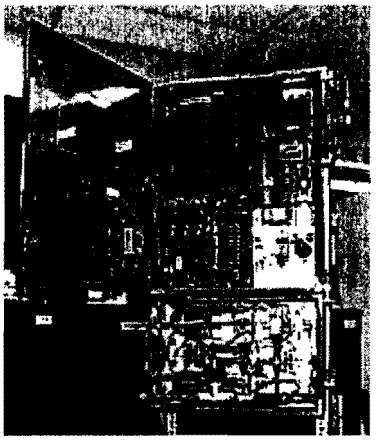
Process Converting Nitrogen Tetroxide Wastes to Potassium Nitrate, a Commercial Fertilizer

The new process will convert the scrubber liquor to a high-grade fertilizer (see the flowchart). The process reacts N2O4 with hydrogen peroxide and potassium hydroxide and produces potassium nitrate, a major ingredient in commercial fertilizers. This process avoids the generation of the hazardous wastes, which occurs when sodium hydroxide is used as the scrubber liquor. A patent application that covers the process has been filed with the U.S. Patent and Trademark Office.

A feature of the new process is lower NOx emissions, since the new scrubber is more efficient at capturing nitrogen tetroxide than the current scrubber liquor. For example, when the two scrubber liquors were compared under similar test conditions, the emissions from the new scrubber liquor were only 1 to 10 percent of the emissions from the current scrubber liquor. A major effect of lower NOx emission will be to reduce the size of the area around the oxidizer scrubbers that must be cleared during operations, thus reducing the impact of toxic hypergolic oxidizer emissions on adjacent operations.

The new scrubber liquor and control system was tested with nitrogen dioxide (NO2) concentrations from

low parts per million to pure vapor. To simulate operations at KSC where aspirators are used to capture NO2 vapor, up to 500 standard cubic feet per minute of gaseous nitrogen (GN2) were added to the NO2 stream. In addition, approximately 90 pounds of oxidizer (vapor and liquid) were added over a 1- to 9-minute period to the scrubber. Under all of these test conditions, the new scrubber-liquor system performed well and produced lower emissions. The only problem encountered during the field tests, which will require slight modifications to the scrubber, was due to inadequate mixing in the scrubber sump. These mixing problems are being corrected during the current installation by changing the point of addition of the reagents.



Control Panel for the Oxidizer Scrubber Control System

In summary, this change in the scrubber liquor has eliminated the second largest hazardous waste stream at KSC and produced a product that is approved for application as fertilizer to the lawns and citrus groves at KSC. This new scrubber liquor is a 15-weight-percent potassium nitrate solution with 0- to 1-weight-percent hydrogen peroxide and a pH of 7. The system is more efficient and less expensive than the current 25-weight-percent sodium hydroxide, when all factors including waste disposal, fertilizer replacement, and handling a hazardous waste (the spent oxidizer scrubber liquor) are considered.

Key accomplishments:

Developed a method to eliminate the second largest waste stream at KSC (oxidizer scrubber-liquor waste).

Developed internal diagnostics that monitor the performance of the control system.

Developed a production process for potassium nitrate, a fertilizer currently purchased by KSC for use on lawns and citrus groves.

Demonstrated that the process control system is robust and can withstand field operations.

Demonstrated that the scrubber liquor is more efficient with only 1 to 10 percent of the emissions found with the current 25-weight-percent sodium hydroxide scrubber liquor.

Contacts:

R.C. Young (Rebecca.Young-1@ksc.nasa.gov), and D.E. Lueck, MM-G2, (321) 867-4439

Participating Organization:

Dynacs Engineering Co., Inc. (C.F. Parrish, C.J. Schwindt, T.R. Hodge, and P.H. Gamble)

ATTACHMENT 3
Data Quality Objectives (DQOs) Associated with Waste Analysis Plan (WAP)

Waste characterization data obtained through WAP implementation shall be used to ensure that the Permittee meets regulatory obligations at permitted hazardous waste treatment and storage units. One of the DQOs that shall be met for all waste characterization will be to comply with the following applicable Resource Conservation and Recovery Act (RCRA) regulatory requirements:

1. Determine all information which must be known to treat, store and dispose of the wastes in accordance with New Mexico's Hazardous Waste Regulations (20.4.1.500 NMAC, incorporating 40 CFR 264.13 (a)(1));

2. Determine if the waste is hazardous (20.4.1.300 NMAC, incorporating 40 CFR 262. 10 (c), 262.11);

3. Ascertain the hazardous constituents in a waste stream to identify all applicable hazardous waste codes and all underlying hazardous constituents (20.4.1.300 NMAC, incorporating 40 CFR 262.11; and 20.4.1.800 NMAC, incorporating 40 CFR 268.7 (a)(2) and 268.9 (a));

4. Ascertain whether the waste must be treated before it can be land disposed (20.4.1.800 NMAC, incorporating 40 CFR 268.7 and 268.9);

5. Ascertain whether a routine waste generating process has changed sufficiently to create a new waste stream that may require alternative regulatory requirements (20.4.1.500 NMAC, incorporating 40 CFR 264.13 (a)(3)(i); 20.4.1.800 NMAC, incorporating 40 CFR 268.7 (a)(3)(iii) and 268.7 (b)(3)(ii));

6. Facilitate appropriate waste packaging for transportation (20.4.1.300 NMAC, incorporating 40 CFR 262.10 (h));

7. Demonstrate the adequacy of treatment activities (both permitted and non-permitted) with respect to meeting treatment goals and standards (20.4.1.900 NMAC, incorporating 40 CFR 270.23 (d); 20.4.1.500 NMAC, incorporating 40 CFR 264.601(c)(1); 20.4.1.800 NMAC, incorporating 40 CFR 268.7 (a)(5));

8. Ascertain the presence and concentration of waste constituents that might cause unlawful air emissions (20.4.1.900 NMAC, incorporating 40 CFR

270.25 (a); 20.4.1.500 NMAC, incorporating 40 CFR 264.179, 264.200, 264.13 (b)(6), 264.601 (c)(1), 264.1050, and 264.1082);

9. Ensure that wastes received from off-site match the identity of the wastes on the accompanying manifests (20.4.1.500 NMAC, incorporating 40 CFR 264.13);

10. Ensure that wastes are not inappropriately diluted to avoid LDR treatment requirements (20.4.1.800 NMAC, incorporating 40 CFR 268.3);

11. Determine the presence of prohibited materials (20.4.1.800 NMAC, incorporating 40 CFR 268.50 (f));

12. Determine the presence of free liquids in wastes (20.4.1.900 NMAC, incorporating 40 CFR 270.15 (b)(1); 20.4.1.500 NMAC, incorporating 40 CFR 264.13 (b)(6));

13. Ascertain waste/waste and waste/container compatibility characteristics (20.4.1.900 NMAC, incorporating 40 CFR 270.15 and 270.16; 20.4.1.500 NMAC, incorporating 40 CFR 264.172, 264.177, and 264.199); and

14. To ascertain waste ignitability and reactivity characteristics (20.4.1.900 NMAC, incorporating 40 CFR 270.16 (j); 20.4.1.500 NMAC, incorporating 40 CFR 264.17 (a) and 264.198 (a)).

Waste Analysis Plans must fully elaborate on how the facility will comply with all applicable DQOs for all waste streams. The DQOs should be established early and prominently in a WAP and be referred to frequently.

Technical Comments
RCRA Permit Renewal Application
NOD Part 1

ATTACHMENT 4

EPA Brochure Listing Hazardous
Chemicals in Photographic Wastes

U.S. Environmental Protection Agency

FedSite

Facility Regulatory Tour
- Grounds
- Wastewater
- Construction
- Transportation
- Manufacturing Shops
- Vehicle Maintenance
- Storage Tanks
- Hazardous Waste
- Office Complexes
- Medical Clinics
- Site Remediation

Executive Orders
- 13148 - Greening Government

Federal Agency Homepages

State Environmental Programs

EXPLORERS' CLUB FOR KIDS!

Photographic Chemicals - Impact and Regulations

- Pollution Prevention Worksheet
- Mercury
- Photographic Chemicals
- Medical and Infectious Waste
- Solvent Wastes

Many different federal facilities use photographic chemicals, with medical clinics being one of the most common. These clinics generally have radiology equipment onsite from which x-rays are taken and developed. Federal facilities that perform other types of research can also have photographic chemicals on-site. The photographic developing solutions used in photoprocessing consist of two parts, a fixer and a developer. With color developing, a third component, a bleach, is also used in the developing process. All developer and fixer solutions have different chemical formulas, varying by manufacturer. Some of the chemicals commonly used in the photoprocess are listed in the table below, along with their use in the process.

Chemicals
SilverFilm and paper
ChromiumBleach and system cleaner
ZincColor photography only
SeleniumToner
Cyano complexesBleach
HydroquinoneDeveloper
AmmoniumFixer
XyleneSystem cleaner
1-1-1 TrichloroethaneSystem cleaner

At least 30 different chemicals used in photoprocessing are considered highly toxic, and only some of them are included in the table to the left. Most of these chemicals are strictly regulated by Federal, State, and Local authorities. These chemicals are commonly found in concentrations that qualify the waste solutions as hazardous and they must be managed as such. In general, hazardous wastes generated and then stored on-site for later disposal are regulated by RCRA. Chemical wastes discharged down the drain are regulated under the Clean Water Act. Labs often discharge waste solutions to local Publicly Owned Treatment Works (POTWs). In some localities, facilities are required to meet certain "pretreatment" standards before releasing wastewater into the municipal system. Pretreatment standards are necessary so that

the POTW can meet its discharge limits established under EPA's National Pollutant Discharge Elimination System (NPDES) permit program. Many wastewater treatment plants are subject to numerical limits for contaminants discharged from the plant. In order to meet the NPDES permit limits, facilities upstream may need to pretreat their wastes. Contact local officials to see if you are required to pretreat your waste water.

Few, if any, photoprocessing facilities use enough chemicals to necessitate Clean Air Act regulations.

Among the many hazardous chemicals, a few deserve special attention. Heavy metals like silver, chromium, and selenium are present in photographic films and papers. Leftover processing solutions may therefore contain significant concentrations of these metals. For example, these solutions can typically contain between 2,000 and 5,000 mg/L of silver. The highest concentration that can be discharged to US waters is 5 mg/L. Most silver recovery systems remove silver from the solutions to lower the concentration significantly. The recovered silver is considered hazardous waste however, and is regulated by RCRA if stored on-site in sufficient quantities for an extended period of time.

Solvents are used in photoprocessing to clean the machines. Many of them are highly toxic to human and animal health and should never be discarded into drains. If used solvents are accumulated on-site, these too are regulated under RCRA as hazardous waste and must be managed accordingly.

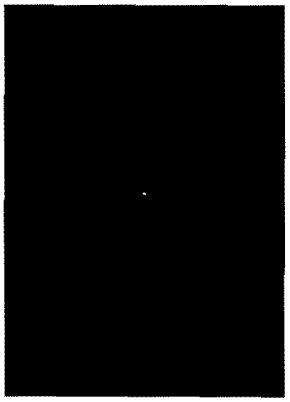
Regulations

- 40 CFR Part 122 - This section outlines the NPDES program. If your facility directly discharges wastewater to the ground or a stream via a ditch or pipe, this section should be reviewed to determine if a NPDES permit is required. Note that many states have been authorized by EPA to run the permit program.
- 40 CFR Part 261 - This section describes how hazardous wastes are identified. Photoprocessing labs should focus on 261.24, where the toxicity levels of compounds containing silver, chromium, and selenium are listed. After determining what chemicals are present in your facilities photoprocess, consult this list to see if their concentrations qualify them as hazardous waste. Section 261.5 describes how hazardous waste generators are categorized according to the quantity of hazardous waste generated per month.
- 40 CFR Part 262 - Part 262 contains the regulations regarding hazardous waste accumulation, labeling, and shipment off-site for recycling and disposal.
- 40 CFR Part 266.70 - This section deals specifically with recovery of precious metals. Facilities should consult it to see if RCRA applies to their silver recovery and recycling operations.
- 40 CFR Part 403 - This section outlines the pretreatment responsibilites of facilities served by POTW's. You will need to check with your local treatment plant to determine if you are responsible for pretreating the water entering the system.

P2

- Digital X-Ray

Click the link on the left to Download Pollution Prevention Project Templates



Pollution Prevention Project Templates

Back to Medical Clinics

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Last updated on Friday, June 20th, 2003
URL: http://www.epa.gov/fedsite/medical/photo.html

Technical Comments
RCRA Permit Renewal Application
NOD Part 1

ATTACHMENT 5

Excerpts from Poor Quality Analytical Data

ALLIED SIGNAL TEAM

Client Sample ID: 0111290706-0708-0710 200SUMP(TOP)

GC/MS Volatiles

Lot-Sample #...: D1K300258-002 **Work Order #...:** EPQQ11AA **Matrix.....:** WATER
Date Sampled...: 11/29/01 07:06 **Date Received..:** 11/30/01
Prep Date.....: 12/13/01 **Analysis Date..:** 12/13/01
Prep Batch #...: 1348269 **Analysis Time..:** 13:02
Dilution Factor: 1333

Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	ND	7100000000	ug/L
Acetonitrile	ND	1400000000	ug/L
Acrolein	ND	1400000000	ug/L
Acrylonitrile	ND	1400000000	ug/L
Benzene	ND	710000000	ug/L
Bromodichloromethane	ND	710000000	ug/L
Bromoform	ND	710000000	ug/L
Bromomethane	ND	1400000000	ug/L
Carbon disulfide	ND	710000000	ug/L
Carbon tetrachloride	ND	710000000	ug/L
Chlorobenzene	ND	710000000	ug/L
Chloroprene	ND	710000000	ug/L
Dibromochloromethane	ND	710000000	ug/L
Chloroethane	ND	1400000000	ug/L
Chloroform	ND	710000000	ug/L
Chloromethane	ND	1400000000	ug/L
Allyl chloride	ND	1400000000	ug/L
Dibromomethane	ND	710000000	ug/L
trans-1,4-Dichloro-2-butene	ND	710000000	ug/L
Dichlorodifluoromethane	ND	1400000000	ug/L
1,1-Dichloroethane	ND	710000000	ug/L
1,2-Dichloroethane	ND	710000000	ug/L
1,1-Dichloroethene	ND	710000000	ug/L
1,2-Dichloroethene (total)	ND	710000000	ug/L
Dichlorofluoromethane	ND	1400000000	ug/L
1,2-Dichloropropane	ND	710000000	ug/L
cis-1,3-Dichloropropene	ND	710000000	ug/L
trans-1,3-Dichloropropene	ND	710000000	ug/L
1,4-Dioxane	ND	1400000000	ug/L
Ethylbenzene	ND	710000000	ug/L
Ethyl methacrylate	ND	710000000	ug/L
Trichlorofluoromethane	ND	1400000000	ug/L
2-Hexanone	ND	3600000000	ug/L
Iodomethane	ND	710000000	ug/L
Isobutyl alcohol	ND	3600000000	ug/L
2-Propanol	**27000 J**	**5300000000**	**ug/L**

(Continued on next page)

ALLIED SIGNAL TEAM

Client Sample ID: 0111290706-0708-0710 200SUMP(TOP)

GC/MS Volatiles

Lot-Sample #...: D1K300258-002 **Work Order #...:** EPQQ11AA **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methacrylonitrile	ND	7100000000	ug/L
Methylene chloride	ND	710000000	ug/L
Methyl methacrylate	ND	710000000	ug/L
4-Methyl-2-pentanone	ND	3600000000	ug/L
Propionitrile	ND	3600000000	ug/L
Styrene	ND	710000000	ug/L
1,1,1,2-Tetrachloroethane	ND	710000000	ug/L
1,1,2,2-Tetrachloroethane	ND	710000000	ug/L
Tetrachloroethene	ND	710000000	ug/L
Tetrahydrofuran	ND	3600000000	ug/L
Toluene	ND	710000000	ug/L
1,1,1-Trichloroethane	ND	710000000	ug/L
1,1,2-Trichloroethane	ND	710000000	ug/L
Trichloroethene	ND	710000000	ug/L
1,2,3-Trichloropropane	ND	710000000	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	**41000 J**	**710000000**	**ug/L**
Vinyl acetate	ND	1400000000	ug/L
Vinyl chloride	ND	1400000000	ug/L
Xylenes (total)	ND	710000000	ug/L
1,2-Dichloro-1,1,2-trifluoroethane	ND	710000000	ug/L
1,2-Dibromo-3-chloropropane (DBCP)	ND	1400000000	ug/L
1,2-Dibromoethane (EDB)	ND	710000000	ug/L
2-Butanone (MEK)	ND	3600000000	ug/L
2,2-Dichloro-1,1,1-Trifluoroethane	ND	710000000	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	101	(80 - 120)
1,2-Dichloroethane-d4	108	(72 - 127)
4-Bromofluorobenzene	100	(79 - 119)
Toluene-d8	107	(79 - 119)

NOTE(S):

J Estimated result. Result is less than RL.

ALLIED SIGNAL TRAM

0111290706-0708-0710 200SUMP(TOP)

GC/MS Volatiles

Lot-Sample #: D1K300258-002 **Work Order #:** EPQQ11AA **Matrix:** WATER

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS

PARAMETER	CAS #	ESTIMATED RESULT	RETENTION TIME	UNITS
None				ug/L

ALLIED SIGNAL TEAM

Client Sample ID: 0111290800-0802-0804 200SUMP(BOTTOM)

GC/MS Volatiles

Lot-Sample #...: D1K300258-003 **Work Order #...:** EPQQ51AA **Matrix.....:** WATER
Date Sampled...: 11/29/01 08:00 **Date Received..:** 11/30/01
Prep Date.....: 12/13/01 **Analysis Date..:** 12/13/01
Prep Batch #...: 1348269 **Analysis Time..:** 10:53
Dilution Factor: 400

Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	ND	1600000	ug/L
Acetonitrile	ND	3200000	ug/L
Acrolein	ND	3200000	ug/L
Acrylonitrile	ND	3200000	ug/L
Benzene	ND	160000	ug/L
Bromodichloromethane	ND	160000	ug/L
Bromoform	ND	160000	ug/L
Bromomethane	ND	320000	ug/L
Carbon disulfide	ND	160000	ug/L
Carbon tetrachloride	ND	160000	ug/L
Chlorobenzene	ND	160000	ug/L
Chloroprene	ND	160000	ug/L
Dibromochloromethane	ND	160000	ug/L
Chloroethane	ND	320000	ug/L
Chloroform	ND	160000	ug/L
Chloromethane	ND	320000	ug/L
Allyl chloride	ND	320000	ug/L
Dibromomethane	ND	160000	ug/L
trans-1,4-Dichloro-2-butene	ND	160000	ug/L
Dichlorodifluoromethane	ND	320000	ug/L
1,1-Dichloroethane	ND	160000	ug/L
1,2-Dichloroethane	ND	160000	ug/L
1,1-Dichloroethene	ND	160000	ug/L
1,2-Dichloroethene (total)	ND	160000	ug/L
Dichlorofluoromethane	ND	320000	ug/L
1,2-Dichloropropane	ND	160000	ug/L
cis-1,3-Dichloropropene	ND	160000	ug/L
trans-1,3-Dichloropropene	ND	160000	ug/L
1,4-Dioxane	ND	32000000	ug/L
Ethylbenzene	ND	160000	ug/L
Ethyl methacrylate	ND	160000	ug/L
Trichlorofluoromethane	ND	320000	ug/L
2-Hexanone	ND	800000	ug/L
Iodomethane	ND	160000	ug/L
Isobutyl alcohol	ND	8000000	ug/L
2-Propanol	**41000 J**	**12000000**	**ug/L**

(Continued on next page)

ALLIED SIGNAL TEAM

Client Sample ID: 0111290800-0802-0804 200SUMP(BOTTOM)

GC/MS Volatiles

Lot-Sample #...: D1K300258-003 **Work Order #...:** EPQQ51AA **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Methacrylonitrile	ND	1600000	ug/L
Methylene chloride	ND	160000	ug/L
Methyl methacrylate	ND	160000	ug/L
4-Methyl-2-pentanone	ND	800000	ug/L
Propionitrile	ND	800000	ug/L
Styrene	ND	160000	ug/L
1,1,1,2-Tetrachloroethane	ND	160000	ug/L
1,1,2,2-Tetrachloroethane	ND	160000	ug/L
Tetrachloroethene	ND	160000	ug/L
Tetrahydrofuran	ND	800000	ug/L
Toluene	ND	160000	ug/L
1,1,1-Trichloroethane	ND	160000	ug/L
1,1,2-Trichloroethane	ND	160000	ug/L
Trichloroethene	ND	160000	ug/L
1,2,3-Trichloropropane	ND	160000	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	**10000 J**	**160000**	**ug/L**
Vinyl acetate	ND	320000	ug/L
Vinyl chloride	ND	320000	ug/L
Xylenes (total)	ND	160000	ug/L
1,2-Dichloro-1,1,2-trifluoroethane	**200 J**	**160000**	**ug/L**
1,2-Dibromo-3-chloropropane (DBCP)	ND	320000	ug/L
1,2-Dibromoethane (EDB)	ND	160000	ug/L
2-Butanone (MEK)	ND	800000	ug/L
2,2-Dichloro-1,1,1-Trifluoroethane	ND	160000	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Dibromofluoromethane	103	(80 - 120)
1,2-Dichloroethane-d4	114	(72 - 127)
4-Bromofluorobenzene	105	(79 - 119)
Toluene-d8	99	(79 - 119)

NOTE(S):

J Estimated result. Result is less than RL.

ALLIED SIGNAL TEAM

0111290800-0802-0804 200SUMP(BOTTOM)

GC/MS Volatiles

Lot-Sample #: D1K300258-003 **Work Order #:** EPQQ51AA **Matrix:** WATER

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS

PARAMETER	CAS #	ESTIMATED RESULT	RETENTION TIME	UNITS
None				ug/L

TRACEANALYSIS, INC.

ANALYTICAL REPORT

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
2026 Hawkins Blvd. El Paso, Texas 79922 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail: lab@traceanalysis.com

CLIENT NASA/WHITE SANDS/HOLLOMAN
PO BOX 20
LAS CRUCES, NM 88004

SAMPLE NO.: 20001347
INVOICE NO.: 22105472
REPORT DATE: 05-05-00
REVIEWED BY:
PAGE : 1 OF 4

CLIENT SAMPLE ID : 0003300700-0702-0704
SAMPLE TYPE .....: Water
SAMPLED BY .....: --
SUBMITTED BY ....: --
SAMPLE SOURCE ...: 200 Sump Top Phase
ANALYST .....: B.Murphy

AUTHORIZED BY : ES
CLIENT P.O. : --
SAMPLE DATE ...: 03-30-00
SUBMITTAL DATE : 03-31-00
EXTRACTION DATE: --
ANALYSIS DATE .: 04-11-00

REMARKS -

Detection limits raised due to dilution. Sample pH was 12.
Surrogate 4-Bromofluorobenzene was out of acceptance criteria in the sample. Laboratory Control Spike and Matrix Spike.
Surrogate Dibromofluoromethane was out of acceptance criteria in the Matrix Spikes.
Chlorobenzene was out of acceptance criteria in the Matrix Spikes.

8260 Volatiles Extra Compounds

DATA TABLE

Parameter	Result	Unit	Detection Limit
Ether	<2000.	ug/L	2000.
Iodomethane (Methyliodide)	<2000.	ug/L	2000.
Allyl Chloride	<2000.	ug/L	2000.
Methacrylonitrile	<2000.	ug/L	2000.
1-Chlorobutane	<2000.	ug/L	2000.
Methyl Methacrylate	<2000.	ug/L	2000.
2-Nitropropane	<2000.	ug/L	2000.
1,1-Dichloro-2-propanone	<2000.	ug/L	2000.
Ethylmethacrylate	<2000.	ug/L	2000.
trans-1,4-Dichloro-2-Butene	<2000.	ug/L	2000.
Pentachloroethane	<2000.	ug/L	2000.
Hexachloroethane	<2000.	ug/L	2000.
1,2-Dichlorotrifluoroethane	<2000.	ug/L	2000.
2,2-Dichlorotrifluoroethane	<2000.	ug/L	2000.
1,1,2-Trichlorotrifluoroethane ...	3500	ug/L	2000.
Acetonitrile	<4000.	ug/L	4000.
Vinyl Acetate	<2000.	ug/L	2000.
Chloroprene	<2000.	ug/L	2000.
Bromochloromethane	<200.	ug/L	200.
Dichlorodifluoromethane	<200.	ug/L	200.
Chloromethane	<200.	ug/L	200.

(1) Copy to Client

MANAGING DIRECTOR

ALLIED SIGNAL TEAM

Client Sample ID: 0201301006 200 SUMP BOT PHASE

GC/MS Semivolatiles

Lot-Sample #...: D2B010253-008 Work Order #...: ETKVJ2AA Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Pyridine	ND	200	ug/L
1,2,4-Trichloro-benzene	ND	100	ug/L
2,4,5-Trichloro-phenol	ND	100	ug/L
2,4,6-Trichloro-phenol	ND	100	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorophenol	DIL,NC	(51 - 99)
Phenol-d5	DIL,NC	(52 - 99)
Nitrobenzene-d5	DIL,NC	(57 - 97)
2-Fluorobiphenyl	DIL,NC	(49 - 98)
2,4,6-Tribromophenol	DIL,NC	(53 - 108)
Terphenyl-d14	DIL,NC	(38 - 119)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

NC The recovery and/or RPD were not calculated.

J Estimated result. Result is less than RL.

ALLIED SIGNAL TEAM

0201301006 200 SUMP BOT PHASE

GC/MS Semivolatiles

Lot-Sample #: D2B010253-008 Work Order #: ETKVJ2AA Matrix: WATER

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS

PARAMETER	CAS #	ESTIMATED RESULT		RETENTION TIME	UNITS
Unknown		1300 J	M	2.8151	ug/L
Disulfide, dimethyl	624-92-0	180 J	M	3.0984	ug/L
Propanoic acid, 2-methyl-	79-31-2	420 J	M	3.216	ug/L
Butanoic acid	107-92-6	3000 J	M	3.5368	ug/L
Butanoic acid, 3-methyl-	503-74-2	800 J	M	3.8736	ug/L
Butanoic acid, 2-methyl-	116-53-0	300 J	M	3.9538	ug/L
Unknown		740 J	M	4.3388	ug/L
Trisulfide, dimethyl	3658-80-8	210 J	M	4.9108	ug/L
Unknown		260 J	M	5.0659	ug/L
1-Hexanol, 2-ethyl-	104-76-7	240 J	M	5.2102	ug/L
2-Pyrrolidinone, 1-methyl-	872-50-4	4000 J	M	5.4134	ug/L
Unknown		3000 J	M	5.916	ug/L
Unknown		2700 J	M	6.2688	ug/L
Unknown		230 J	M	6.2956	ug/L
Unknown		400 J	M	6.3704	ug/L
Unknown		180 J	M	6.6217	ug/L
Benzeneacetic acid	103-82-2	390 J	M	6.6859	ug/L
Decanoic acid	334-48-5	170 J	M	7.2579	ug/L
Cyclopropane, nonyl-	74663-85-7	290 J	M	7.83	ug/L
Dodecanoic acid	143-07-7	960 J	M	8.2096	ug/L
1-Tridecanol	112-70-9	140 J	M	8.2791	ug/L
Unknown		200 J	M	8.91	ug/L
Unknown		1500 J	M	9.2307	ug/L
Hexadecane, 1-(ethenyloxy)-	822-28-6	190 J	M	9.4125	ug/L
Unknown		1100 J	M	9.5355	ug/L
Unknown		920 J	M	9.7547	ug/L
Unknown		580 J	M	9.7868	ug/L
Unknown		360 J	M	9.8082	ug/L
Unknown		720 J	M	9.8563	ug/L
Unknown		35000 J	M	9.8937	ug/L

NOTE(S):

M: Result was measured against nearest internal standard assuming a response factor of 1.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC/MS Semivolatiles

Client Lot #...: D2B010253 Work Order #...: ETKT41AC-MS Matrix.....: WATER
MS Lot-Sample #: D2B010253-005 ETKT41AD-MSD
Date Sampled...: 01/30/02 08:04 Date Received..: 02/01/02
Prep Date.....: 02/04/02 Analysis Date..: 02/07/02
Prep Batch #...: 2035221 Analysis Time..: 11:00
Dilution Factor: 10

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Acenaphthene	0.0 DIL,N	(52 - 93)			SW846 8270C
	0.0 DIL,N	(52 - 93)	0.0	(0-28)	SW846 8270C
4-Chloro-3-methylphenol	0.0 DIL,N	(55 - 95)			SW846 8270C
	0.0 DIL,N	(55 - 95)	0.0	(0-34)	SW846 8270C
2-Chlorophenol	0.0 DIL,N	(52 - 92)			SW846 8270C
	0.0 DIL,N	(52 - 92)	0.0	(0-33)	SW846 8270C
1,4-Dichlorobenzene	0.0 DIL,N	(38 - 87)			SW846 8270C
	0.0 DIL,N	(38 - 87)	0.0	(0-37)	SW846 8270C
2,4-Dinitrotoluene	0.0 DIL,N	(56 - 107)			SW846 8270C
	0.0 DIL,N	(56 - 107)	0.0	(0-30)	SW846 8270C
4-Nitrophenol	0.0 DIL,N	(41 - 108)			SW846 8270C
	0.0 DIL,N	(41 - 108)	0.0	(0-40)	SW846 8270C
N-Nitrosodi-n-propyl-amine	0.0 DIL,N	(48 - 88)			SW846 8270C
	0.0 DIL,N	(48 - 88)	0.0	(0-33)	SW846 8270C
Pentachlorophenol	0.0 DIL,N	(42 - 105)			SW846 8270C
	0.0 DIL,N	(42 - 105)	0.0	(0-34)	SW846 8270C
Phenol	0.0 DIL,N	(50 - 90)			SW846 8270C
	0.0 DIL,N	(50 - 90)	0.0	(0-31)	SW846 8270C
Pyrene	0.0 DIL,N	(54 - 104)			SW846 8270C
	0.0 DIL,N	(54 - 104)	0.0	(0-31)	SW846 8270C
1,2,4-Trichloro-benzene	0.0 DIL,N	(43 - 88)			SW846 8270C
	0.0 DIL,N	(43 - 88)	0.0	(0-35)	SW846 8270C

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorophenol	DIL,NC	(51 - 99)
	DIL,NC	(51 - 99)
Phenol-d5	DIL,NC	(52 - 99)
	DIL,NC	(52 - 99)
Nitrobenzene-d5	DIL,NC	(57 - 97)
	DIL,NC	(57 - 97)
2-Fluorobiphenyl	DIL,NC	(49 - 98)
	DIL,NC	(49 - 98)
2,4,6-Tribromophenol	DIL,NC	(53 - 108)
	DIL,NC	(53 - 108)

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

GC/MS Semivolatiles

Client Lot #...: D2B010253 Work Order #...: ETKVD1AC-MS Matrix.....: WATER
MS Lot-Sample #: D2B010253-007 ETKVD1AD-MSD

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorobiphenyl	14 *	(49 - 98)
	8.3 *	(49 - 98)
2,4,6-Tribromophenol	40 *	(53 - 108)
	30 *	(53 - 108)
Terphenyl-d14	13 *	(38 - 119)
	7.9 *	(38 - 119)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

p Relative percent difference (RPD) is outside stated control limits.

E Estimated result. Result concentration exceeds the calibration range.

* Surrogate recovery is outside stated control limits.

ALLIED SIGNAL TEAM

Client Sample ID: 0201301006 200 SUMP BOT PHASE

GC/MS Semivolatiles

Lot-Sample #...: D2B010253-008 **Work Order #...:** ETKVJ1AA **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Pyridine	ND	20	ug/L
1,2,4-Trichloro-benzene	ND	10	ug/L
2,4,5-Trichloro-phenol	ND	10	ug/L
2,4,6-Trichloro-phenol	ND	10	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorophenol	45 *	(51 - 99)
Phenol-d5	65	(52 - 99)
Nitrobenzene-d5	61	(57 - 97)
2-Fluorobiphenyl	8.7 *	(49 - 98)
2,4,6-Tribromophenol	25 *	(53 - 108)
Terphenyl-d14	9.0 *	(38 - 119)

NOTE(S):

* Surrogate recovery is outside stated control limits.

E Estimated result. Result concentration exceeds the calibration range.

J Estimated result. Result is less than RL.

ATTACHMENT 6

Acceptable Knowledge

The Permittee shall obtain the waste characterization information by sampling and analysis of the waste or by use of acceptable knowledge (AK). AK is defined in U.S. EPA guidance; "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste" dated April 1994 as process knowledge and prior sampling data performed before the effective date of RCRA regulations. Current sampling and analysis is the preferred method, and the Permittee shall obtain characterization by sampling and analysis whenever feasible. AK may be used as the sole method to characterize waste only when the waste is from processes that are well documented with supporting information that address all characterization requirements of the permit, including the requirement to determine the LDR status of the waste. If the existing data do not fulfill the above criteria, and sampling and analysis is used to characterize a waste, the Permittee shall develop a sampling and analysis plan for that waste identifying the sampling and laboratory analytical methods appropriate to identify and quantify potential contaminants in the waste stream for characterization of that waste.

The Permittee may use AK to comply with the waste characterization requirements if the following or equivalent criteria are met:

1. The waste is an unused, or commercial chemical product, or reagent, or a product of known physical and chemical constituents, for example is a P or U-listed EPA Hazardous Waste Number under 20.4.1.200 NMAC (incorporating 40 CFR § 261.33), and the characterization is based on a Material Safety Data Sheet or equivalent information supplied by the manufacturer and identifying the chemical content of the waste;

2. Health and safety risks to personnel would result from sampling and analysis, for example of mixed or explosive waste, and this risk is documented by reports or other written documentation signed by appropriate site personnel responsible for assessing health and safety risk; or

3. The physical nature of the waste precludes collection of a representative sample, for example of heterogeneous debris waste, and the physical nature of the waste is documented by a detailed written description of the waste identifying the specific characteristics of the waste that make sampling or analysis unachievable.

The Permittee shall maintain written documentation supporting the use of AK for each waste stream. The Permittee shall include in the record all specific AK documentation assembled and used in the AK process, whether or not it supports the decision to use AK.

ATTACHMENT 7

Hazardous Waste Characterization Documents (Forms, Sheets, etc.)

Example Table

Name	Location in Permit/WAP/Area	Contents
Operating Record • List all documents considered part of the operating record	ETU FTU	Kept at the permitted units. Includes description and quantity of each waste and methods and dates of storage/treatment, location of waste and cross-reference to manifest, records and results of waste characterization, air emission monitoring results, and LDR notice and certification.
WIWPS (hard copies)	ETU, FTU WAP Attachment XX	Waste specific. Identifies unique #, waste type, amount, characteristics, waste codes, etc.
NASA WSTF SOPs 9001 Manuals WJIs	WAP Attachment XX	WSTF internal requirements/procedures for generators to perform waste characterization. References used in AK determination.
Supporting Documents MSDSs	ETU, FTU WAP Attachment XX	Contains AK with supporting data. All information necessary to transfer waste to ETU and FTU.
LDR Notifications	WAP Section XX, Manifests	Document will accompany each waste to off-site TSDF. Will identify appropriate treatment standards for the waste and contain applicable analytical data.
Hazardous Waste Report	WAP Section XX	Year specific. Identifies waste description, associated waste codes, source and form codes, waste generated in specific year, and hazardous waste handler that takes waste off-site.
Characterization Plan/ Sampling and Analysis Plan	WAP Section XX	Identifies at a minimum the parameters a waste will be characterized for and the rationale for selecting those parameters. Identifies the sampling and analysis methods. Routinely generated wastes' parameters and associated rationale are addressed in the WAP.
Sampling Records	ETU, FTU	Records accompany wastes. Includes justification for random or biased samples and field instrument readings and observations.
QA/QC Documentation	ETU, FTU WAP Section XX	Includes; training records, documentation of sampling locations, and off-site laboratory quality assurance manual.
Manifests	Waste Accumulation Areas (list all of these), ETU, FTU	
Biennial Reports		

Technical Comments
RCRA Permit Renewal Application
NOD Part 1

ATTACHMENT 8

Contingency Plan Guidance

federal register

Wednesday
June 5, 1996

Part II

Environmental Protection Agency

Department of Transportation

Coast Guard

Research and Special Programs Administration

Department of the Interior

Minerals Management Service

Department of Labor

Occupational Safety and Health Administration

The National Response Team's Integrated Contingency Plan Guidance; Notice

ENVIRONMENTAL PROTECTION AGENCY

DEPARTMENT OF TRANSPORTATION

Coast Guard

Research and Special Programs Administration

DEPARTMENT OF THE INTERIOR

Minerals Management Service

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

[FRL–5512–8]

The National Response Team's Integrated Contingency Plan Guidance

AGENCY: Environmental Protection Agency (EPA), U.S. Coast Guard (USCG), Minerals Management Service (MMS), Research and Special Programs Administration (RSPA), Occupational Safety and Health Administration (OSHA).

ACTION: Notice.

SUMMARY: The U.S. Environmental Protection Agency, as the chair of the National Response Team (NRT), is announcing the availability of the NRT's Integrated Contingency Plan Guidance ("one plan"). This guidance is intended to be used by facilities to prepare emergency response plans. The intent of the NRT is to provide a mechanism for consolidating multiple plans that facilities may have prepared to comply with various regulations into one functional emergency response plan or integrated contingency plan (ICP). This notice contains the suggested ICP outline as well as guidance on how to develop an ICP and demonstrate compliance with various regulatory requirements. The policies set out in this notice are intended solely as guidance.

ADDRESSES: Additional copies of this one-plan guidance can be obtained by writing to the following address: William Finan, U.S. Environmental Protection Agency, Mail Code 5101, 401 M Street SW, Washington, DC 20460. Copies of the ICP Guidance are also available by calling the EPCRA/RCRA/Superfund Hotline at (800) 424–9346 (in the Washington, DC, metropolitan area, (703) 412–9810). In addition, this guidance is available electronically at the home page of EPA's Chemical Emergency Preparedness and Prevention Office (http://www.epa.gov/swercepp/).

FOR FURTHER INFORMATION CONTACT: William Finan, U.S. Environmental Protection Agency, Mail Code 5101, 401 M Street, SW., Washington, DC 20460, at (202) 260–0030 (E-Mail homepage.ceppo@epamail.epa.gov—please include "one plan" in the subject line). In addition, the EPCRA/RCRA/Superfund Hotline can answer general questions about the guidance.

For further information and guidance on complying with specific regulations, contact: for EPA's Oil Pollution Prevention Regulation: Bobbie Lively-Diebold, U.S. Environmental Protection Agency, Mail Code 5203G, 401 M Street, SW., Washington, DC 20460, at (703) 356–8774 (E-Mail Lively.Barbara@epamail.epa.gov), or the SPCC Information Line at (202) 260–2342); for the U.S. Coast Guard's Facility Response Plan Regulation: LCDR Mark Hamilton, U.S. Coast Guard, Commandant (G–MOR), 2100 2nd Street, SW., Washington, DC 20593, at 202–267–1983 (E-Mail M.Hamilton/G-M03@CGSMTP.uscg.mil); for DOT/RSPA's Pipeline Response Plan Regulation: Jim Taylor, U.S. Department of Transportation, Room 2335, 400 7th Street, SW., Washington, DC 20590 at (202) 366–8860 (E-Mail OPATEAM@RSPA.DOT.GOV); for pertinent OSHA regulations, contact either your Regional or Area OSHA office; for DOI/MMS' Facility Response Plan Regulation: Larry Ake, U.S. Department of the Interior—Minerals Management Service, MS 4700, 381 Elden Street, Herndon, VA 22070–4817 at (703) 787–1567 (E-Mail Larry_Ake@SMTP.MMS.GOV); for EPA's Risk Management Program Regulation: William Finan (see above); and for RCRA's Contingency Planning Requirements, contact the EPCRA/RCRA/Superfund Hotline (see above).

The NRT welcomes comments on specific implementation issues related to this guidance. Please provide us with information about the successful use of this guidance, about problems with using this guidance, as well as suggestions for improving the guidance. Send comments to William Finan (see above) or to any of the other people listed in the previous paragraph.

SUPPLEMENTARY INFORMATION:

Presidential Review Findings

Section 112(r)(10) of the Clean Air Act required the President to conduct a review of federal release prevention, mitigation, and response authorities. The Presidential Review was delegated to EPA, in coordination with agencies and departments that are members of the National Response Team (NRT). The Presidential Review concluded that, while achieving its statutory goals to protect public safety and the environment, the current system is complex, confusing, and costly. It identified several key problem areas and recommended a second phase to address these issues. One of the issues identified by the Presidential Review is the multiple and overlapping federal requirements for facility emergency response plans.

NRT Policy Statement

This one-plan guidance is intended to be used by facilities to prepare emergency response plans for responding to releases of oil and non-radiological hazardous substances. The intent of NRT is to provide a mechanism for consolidating multiple plans that facilities may have prepared to comply with various regulations into one functional emergency response plan or integrated contingency plan (ICP). A number of statutes and regulations, administered by several federal agencies, include requirements for emergency response planning. A particular facility may be subject to one or more of the following federal regulations:

- EPA's Oil Pollution Prevention Regulation (SPCC and Facility Response Plan Requirements)—40 CFR part 112.7(d) and 112.20–.21;
- MMS's Facility Response Plan Regulation—30 CFR part 254;
- RSPA's Pipeline Response Plan Regulation—49 CFR part 194;
- USCG's Facility Response Plan Regulation—33 CFR part 154, Subpart F;
- EPA's Risk Management Programs Regulation—40 CFR part 68;
- OSHA's Emergency Action Plan Regulation—29 CFR 1910.38(a);
- OSHA's Process Safety Standard—29 CFR 1910.119;
- OSHA's HAZWOPER Regulation—29 CFR 1910.120; and
- EPA's Resource Conservation and Recovery Act Contingency Planning Requirements—40 CFR part 264, Subpart D, 40 CFR part 265, Subpart D, and 40 CFR 279.52.

In addition, facilities may also be subject to state emergency response planning requirements that this guidance does not specifically address. Facilities are encouraged to coordinate development of their ICP with relevant state and local agencies to ensure compliance with any additional regulatory requirements.

Individual agencies' planning requirements and plan review procedures are not changed by the advent of the ICP format option. This one-plan guidance has been developed

to assist facilities in demonstrating compliance with the existing federal emergency response planning requirements referenced above. Although it does not relieve facilities from their current obligations, it has been designed specifically to help meet those obligations. Adherence to this guidance is not required in order to comply with federal regulatory requirements. Facilities are free to continue maintaining multiple plans to demonstrate federal regulatory compliance; however, the NRT believes that an integrated plan prepared in accordance with this guidance is a preferable alternative.

The NRT realizes that many existing regulations pertaining to contingency planning require review by a specific agency to determine compliance with applicable requirements. It is not the intent of the NRT to modify existing agency review procedures or to supersede the requirements of a regulation.

This one-plan guidance was developed through a cooperative effort among numerous NRT agencies, state and local officials, and industry and community representatives. The NRT and the agencies responsible for reviewing and approving federal response plans to which the ICP option applies agree that integrated response plans prepared in the format provided in this guidance will be acceptable and be the federally preferred method of response planning. The NRT realizes that alternate formats for integrating multiple plans already exist and that others likely will be developed. Certain facilities may find those formats more desirable than the one proposed here. The NRT believes that a single functional plan is preferable to multiple plans regardless of the specific format chosen. While they are acceptable, other formats may not allow the same ease of coordination with external plans. In any case, whatever format a facility chooses, no individual NRT agency will require an integrated response planning format differing from the ICP format described here. The NRT anticipates that future development of all federal regulations addressing emergency response planning will incorporate use of the ICP guidance. Also, developers of state and local requirements will be encouraged to be consistent with this document.

The ICP guidance does not change existing regulatory requirements; rather, it provides a format for organizing and presenting material currently required by the regulations. Individual regulations are often more detailed than the ICP guidance. To ensure full compliance, facilities should continue to read and comply with all of the federal regulations that apply to them. Furthermore, facilities submitting an ICP (in whatever format) for agency or department review will need to provide a cross-reference to existing regulatory requirements so that plan reviewers can verify compliance with these requirements. The guidance contains a series of matrices designed to assist owners and operators in consolidating various plans and documenting compliance with federal regulatory requirements. (See Attachments 2 and 3.) The matrices can be used as the basis for developing a cross-reference to various regulatory requirements.

This guidance also provides a useful contingency planning template for owners and operators of facilities not subject to the federal regulations cited previously.

Integrated Contingency Plan Philosophy

The ICP will minimize duplication in the preparation and use of emergency response plans at the same facility and will improve economic efficiency for both the regulated and regulating communities. Facility expenditures for the preparation, maintenance, submission, and update of a single plan should be much lower than for multiple plans.

The use of a single emergency response plan per facility will eliminate confusion for facility first responders who often must decide which of their plans is applicable to a particular emergency. The guidance is designed to yield a highly functional document for use in varied emergency situations while providing a mechanism for complying with multiple agency requirements. Use of a single integrated plan should also improve coordination between facility response personnel and local, state, and federal emergency response personnel.

The adoption of a standard plan format should facilitate integration of plans within a facility, in the event that large facilities may need to prepare separate plans for distinct operating units. The ICP concept should also allow coordination of facility plans with plans that are maintained by local emergency planning committees (LEPCs),[1] Area Committees,[2] co-operatives, and mutual aid organizations. In some cases, there are specific regulatory requirements to ensure that facility plans are consistent with external planning efforts. Industry use of this guidance along with active participation on local and Area Committees will improve the level of emergency preparedness and is therefore highly encouraged.

In some areas, it may be possible to go beyond simple coordination of plans and actually integrate certain information from facility plans with corresponding areas of external plans. The adoption of a single, common ICP outline such as the one proposed in this guidance would facilitate a move toward integration of facility plans with local, state, and federal plans.

The projected results described above will ultimately serve the mutual goal of the response community to more efficiently and effectively protect public health, worker safety, the environment, and property.

Scope

This one-plan guidance is provided for any facility subject to federal contingency planning regulations and is also recommended for use by other facilities to improve emergency preparedness through planning. In this context, the term "facility" is meant to have a wide connotation and may include, but is not limited to, any mobile or fixed onshore or offshore building, structure, installation, equipment, pipe, or pipeline.

Facility hazards need to be addressed in a comprehensive and coordinated manner. Accordingly, this guidance is broadly constructed to allow for facilities to address a wide range of risks in a manner tailored to the specific needs of the facility. This includes both physical and chemical hazards associated with events such as chemical releases, oil spills, fires, explosions, and natural disasters.

Organizational Concepts

The ICP format provided in this one-plan guidance (See Attachment 1) is organized into three main sections: an introductory section, a core plan, and a series of supporting annexes. It is important to note that the elements contained in these sections are not new concepts, but accepted emergency response activities that are currently addressed in various forms in existing contingency planning regulations. The goal of the NRT is not to create new planning requirements, but to provide a mechanism to consolidate existing concepts into a single functional plan structure. This approach would provide a consistent basis for addressing

[1] LEPC plans are developed by LEPCs in coordination with facility emergency response coordinators under section 303 of the Emergency Planning and Community Right-to-Know Act.

[2] Area Contingency Plans are developed by Area Committees pursuant to section 4202(a)(6) of the Oil Pollution Act of 1990 (OPA).

emergency response concerns as it gains widespread use among facilities.

The introduction section of the plan format is designed to provide facility response personnel, outside responders, and regulatory officials with basic information about the plan and the entity it covers. It calls for a statement of purpose and scope, a table of contents, information on the current revision date of the plan, general facility information, and the key contact(s) for plan development and maintenance. This section should present the information in a brief factual manner.

The structure of the sample core plan and annexes in this guidance is based on the structure of the National Interagency Incident Management System (NIIMS) Incident Command System (ICS). NIIMS ICS is a nationally recognized system currently in use by numerous federal, state, and local organizations (e.g., some Area Committees under OPA). NIIMS ICS is a type of response management system that has been used successfully in a variety of emergency situations, including releases of oil or hazardous substances. NIIMS ICS provides a commonly understood framework that allows for effective interaction among response personnel. Organizing the ICP along the lines of the NIIMS ICS will allow the plan to dovetail with established response management practices, thus facilitating its ease of use during an emergency.

The core plan is intended to contain essential response guidance and procedures. Annexes would contain more detailed supporting information on specific response management functions. The core plan should contain frequent references to the response critical annexes to direct response personnel to parts of the ICP that contain more detailed information on the appropriate course of action for responders to take during various stages of a response. Facility planners need to find the right balance between the amount of information contained in the core plan versus the response critical annexes (Annexes 1 through 3). Information required to support response actions at facilities with multiple hazards will likely be contained in the annexes. Planners at facilities with fewer hazards may choose to include most if not all information in the core plan. Other annexes (e.g., Annexes 4 through 8) are dedicated to providing information that is non-critical at the time of a response (e.g., cross-references to demonstrate regulatory compliance and background planning information). Consistent with the goal of keeping the size of the ICP as manageable as practicable, it is not necessary for a plan holder to provide its field responders with all the compliance documentation (e.g., Annexes 4 through 8) that it submits to regulatory agencies. Similarly, it may not be necessary for a plan holder to submit all annexes to every regulatory agency for review.

Basic headings are consistent across the core plan and annexes to facilitate ease of use during an emergency. These headings provide a comprehensive list of elements to be addressed in the core plan and response annexes and may not be relevant to all facilities. Planners should address those regulatory elements that are applicable to their particular facilities. Planners at facilities with multiple hazards will need to address most, if not all, elements included in this guidance. Planners at facilities with fewer hazards may not need to address certain elements. If planners choose to strictly adopt the ICP outline contained in this guidance but are not required by regulation to address all elements of the outline, they may simply indicate "not applicable" for those items where no information is provided. A more detailed discussion of the core plan and supporting annexes follows.

Core Plan

The core plan is intended to reflect the essential steps necessary to initiate, conduct, and terminate an emergency response action: recognition, notification, and initial response, including assessment, mobilization, and implementation. This section of the plan should be concise and easy to follow. A rule of thumb is that the core plan should fit in the glovebox of a response vehicle. The core plan need not detail all procedures necessary under these phases of a response but should provide information that is time critical in the earliest stages of a response and a framework to guide responders through key steps necessary to mount an effective response. The response action section should be convenient to use and understandable at the appropriate skill level.

The NRT recommends the use of checklists or flowcharts wherever possible to capture these steps in a concise easy-to-understand manner. The core plan should be constructed to contain references to appropriate sections of the supporting annexes for more detailed guidance on specific procedures. The NRT anticipates that for a large, complex facility with multiple hazards the annexes will contain a significant amount of information on specific procedures to follow. For a small facility with a limited number of hazard scenarios, the core plan may contain most if not all of the information necessary to carry out the response thus obviating the need for more detailed annexes. The checklists, depending on their size and complexity, can be in either the core or the support section.

The core plan should reflect a hierarchy of emergency response levels. A system of response levels is commonly used in emergency planning for classifying emergencies according to seriousness and assigning an appropriate standard response or series of response actions to each level. Both complex and simple industrial facilities use a system of response levels for rapidly assessing the seriousness of an emergency and developing an appropriate response. This process allows response personnel to match the emergency and its potential impacts with appropriate resources and personnel. The concept of response levels should be considered in developing checklists or flowcharts designed to serve as the basis for the core plan. Note that for those facilities subject to planning requirements under OPA, response levels in the core plan may not necessarily correspond to discharge planning amounts (e.g., average most probable discharge, maximum most probable discharge, and worst case discharge).

Facility owners and operators should determine appropriate response levels based on 1) the need to initiate time-urgent response actions to minimize or prevent unacceptable consequences to the health and safety of workers, the public, or the environment; and 2) the need to communicate critical information concerning the emergency to offsite authorities. The consideration and development of response levels should, to the extent practicable, be consistent with similar efforts that may have been taken by the LEPC, local Area Committee, or mutual aid organization. Response levels, which are used in communications with offsite authorities, should be fully coordinated and use consistent terminology.

Annexes

The annexes are designed to provide key supporting information for conducting an emergency response under the core plan as well as document compliance with regulatory requirements not addressed elsewhere in the ICP. Annexes are not meant to duplicate information that is already contained in the core plan, but to augment core plan information. The annexes should relate to the basic

headings of the core plan. To accomplish this, the annexes should contain sections on facility information, notification, and a detailed description of response procedures under the response management system (i.e, command, operations, planning, logistics, and finance). The annexes should also address issues related to post accident investigation, incident history, written follow-up reports, training and exercises, plan critique and modification process, prevention, and regulatory compliance, as appropriate.

The ICP format contained in this guidance is based on the NIIMS ICS. If facility owners or operators choose to follow fundamental principles of the NIIMS ICS, then they may adopt NIIMS ICS by reference rather than having to describe the system in detail in the plan. The owner or operator should identify where NIIMS ICS documentation is kept at the facility and how it will be accessed if needed by the facility or requested by the reviewing agency. Regardless of the response management system used, the plan should include an organization chart, specific job descriptions,[3] a description of information flow ensuring liaison with the on-scene coordinator (OSC), and a description of how the selected response management system integrates with a Unified Command.[4] If a system other than NIIMS ICS is used, the plan should also identify how it differs from NIIMS or provide a detailed description of the system used.

The NRT anticipates that the use of linkages (i.e., references to other plans) when developing annexes will serve several purposes. Linkages will facilitate integration with other emergency plans within a facility (until such plans can be fully incorporated into the ICP) and with external plans, such as LEPC plans and Area Contingency Plans (ACPs). Linkages will also help ensure that the annexes do not become too cumbersome. The use of references to information contained in external plans does not relieve facilities from regulatory requirements to address certain elements in a facility-specific manner and to have information readily accessible to responders. When determining what information may be linked by reference and what needs to be contained in the ICP, response planners should carefully consider the time critical nature of the information. If instructions or procedures will be needed immediately during an incident response, they should be presented for ready access in the ICP. The following information would not normally be well-suited for reference to documents external to the ICP: core plan elements, facility and locality information (to allow for quick reference by responders on the layout of the facility and the surrounding environment and mitigating actions for the specific hazard(s) present), notification procedures, details of response management personnel's duties, and procedures for establishing the response management system. Although linkages provide the opportunity to utilize information developed by other organizations, facilities should note that many LEPC plans and ACPs may not currently possess sufficient detail to be of use in facility plans or the ICP. This information may need to be developed by the facility until detailed applicable information from broader plans is available.

In all cases, referenced materials must be readily available to anticipated plan users. Copies of documents that have been incorporated by reference need not be submitted unless it is required by regulation. The appropriate sections of referenced documents that are unique to the facility, those that are not nationally recognized, those that are required by regulation, and those that could not reasonably be expected to be in the possession of the reviewing agency, should be provided when the plan is submitted for review and/or approval. Discretion should be used when submitting documents containing proprietary data. It is, however, necessary to identify in the ICP the specific section of the document being incorporated by reference, where the document is kept, and how it will be accessed if needed by the facility or requested by the reviewing agency. In addition, facility owners or operators are reminded to take note of submission requirements of specific regulations when determining what materials to provide an agency for review as it may not be necessary to submit all parts of an ICP to a particular agency.

As discussed previously, this guidance contains a series of matrices designed to assist owners and operators in the plan consolidation process and in the process of ensuring and documenting compliance with regulatory requirements. The matrix in Attachment 2 to this guidance displays areas of current regulations that align with the suggested elements contained in this guidance document. When addressing each element of the ICP outline, plan drafters can refer to this matrix to identify specific regulatory requirements related to that element. The matrices in Attachment 3 to this guidance display regulatory requirements as contained in each of the regulations listed in the NRT policy statement above (which are applicable to many facilities) along with an indication of where in the suggested ICP outline these requirements should be addressed. If a facility chooses to follow the ICP outline, these matrices can be included as Annex 8 to a facility's ICP to provide the necessary cross-reference for plan reviewers to document compliance with various regulatory requirements. To the extent that a plan deviates from the suggested ICP outline, plan drafters will have to alter the matrices to ensure that the location of regulatory requirements within the ICP is clearly identified for plan reviewers.

Integrated Contingency Plan Elements

Presented below is a list of elements to be addressed in the ICP and a brief explanation, displayed in italicized text, of the nature of the information to be contained in that section of the ICP. Attachment 1 presents the complete outline of the ICP without the explanatory text. As discussed previously, the elements are organized into three main sections: plan introduction, core plan, and response annexes.

Section I—Plan Introduction Elements

1. Purpose and Scope of Plan Coverage

This section should provide a brief overview of facility operations and describe in general the physical area, and nature of hazards or events to which the plan is applicable. This brief description will help plan users quickly assess the relevancy of the plan to a particular type of emergency in a given location. This section should also include a list of which regulation(s) are being addressed in the ICP.

[3] OPA 90 planning requirements for marine transfer facilities (33 CFR 154.1035) require job descriptions for each spill management team member regardless of the response management system employed by the facility.

[4] Under NIIMS ICS, the command module has traditionally been represented by a single incident commander (supported by a command staff) who directs efforts of and receives input from the four supporting functional areas (planning, logistics, operations, and finance). More recently, a Unified Command System as described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) found at 40 CFR part 300 has been used for larger spill responses where the command module is comprised of representatives from the federal government (i.e., federal on-scene coordinator), state government (state on-scene coordinator), and the responsible party working in a cooperative manner. Unified Command allows all parties who have jurisdictional or functional responsibility for the incident to jointly develop a common set of incident objectives and strategies. Such coordination should be guided by procedures found in the NCP (see figure 1a at 40 CFR 300.105(e)(1)) and the applicable Area Contingency Plan.

2. Table of Contents

This section should clearly identify the structure of the plan and include a list of annexes. This will facilitate rapid use of the plan during an emergency.

3. Current Revision Date

This section should indicate the date that the plan was last revised to provide plan users with information on the currency of the plan. More detailed information on plan update history (i.e., a record of amendments) may be maintained in Annex 6 (Response Critique and Plan Review and Modification Process).

4. General Facility Identification Information

a. Facility name
b. Owner/operator/agent (include physical and mailing address and phone number)
c. Physical address of the facility (include county/parish/borough, latitude/longitude, and directions)
d. Mailing address of the facility (correspondence contact)
e. Other identifying information (e.g., ID numbers, SIC Code, oil storage start-up date)
f. Key contact(s) for plan development and maintenance
g. Phone number(s) for key contact(s)
h. Facility phone number
i. Facility fax number

This section should contain a brief profile of the facility and its key personnel to facilitate rapid identification of key administrative information.

Section II - Core Plan Elements

1. Discovery

This section should address the initial action the person(s) discovering an incident will take to assess the problem at hand and access the response system. Recognition, basic assessment, source control (as appropriate), and initial notification of proper personnel should be addressed in a manner that can be easily understood by everybody in the facility. The use of checklists or flowcharts is highly recommended.

2. Initial Response

a. Procedures for internal and external notifications (i.e., contact, organization name, and phone number of facility emergency response coordinator, facility response team personnel, federal, state, and local officials)
b. Establishment of a response management system
c. Procedures for preliminary assessment of the situation, including an identification of incident type, hazards involved, magnitude of the problem, and resources threatened
d. Procedures for establishment of objectives and priorities for response to the specific incident, including:
(1) Immediate goals/tactical planning (e.g., protection of workers and public as priorities)
(2) Mitigating actions (e.g., discharge/release control, containment, and recovery, as appropriate)
(3) Identification of resources required for response
e. Procedures for implementation of tactical plan
f. Procedures for mobilization of resources

This section should provide for activation of the response system following discovery of the incident. It should include an established 24-hour contact point (i.e., that person and alternate who is called to set the response in motion) and instructions for that person on who to call and what critical information to pass. Plan drafters should also consider the need for bilingual notification. It is important to note that different incident types require that different parties be notified. Appropriate federal, State, and local notification requirements should be reflected in this section of the ICP. Detailed notification lists may be included here or in Annex 2, depending upon the variety of notification schemes that a facility may need to implement. For example, the release of an extremely hazardous substance will require more extensive notifications (i.e., to State Emergency Response Commissions (SERCs) and LEPCs) than a discharge of oil. Even though no impacts or awareness are anticipated outside the site, immediate external notifications are required for releases of CERCLA and EPCRA substances. Again, the use of forms, such as flowcharts, checklists, call-down lists, is recommended.

This section should instruct personnel in the implementation of a response management system for coordinating the response effort. More detailed information on specific components and functions of the response management system (e.g., detailed hazard assessment, resource protection strategies) may be provided in annexes to the ICP.

This part of the plan should then provide information on problem assessment, establishment of objectives and priorities, implementation of a tactical plan, and mobilization of resources. In establishing objectives and priorities for response, facilities should perform a hazard assessment using resources such as Material Safety Data Sheets (MSDSs) or the Chemical Hazard Response Information System (CHRIS) manual. Hazardous Materials Emergency Planning Guide (NRT-1), developed by the NRT to assist community personnel with emergency response planning, provides guidance on developing hazard analyses. If a facility elects to provide detailed hazard analysis information in a response annex, then a reference to that annex should be provided in this part of the core plan.

Mitigating actions must be tailored to the type of hazard present. For example, containment might be applicable to an oil spill (i.e., use of booming strategies) but would not be relevant to a gas release. The plan holder is encouraged to develop checklists, flowcharts, and brief descriptions of actions to be taken to control different types of incidents. Relevant questions to ask in developing such materials include:

- *What type of emergency is occurring?*
- *What areas/resources have been or will be affected?*
- *Do we need an exclusion zone?*
- *Is the source under control?*
- *What type of response resources are needed?*

3. Sustained Actions

This section should address the transition of a response from the initial emergency stage to the sustained action stage where more prolonged mitigation and recovery actions progress under a response management structure. The NRT recognizes that most incidents are able to be handled by a few individuals without implementing an extensive response management system. This section of the core plan should be brief and rely heavily on references to specific annexes to the ICP.

4. Termination and Follow-Up Actions

This section should briefly address the development of a mechanism to ensure that the person in charge of mitigating the incident can, in coordination with the federal or state OSC as necessary, terminate the response. In the case of spills, certain regulations may become effective once the "emergency" is declared over. The section should describe how the orderly demobilization of response resources will occur. In addition, follow-up actions associated with termination of a response (e.g., accident investigation, response critique, plan review, written follow-up reports) should also be outlined in this section. Plan drafters

may reference appropriate annexes to the ICP in this section of the core plan.

Section III—Annexes

Annex 1. Facility and Locality Information

a. Facility maps
b. Facility drawings
c. Facility description/layout, including identification of facility hazards and vulnerable resources and populations on and off the facility which may be impacted by an incident

This annex should provide detailed information to responders on the layout of the facility and the surrounding environment. The use of maps and drawings to allow for quick reference is preferable to detailed written descriptions. These should contain information critical to the response such as the location of discharge sources, emergency shut-off valves and response equipment, and nearby environmentally and economically sensitive resources and human populations (e.g., nursing homes, hospitals, schools). The ACP and LEPC plan may provide specific information on sensitive environments and populations in the area. EPA Regional Offices, Coast Guard Marine Safety Offices, and LEPCs can provide information on the status of efforts to identify such resources. Plan holders may need to provide additional detail on sensitive areas near the facility. In addition, this annex should contain other facility information that is critical to response and should complement but not duplicate information contained in part 4 of the plan introduction section containing administrative information on the facility.

Annex 2. Notification

a. Internal notifications
b. Community notifications
c. Federal and state agency notifications

This annex should detail the process of making people aware of an incident (i.e., who to call, when the call must be made, and what information/data to provide on the incident). The incident commander is responsible for ensuring that notifications are carried out in a timely manner but is not necessarily responsible for making the notifications. ACPs, Regional Contingency Plans (RCPs), and LEPC plans should be consulted and referenced as a source of information on the roles and responsibilities of external parties that are to be contacted. This information is important to help company responders understand how external response officials fit into the picture. Call-down lists must be readily accessible to ensure rapid response. Notification lists provided in the core plan need not be duplicated here but need to be referenced.

Annex 3. Response Management System

This annex should contain a general description of the facility's response management system as well as contain specific information necessary to guide or support the actions of each response management function (i.e., command, operations, planning, logistics, and finance) during a response.

a. General

If facility owners or operators choose to follow the fundamental principles of NIIMS ICS (see discussion of annexes above), then they may adopt NIIMS ICS by reference rather than having to describe the response management system in detail in the plan. In this section of Annex 3, planners should briefly address either 1) basic areas where their response management system is at variance with NIIMS ICS or 2) how the facility's organization fits into the NIIMS ICS structure. This may be accomplished through a simple organizational diagram.

If facility owners or operators choose not to adopt the fundamental principles of NIIMS ICS, this section should describe in detail the structure of the facility response management system. Regardless of the response management system used, this section of the annex should include the following information:

- *Organizational chart;*
- *Specific job description for each position;*[5]
- *A detailed description of information flow; and*
- *Description of the formation of a unified command within the response management system.*

b. Command

(1) List facility Incident Commander and Qualified Individual (if applicable) by name and/or title and provide information on their authorities and duties.

This section of Annex 3 should describe the command aspects of the response management system that will be used (i.e., reference NIIMS ICS or detail the facility's response management system). The location(s) of predesignated command posts should also be identified.

(2) Information (i.e., internal and external communications).

This section of Annex 3 should address how the facility will disseminate information internally (i.e., to facility/response employees) and externally (i.e., to the public). For example, this section might address how the facility would interact with local officials to assist with public evacuation and other needs. Items to consider in developing this section include press release statement forms, plans for coordination with the news media, community relations plan, needs of special populations, and plans for families of employees.

(3) Safety.

This section of Annex 3 should include a process for ensuring the safety of responders. Facilities should reference responsibilities of the safety officer, federal/state requirements (e.g., HAZWOPER), and safety provisions of the ACP. Procedures for protecting facility personnel should be addressed (i.e., evacuation signals and routes, sheltering in place).

(4) Liaison—Staff Mobilization.

This section of Annex 3 should address the process by which the internal and external emergency response teams will interact. Given that parallel mobilization may be occurring by various response groups, the process of integration (i.e., unified command) should be addressed. This includes a process for communicating with local emergency management especially where safety of the general public is concerned.

c. Operations

(1) Operational response objectives
(2) Discharge or release control
(3) Assessment/monitoring
(4) Containment
(5) Recovery
(6) Decontamination
(7) Non-responder medical needs, including information on ambulances and hospitals
(8) Salvage plans

This section of Annex 3 should contain a discussion of specific operational procedures to respond to an incident. It is important to note that response operations are driven by the type of incident. That is, a response to an oil spill will differ markedly from a response to a release of a toxic gas to the air. Plan drafters should tailor response procedures to the particular hazards in place at the facility. A facility with limited hazards may have relatively few procedures. A larger more complex facility with numerous hazards is likely to have a series of procedures

[5] OPA 90 planning requirements for marine transfer facilities (33 CFR 154.1035) require job descriptions for each spill management team member regardless of the response management system employed by the facility.

designed to address the nuances associated with each type of incident.

d. Planning

(1) Hazard assessment, including facility hazards identification, vulnerability analysis, prioritization of potential risks.

This section of Annex 3 should present a detailed assessment of all potential hazards present at the facility, an analysis of vulnerable receptors (e.g., human populations, both workers and the general public, environmentally sensitive areas, and other facility-specific concerns) and a discussion of which risks deserve primary consideration during an incident. NRT-1 contains guidance on conducting a hazard analysis. Also, ACPs and LEPC plans may provide information on environmentally sensitive and economically important areas, human populations, and protection priorities. Plan drafters should address the full range of risks present at the facility. By covering actions necessary to respond to a range of incident types, plan holders can be prepared for small, operational discharges and large catastrophic releases. One approach that is required by certain regulations, such as the Clean Air Act (CAA) and OPA is to develop planning scenarios for certain types and sizes of releases (i.e., worst case discharge). Facilities may address such planning scenarios and associated calculations in this section of Annex 3 or as part of a separate annex depending on the size and complexity of the facility.

(2) Protection

This section of Annex 3 should present a discussion of strategies for protecting the vulnerable receptors identified through the hazard analysis. Primary consideration should be given to minimizing those risks identified as a high priority. Activities to be considered in developing this section include: population protection; protective booming; dispersant use, in-situ burning, bioremediation; water intake protection; wildlife recovery/rehabilitation; natural remediation; vapor suppression; and monitoring, sampling, and modeling. ACPs and LEPC plans may contain much of this information.

(3) Coordination with natural resource trustees.

This section should address coordination with government natural resource trustees. In their role as managers of and experts in natural resources, trustees assist the federal OSC in developing or selecting removal actions to protect these resources. In this role, they serve as part of the response organization working for the federal OSC. A key area to address is interaction with facility response personnel in protection of natural resources.

Natural resource trustees are also responsible to act on behalf of the public to present a claim for and recover damages to natural resources injured by an oil spill or hazardous substance release. The process followed by the natural resource trustees, natural resource damage assessment (NRDA), generally involves some data collection during emergency response. NRDA regulations provide that the process may be carried out in cooperation with the responsible party. Thus, the facility may wish to plan for how that cooperation will occur, including designation of personnel to work with trustees in NRDA.

(4) Waste management.

This section should address procedures for the disposal of contaminated materials in accordance with federal, state, and local requirements.

e. Logistics

(1) Medical needs of responders
(2) Site security
(3) Communications (internal and external resources)
(4) Transportation (air, land, water)
(5) Personnel support (e.g., meals, housing, equipment)
(6) Equipment maintenance and support

This section of the Annex 3 should address how the facility will provide for the operational needs of response operations in each of the areas listed above. For example, the discussion of personnel support should address issues such as: volunteer training; management; overnight accommodations; meals; operational/administrative spaces; and emergency procedures. The NRT recognizes that certain logistical considerations may not be applicable to small facilities with limited hazards.

f. Finance/procurement/administration

(1) Resource list
(2) Personnel management
(3) Response equipment
(4) Support equipment
(5) Contracting
(6) Claims procedures
(7) Cost documentation

This section of Annex 3 should address the acquisition of resources (i.e., personnel and equipment) for the response and monitoring of incident-related costs. Lists of available equipment in the local and regional area and how to procure such equipment as necessary should be included. Information on previously established agreements (e.g., contracts) with organizations supplying personnel and equipment (e.g., oil spill removal organizations) also should be included. This section should also address methods to account for resources expended and to process claims resulting from the incident.

Annex 4. Incident Documentation

a. Post accident investigation
b. Incident history

This annex should describe the company's procedures for conducting a follow-up investigation of the cause of the accident, including coordination with federal, State, and local officials. This annex should also contain an accounting of incidents that have occurred at the facility, including information on cause, amount released, resources impacted, injuries, response actions, etc. This annex should also include information that may be required to prove that the facility met its legal notification requirements with respect to a given incident, such as a signed record of initial notifications and certified copies of written follow-up reports submitted after a response.

Annex 5. Training and Exercises/Drills

This annex should contain a description of the training and exercise program conducted at the facility as well as evidence (i.e., logs) that required training and exercises have been conducted on a regular basis. Facilities may follow appropriate training or exercise guidelines (e.g., National Preparedness for Response Exercise Program Guidelines) as allowed under the various regulatory requirements.

Annex 6. Response Critique and Plan Review and Modification Process

This annex should describe procedures for modifying the plan based on periodic plan review or lessons learned through an exercise or a response to an actual incident. Procedures to critique an actual or simulated response should be a part of this discussion. A list of plan amendments (i.e., history of updates) should also be contained in this annex. Plan modification should be viewed as a part of a facility's continuous improvement process.

Annex 7. Prevention

Some federal regulations that primarily address prevention of accidents include elements that relate to contingency planning (e.g., EPA's RMP and SPCC regulations and OSHA's Process Safety Standard). This annex is designed to allow facilities to include

prevention-based requirements (e.g., maintenance, testing, in-house inspections, release detection, site security, containment, fail safe engineering) that are required in contingency planning regulations or that have the potential to impact response activities covered in a contingency plan. The modular nature of the suggested plan outline provides planners with necessary flexibility to include prevention requirements in the ICP. This annex may not need to be submitted to regulatory agencies for review.

Annex 8. Regulatory Compliance and Cross-Reference Matrices

This annex should include information necessary for plan reviewers to determine compliance with specific regulatory requirements. To the extent that plan drafters did not include regulatory required elements in the balance of the ICP, they should be addressed in this annex. This annex should also include signatory pages to convey management approval and certifications required by the regulations, such as certification of adequate response resources and/or statements of regulatory applicability as required by regulations under OPA authority. Finally, this annex should contain cross-references that indicate where specific regulatory requirements are addressed in the ICP for each regulation covered under the plan. As discussed previously, Attachment 3 contains a series of matrices designed to fulfill this need in those instances where plan drafters adhere to the outline contained in this guidance.

Attachment 1—ICP Outline

Section I—Plan Introduction Elements

1. Purpose and Scope of Plan Coverage
2. Table of Contents
3. Current Revision Date
4. General Facility Identification Information
   a. Facility name
   b. Owner/operator/agent (include physical and mailing address and phone number)
   c. Physical address of the facility (include county/parish/borough, latitude/longitude, and directions)
   d. Mailing address of the facility (correspondence contact)
   e. Other identifying information (e.g., ID numbers, SIC Code, oil storage start-up date)
   f. Key contact(s) for plan development and maintenance
   g. Phone number for key contact(s)
   h. Facility phone number
   i. Facility fax number

Section II—Core Plan Elements

1. Discovery
2. Initial Response
   a. Procedures for internal and external notifications (i.e., contact, organization name, and phone number of facility emergency response coordinator, facility response team personnel, federal, state, and local officials)
   b. Establishment of a response management system
   c. Procedures for preliminary assessment of the situation, including an identification of incident type, hazards involved, magnitude of the problem, and resources threatened
   d. Procedures for establishment of objectives and priorities for response to the specific incident, including:
      (1) Immediate goals/tactical planning (e.g., protection of workers and public as priorities)
      (2) Mitigating actions (e.g., discharge/release control, containment, and recovery, as appropriate)
      (3) Identification of resources required for response
   e. Procedures for implementation of tactical plan
   f. Procedure for mobilization of resources
3. Sustained Actions
4. Termination and Follow-Up Actions

Section III-Annexes

Annex 1. Facility and Locality Information

a. Facility maps
b. Facility drawings
c. Facility description/layout, including identification of facility hazards and vulnerable resources and populations on and off the facility which may be impacted by an incident

Annex 2. Notification

a. Internal notifications
b. Community notifications
c. Federal and state agency notifications

Annex 3. Response Management System

a. General
b. Command
   (1) List facility Incident Commander and Qualified Individual (if applicable) by name and/or title and provide information on their authorities and duties
   (2) Information (i.e., internal and external communications)
   (3) Safety
   (4) Liaison—Staff mobilization
c. Operations
   (1) Operational response objectives
   (2) Discharge or release control
   (3) Assessment/monitoring
   (4) Containment
   (5) Recovery
   (6) Decontamination
   (7) Non-responder medical needs including information on ambulances and hospitals
   (8) Salvage plans
d. Planning
   (1) Hazard assessment, including facility hazards identification, vulnerability analysis, prioritization of potential risks
   (2) Protection
   (3) Coordination with natural resource trustees
   (4) Waste management
e. Logistics
   (1) Medical needs of responders
   (2) Site security
   (3) Communications (internal and external resources)
   (4) Transportation (air, land, water)
   (5) Personnel support (e.g., meals, housing, equipment)
   (6) Equipment maintenance and support
f. Finance/procurement/administration
   (1) Resource list
   (2) Personnel management
   (3) Response equipment
   (4) Support equipment
   (5) Contracting
   (6) Claims procedures
   (7) Cost documentation

Annex 4. Incident Documentation

a. Post accident investigation
b. Incident history

Annex 5. Training and Exercises/Drills

Annex 6. Response Critique and Plan Review and Modification Process

Annex 7. Prevention

Annex 8. Regulatory Compliance and Cross-Reference Matrices

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Attachment 2: ICP Development Matrix

ICP Elements	RCRA (40 CFR part 264, Subpart D, 40 CFR part 265, Subpart D, and 40 CFR 279.52)	EPA's Oil Pollution Prevention Regulation (40 CFR part 112)	USCG-FRP (33 CFR part 154)	DOT/RSPA-FRP (49 CFR part 194)	OSHA Emergency Action Plans (29 CFR 1910.38(a)) and Process Safety (29 CFR 1910.119)	OSHA HAZWOPER (29 CFR 1910.120)	CAA RMP (40 CFR part 68)
Section 1 - Plan Introduction Elements							
1. Purpose and scope of plan coverage	264.51 265.51 279.52(b)(1) 264.52(a) 265.52(a) 279.52(b)(2)(i)				38(a)(1)[1] 119(n) 272(d)	(l)[2] (p)(8) (q)(1)	
2. Table of contents		112.20(h) **Appendix F**	1035(a)(4)[3] 1030(b)	**Appendix A**			
3. Current revision date		**F1.2**	1035(a)(6)				
4. General facility identification information		**F1.2** **F1.9**		194.107(d)(1)(i) 194.113 194.113(b)(1)			
a. Facility name		**F1.2**	1035(a)(1)				
b. Owner/operator/ agent		112.20(h)(2) **F1.2** **F2.0**	1035(a)(3)	194.113(a)(1) **A-1**			
c. Physical address and directions		112.20(h)(2) **F1.2** **F2.0**	1035(a)(1) 1035(a)(2) 1035(e)	194.113(a)(2) 194.113(b)(3),(4) **A-1**			
d. Mailing address		112.20(h)(2)	1035(a)(1)	194.113(a)(1)			
e. Other identifying information							

[1] All citations refer to part 1910 unless otherwise noted.
[2] All citations refer to 29 CFR 1910.120 unless otherwise noted.
[3] All citations refer to part 154 unless otherwise noted.

ICP Elements	RCRA (40 CFR part 264, Subpart D, 40 CFR part 265, Subpart D, and 40 CFR 279.52)	EPA's Oil Pollution Prevention Regulation (40 CFR part 112)	USCG-FRP (33 CFR part 154)	DOT/RSPA-FRP (49 CFR part 194)	OSHA Emergency Action Plans (29 CFR 1910.38(a)) and Process Safety (29 CFR 1910.119)	OSHA HAZWOPER (29 CFR 1910.120)	CAA RMP (40 CFR part 68)
f. Key contact(s) for plan development and maintenance					38(a)(2)(vi)	(l)(2)(i),(ii) (p)(8)(ii)(A),(B) (q)(2)(i),(ii)	
g. Phone number for key contact(s)							
h. Facility phone number		F1.2 F2.1	1035(a)(1)				
i. Facility fax number			1035(a)(1)				
Section II - Core Plan Elements							
1. Discovery		112.20(h)(6) F1.6.1, F1.6.2	1035(b)(3)(i)	194.107(d)(1)(iii) A-3	119(n)	(l)(2)(iii) (p)(8)(ii)(C) (q)(2)(iii)	68.95(a)(1)(iii)
2. Initial response		112.20(h)(7)(i) F1.3.6 F1.7	1035(b)(2)(ii) 1035(b)(3)(i) 1035(b)(3)(ii)	A-2	38(a)(2)(i) 38(a)(2)(ii) 119(n)	(l)(2)(ix) (p)(8)(ii)(I) (q)(2)(ix)	68.95(a)(1)(iii)
a. Procedures for internal and external notifications	264.52(d) 265.52(d) 279.52(b)(2)(iv) 264.55 265.55 279.52(b)(5) 264.56(a)(1),(2) 265.56(a)(1),(2) 279.52(b)(6)(i)(A),(B) 264.56(d)(1),(2) 265.56(d)(1),(2) 279.52(b)(6)(iv)(A),(B)	112.20(h)(1)(iii) 112.20(h)(3)(iii) 112.20(h)(3)(iii) 112.20(h)(3)(iv) F1.2 F1.3.1	1026 1035(a)(3) 1035(b)(1)(i) 1035(e)(2)	194.107(d)(1)(ii) 194.113(b)(2) A-1, A-1(b)(2) A-2 A-5	38(a)(2)(v) 38(a)(2)(vi) 38(a)(3)(i) 38(a)(3)(ii) 165	(l)(2)(ix) (p)(8)(ii)(I) (q)(2)(ix)	68.95(a)(1)(i)
b. Establishment of a response management structure	264.37 265.37 279.52(a)(6) 264.52(c) 265.52(c) 279.52(b)(2)(iii)	112.20(h)(1)(v) 112.20(h)(3)(v) F1.3.4	1035(b)(3)(iii)	194.107(d)(1)(v) A-4 A-9		(l)(2)(i),(ii) (p)(8)(ii)(A),(B) (q)(2)(i),(ii) (q)(3)(i)	
c. Preliminary assessment	264.56(b),(c) 265.56(b),(c) 279.52(b)(6)(ii),(iii)	112.20(h)(3)(ix) 112.20(h)(4) F1.4, F1.4.2	1035(b)(3) 1035(b)(4)(i)	194.107(d)(1)(ii)	38(a)(2)(i) 38(a)(2)(ii)	(l)(2)(i) (l)(3)(vii) (p)(8)(ii)(A) (q)(2)(i) (q)(3)(ii),(iii)	

ICP Elements	RCRA (40 CFR part 264, Subpart D, 40 CFR part 265, Subpart D, and 40 CFR 279.52)	EPA's Oil Pollution Prevention Regulation (40 CFR part 112)	USCG-FRP (33 CFR part 154)	DOT/RSPA-FRP (49 CFR part 194)	OSHA Emergency Action Plans (29 CFR 1910.38(a)) and Process Safety (29 CFR 1910.119)	OSHA HAZWOPER (29 CFR 1910.120)	CAA RMP (40 CFR part 68)
d. Establishment of objectives and priorities for response, including: **(1) Immediate goals/ tactical planning** **(2) Mitigating actions** **(3) Response resources**	264.52(e) 265.52(e) 279.52(b)(2)(v)	112.20(h)(1)(iv) 112.20(h)(1)(vii) 112.20(h)(3)(vi) 112.20(h)(3)(ix) 112.20(h)(7) **F1.3.2** **F1.7.1, F1.7.3**	1035(b)(2) 1035(b)(3)(iv),(v)	194.107(d)(1)(iii) 194.107(d)(1)(v)	38(a)(4) 119(n)	(l)(2)(vi),(viii) (p)(8)(ii)(F),(H) (q)(2)(vi),(viii) (p)(8)(iv)(F) (q)(3)(ii),(iii),(iv),(vi),(vii)	
e. Implementation of tactical plan	264.52(e) 265.52(e) 279.52(b)(2)(v)	112.20(h)(3)(ix) 112.20(h)(7)	1035(b)(2)(iii) 1035(b)(3) 1035(b)(4)(iii)	194.107(d)(1)(v) **A-3**	38(a)(2)(ii)	(l)(3)(vii) (p)(8)(iv)(F) (q)(3)(iii)	
f. Mobilization of resources	264.52(e) 265.52(e) 279.52(b)(2)(v)	112.20(h)(7) **F1.7.1**	1035(b)(2)(iii) 1035(b)(3) 1035(b)(4)(iii)	194.115 194.107(d)(1)(v) **A-1** **A-3**		(l)(2)(ix) (p)(8)(ii)(I) (q)(2)(ix)	
3. Sustained actions		112.20(h)(7)	1035(b)(3)	194.107(d)(1)(v) **A-9**	38(a)(2)(iii)	(l)(2)(x) (p)(8)(ii)(J) (q)(2)(x)	68.95(a)(1)(iii)
4. Termination and follow-up actions	264.56(i) 265.56(i)	112.20(h)(7)	1035(b)(3)			(l)(2)(ix) (p)(8)(ii)(I) (q)(2)(ix)	68.95(a)(1)(iii)
Section III - Annexes							
1. Facility and locality information		112.20(h)(2) **F1.2** **F2.0**	1035(a) 1035(e)(1)	194.107(d)(1)(i) 194.113 194.113(b)(1)			
a. Facility maps		112.20(h)(1)(viii) **F1.9**		194.113(b)(2) **A-9**			
b. Facility drawings		112.20(h)(1)(viii) 112.20(h)(9) **F1.9**	1035(e)	**A-9**			
c. Facility description/ layout		**F1.9**	1035(b)(4)	**A-9**		(l)(3)(i)(A) (p)(8)(iv)(A)(1)	

ICP Elements	RCRA (40 CFR part 264, Subpart D, 40 CFR part 265, Subpart D, and 40 CFR 279.52)	EPA's Oil Pollution Prevention Regulation (40 CFR part 112)	USCG-FRP (33 CFR part 154)	DOT/RSPA-FRP (49 CFR part 194)	OSHA Emergency Action Plans (29 CFR 1910.38(a)) and Process Safety (29 CFR 1910.119)	OSHA HAZWOPER (29 CFR 1910.120)	CAA RMP (40 CFR part 68)
2. Notification	264.52(d) 265.52(d) 279.52(b)(2)(iv) 264.56(a)(1),(2) 265.56(a)(1),(2) 279.52(b)(6)(i)(A),(B) 264.56(d)(1),(2) 265.56(d)(1),(2) 279.52(b)(6)(iv)(A),(B)	112.20(h)(1)(ii)		194.107(d)(1)(ii) A-2	119(n) 165(b)(1) 165(b)(4) 272(d)	(l)(3)(i)(B) (l)(2)(ix) (p)(8)(ii)(I) (p)(8)(iv)(A)(2) (q)(2)(ix)	68.95(a)(1)(i)
a. Internal		112.20(h)(3)(iii) F1.3.1	1035(b)(1)(i) 1035(b)(1)(ii) 1035(e)(2)	194.107(d)(1)(iv)	119(n) 165(b)(1)	(l)(2)(ix) (q)(2)(ix) (p)(8)(ii)(I)	
b. Community		112.20(h)(3)(iii) 112.20(h)(3)(ix) F1.3.1	1035(b)(1)(i) 1035(b)(1)(ii) 1035(e)(2)		119(n)	(l)(2)(i),(ii),(ix) (p)(8)(ii)(A),(B), (I) (q)(2)(i),(ii),(ix)	
c. Federal and state agency		112.20(h)(3)(iii) 112.20(h)(3)(ix) F1.3.1	1035(b)(1)(i) 1035(b)(1)(ii) 1035(e)(2)	194.107(d)(1)(vi)		(l)(2)(i),(ii),(ix) (p)(8)(ii)(A),(B),(I) (q)(2)(i),(ii),(ix)	
3. Response management structure		112.20(h)(1)(v) 112.20(h)(3)(v) F1.3.4	1035(b)(3)(iii)	194.107(d)(1)(v) A-9		(q)(3)(i)	
a. General	264.52(c) 265.52(c) 279.52(b)(2)(iii)		1035(b)(3)(iii)			(q)(3)(i)	
b. Command		112.20(h)(3)(iv)				(q)(3)(i)	
(1) Facility incident commander and qualified individual	264.55 265.55 279.52(b)(5)	112.20(h)(1)(i) F1.2.5	1026	A-4		(q)(3)(i)	
(2) Information	264.56(a)(1),(2) 265.56(a)(1),(2) 279.52(b)(6)(i)(A),(B)	112.20(h)(3)(iii)	1035(b)(3)(iii) 1035(e)(4)	194.107(d)(1)(v) A-2	38(a)(2)(vi) 38(a)(5)(iii)	(q)(3)(i)	
(3) Safety	264.52(f) 265.52(f) 279.52(b)(2)(vi)	112.20(h)(1)(vi) 112.20(h)(3)(vii) 112.20(h)(3)(viii) F1.3.5	1035(b)(3)(iii) 1035(e)(5)		38(a)(2)(i) 38(a)(2)(iii) 38(a)(2)(iv) 38(a)(4)	(l)(2)(iv),(vi) (p)(8)(ii)(D),(F) (q)(2)(iv),(vi) (q)(3)(vii),(viii)	
(4) Liaison			1035(b)(3)(iii)		38(a)(2)(vi)	(l)(2)(i),(ii) (p)(8)(ii)(A),(B) (q)(2)(i),(ii)	

ICP Elements	RCRA (40 CFR part 264, Subpart D, 40 CFR part 265, Subpart D, and 40 CFR 279.52)	EPA's Oil Pollution Prevention Regulation (40 CFR part 112)	USCG-FRP (33 CFR part 154)	DOT/RSPA-FRP (49 CFR part 194)	OSHA Emergency Action Plans (29 CFR 1910.38(a)) and Process Safety (29 CFR 1910.119)	OSHA HAZWOPER (29 CFR 1910.120)	CAA RMP (40 CFR part 68)
c. Operations			1035(b)(3)(iii)	194.107(d)(1)(v)	38(a)(2)(i)-(iv)	(q)(3)(iii),(v)	
(1) Response objectives			1035(b)(2)(iii) 1035(b)(4)(iii)		38(a)(1)	(q)(3)(iii)	
(2) Discharge or release control	264.56(e) 265.56(e) 279.52(b)(6)(v)	112.20(h)(3)(i) 112.20(h)(7)(iv) 112.20(h)(1)(vii)	1035(b)(2) 1035(b)(2)(iii) 1035(b)(4)(iii)	194.107(d)(1)(v) A-3			
(3) Assessment/ monitoring	264.56(b),(c),(d),(f) 265.56(b),(c),(d),(f) 279.52(b)(6)(ii),(iii),(iv),(vi)	112.20(h)(3)(ix) F1.7.1	1035(b)(2)(iii) 1035(b)(3) 1035(b)(4)(iii)		38(a)(3)(ii) 38(a)(4)	(q)(3)(ii)	
(4) Containment	264.56(e) 265.56(e) 279.52(b)(6)(v)	112.20(h)(1)(vii) 112.20(h)(3)(i) 112.20(h)(7)(iv) F1.7.3	1035(b)(2)(iii) 1035(b)(3)(iv) 1035(b)(4)(iii)	194.107(d)(1)(v)			
(5) Recovery		112.20(h)(3)(i) 112.20(h)(7)(iii) F1.7.2	1035(b)(2)(iii) 1035(b)(3)(iv) 1035(b)(4)(iii)	194.107(d)(1)(v)			
(6) Decontamination	264.56(h)(2) 265.56(h)(2) 279.52(b)(6)(viii)(B)	112.20(h)(7)(iii) F1.7.2		194.107(d)(1)(v)		(k) (l)(2)(vii) (p)(8)(ii)(G) (q)(2)(vii) (q)(3)(ix)	
(7) Non-responder medical needs			1035(e)(5)		38(a)(2)(iv)	(l)(2)(viii) (p)(8)(ii)(H) (q)(2)(viii)	68.95(a)(1)(ii)
(8) Salvage plans				194.107(d)(1)(v)			
d. Planning				194.107(a) 194.115	38(a)(1) 38(a)(4)	(l)(2)(i),(ix) (p)(8)(ii)(A),(I) (q)(1) (q)(2)(i),(ix)	
(1) Hazard assessment		112.20(h)(3)(ix) 112.20(h)(4) 112.20(h)(5) 112.20(h)(7)(ii) F1.4.1-F1.4.3 F1.5.1, F1.5.2	1029 1035(b)(4)(ii)	194.105 194.113(b)(6)	38(a)(4)	(l)(1)(ii)(C),(D) (p)(8)(iv)(A)(1),(F) (q)(3)(iii)	68.20-36 68.50 68.67
(2) Protection		112.20(h)(7)(i) 112.20(h)(7)(iv) F1.7.1, F1.7.3	1035(b)(4)			(l)(2)(iv),(v),(vi) (p)(8)(ii)(D),(E),(K) (q)(2)(iv),(v),(vi) (q)(3)(iii)	

ICP Elements	RCRA (40 CFR part 264, Subpart D, 40 CFR part 265, Subpart D, and 40 CFR 279.52)	EPA's Oil Pollution Prevention Regulation (40 CFR part 112)	USCG-FRP (33 CFR part 154)	DOT/RSPA-FRP (49 CFR part 194)	OSHA Emergency Action Plans (29 CFR 1910.38(a)) and Process Safety (29 CFR 1910.119)	OSHA HAZWOPER (29 CFR 1910.120)	CAA RMP (40 CFR part 68)
(3) Coordination with natural resource trustees		112.20(g)	1030(f)	194.107(c)			
(4) Waste management	264.56(h)(1) 265.56(h)(1) 279.52(b)(6)(viii)(A) 264.56(g) 265.56(g) 279.52(b)(6)(vii)	112.20(h)(7)(iv) **F1.7.2**	1035(b)(5)	194.107(d)(1)(v)			
e. Logistics			1035(b)(3)(iii)			(l)(3)(iii) (p)(8)(iv)(B) (q)(2)(xii)	
(1) Medical needs			1035(e)(5)		38(a)(2)(iv)	(l)(2)(viii) (p)(8)(ii)(H) (q)(2)(viii)	68.95(a)(1)(ii)
(2) Site security		112.20(h)(10) **F1.10**				(l)(2)(v) (p)(8)(ii)(E) (q)(2)(v)	
(3) Communications		112.20(h)(1)(iv) 112.20(h)(3)(vi) **F1.3.2**	1035(e)(3)	194.107(d)(1)(v) **A-2**	38(a)(3) 119(e)(3)(iii) 165(b)	(q)(3)(i)	
(4) Transportation							
(5) Personnel support		112.20(h)(1)(v) 112.20(h)(1)(vi) 112.20(h)(3)(i-ii) 112.20(h)(3)(v) 112.20(h)(3)(vii) **F1.3.5**			38(a)(5)(i)	(l)(2)(ii) (p)(8)(ii)(B) (q)(2)(ii) (q)(3)(v),(vi)	
(6) Equipment maintenance and support		112.20(h)(1)(iv) 112.20(h)(3)(vi) 112.20(h)(8) **F1.3.3** **F1.8.1**	1035(b)(3)(iv) 1035(e)(3) 1057	194.107(d)(1)(viii)	119(j)(4) 119(j)(5) 165(d)	(l)(2)(xi) (p)(8)(ii)(K) (q)(2)(xi)	68.95(a)(2)
f. Finance/procurement/ administration		112.20(h)(3)(ix)	1028 1035(b)(3)(iii)				
(1) Resource list	264.52(e) 265.52(e) 279.52(b)(2)(v)	112.20(h)(1)(iv) 112.20(h)(3)(vi) **F1.3.2** **F1.7.1**	1035(b)(3)(iv) 1035(e)(3)				
(2) Personnel		112.20(h)(1)(v) 112.20(h)(3)(v) **F1.3.4**	1035(b)(3)(iv)				

ICP Elements	RCRA (40 CFR part 264, Subpart D, 40 CFR part 265, Subpart D, and 40 CFR 279.52)	EPA's Oil Pollution Prevention Regulation (40 CFR part 112)	USCG-FRP (33 CFR part 154)	DOT/RSPA-FRP (49 CFR part 194)	OSHA Emergency Action Plans (29 CFR 1910.38(a)) and Process Safety (29 CFR 1910.119)	OSHA HAZWOPER (29 CFR 1910.120)	CAA RMP (40 CFR part 68)
(3) Response equipment	264.52(e) 265.52(e) 279.52(b)(2)(v)	112.20(h)(1)(iv) 112.20(h)(3)(vi) F1.3.2 F1.7.1	1035(b)(2)(ii) 1035(b)(4)(iii) 1035(e)(3) Appendix C			(l)(2)(xi) (p)(8)(ii)(K) (q)(2)(xi)	
(4) Support equipment	264.52(e) 265.52(e) 279.52(b)(2)(v)	F1.3.2 F1.7.1	1035(e)(3)				
(5) Contracting		112.20(h)(3)(ii)	1028(a)(1) 1035(e)(3)	194.115			
(6) Claims procedures							
(7) Cost documentation							
4. Incident documentation					38(a)(2)(iii) 119(e)(3)(ii)	(l)(2)(x) (p)(8)(ii)(J) (q)(2)(x)	
a. Post-accident investigation	264.56(j) 265.56(j) 279.52(b)(6)(ix)				119(m)	(l)(2)(x) (p)(8)(ii)(J) (q)(2)(x)	68.60 68.81
b. Incident history		112.20(h)(4) F1.4.4			119(e)(3)(ii)		68.42
5. Training and exercises/drills		112.20(h)(8) 112.21 F1.8.2, F1.8.3	1035(c) 1050 1055 Appendix D	194.107(d)(1)(vii) 194.107(d)(1)(ix) 194.117 A-6 A-7	38(a)(5) 119(g)(1)(i)	(l)(3)(iv) (p)(8)(iii) (q)(6)	68.95(a)(3)
6. Response critique and plan review and modification process	264.54 265.54 279.52(b)(4)	112.20(g)	1035(a)(6) 1035(d) 1065	194.107(d)(1)(x) 194.111 194.119 194.121 A-8	119(l) 119(o)(1)	(l)(2)(x) (p)(8)(ii)(J) (q)(2)(x)	68.95(a)(4)
7. Prevention						(l)(2)(iii) (p)(8)(ii)(C) (q)(2)(iii)	

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Accordingly, the publication of the notice on June 5, 1996 (61 FR 28642) is corrected as follows:

1. On page 28660, the chart within Attachment 3 labeled ``DOT/RSPA FRP (49 CFR Part 194)" is replaced by the following chart that removes transcription errors and incorporates 22 lines of text omitted from the original notice.

DOT/RSPA FRP (49 CFR part 194)	ICP
194.101 Operators required to submit plans	
194.103 Significant and substantial harm: operator's statement.	III.8.
194.105 Worst case discharge.....	III.3.d.(1).
194.107 General response plan requirements:	
(a) Resource planning requirements.....	III.3.d.
(b) Language requirements.....	
(c) Consistency with NCP and ACP(s).....	III.3.d.(3), III.8.
(d) Each response plan must include:	
(1) Core Plan Contents	
(i) An information summary as required in 194.113.	I.4, III.1.
194.113(a) Core plan information summary	
(1) Name and address of operator..	I.4.b, I.4.d.
(2) Description of each response zone.	I.4.c.
(b) Response zone appendix information summary	
(1) Core plan information summary.	I.4, III.1.
(2) Name, telephone of qualified individual available on 24-hour basis.	II.2.a, III.1.a.
(3) Description of response zone..	I.4.c.
(4) List of line sections for each pipeline.	I.4.c.
(5) Significant and substantial harm determination.	III.8.
(6) Type of oil and volume of WCD.	III.3.d.(1).
(ii) Immediate notification procedures.	II.2.a, III.2.
(iii) Spill detection and mitigation procedures.	II.1, II.2.d.(2).
(iv) The name, address, and telephone number of the oil spill response organization, if appropriate.	III.2.a.
(v) Response activities and response resources.	II.2.b, II.2.d.(3), II.2.e-f, III.3.c.(2), III.3.c.(4)-(6) III.3.e.(3).
(vi) Names and telephone numbers of federal, state, and local agencies which the operator expects to have pollution control responsibilities or support.	III.2.c.
(vii) Training procedures.....	III.5.
(viii) Equipment testing.....	III.3.e.(6).
(ix) Drill types, schedules, and procedures.	III.5.
(x) Plan review and update procedures.	III.6.
(2) An appendix for each response zone \16\	
194.109 Submission of state response plans	
194.111 Response plan retention	III.6.
194.113 Information summary (see 194.107(d)(1)(i))	
194.115 Response resources.....	II.2.f, III.3.d, III.3.f.(5).
194.117 Training.....	III.5.
194.119 Submission and approval procedures.	III.6.
194.121 Response plan review and update procedures.	III.6.
Appendix A Recommended guidelines for the preparation of response plans.	I.2.
Section 1 Information summary.....	I.4.b-c, II.2.a, II.2.f, III.
Section 2 Notification procedures.....	II.2.a, III.2, III.3.b.(2), I
Section 3 Spill detection and on-scene spill mitigation procedures.	II.1, II.2.e-f, III.3.c.(2).
Section 4 Response activities.....	II.2.b, III.3.b.(1).
Section 5 List of contacts.....	II.2.a.
Section 6 Training procedures.....	III.5.
Section 7 Drill procedures.....	III.5.
Section 8 Response plan review and update procedures.	III.6.
Section 9 Response zone appendices.....	II.2.b, II.3, III.1.a-c, III.

ATTACHMENT 3: REGULATORY CROSS-COMPARISON MATRICES

	ICP Citation(s)
RCRA (40 CFR Part 264 Subpart D [1], 40 CFR Part 265 Subpart D [2], 40 CFR Part 279.52(b) [3])	
264.52 Content of contingency plan:	
(a) Emergency response actions.[4]	
(b) Amendments to SPCC plan.	
(c) Coordination with State and local response parties [5]	II.2.b;III.3.a.
(d) Emergency coordinator(s)	II.2.a; III.2.
(e) Detailed description of emergency equipment on-site	II.2.d.(3); II.2.e; II.2.f; III.3.f.(1); III.3.f.(3); III.3.f.(4).
(f) Evacuation plan if applicable	III.3.b.(3).
264.53 Copies of contingency plan.	
264.54 Amendment of contingency plan	III.6.
264.55 Emergency coordinator	II.2.a; III.3.b.(1).
264.56 Emergency procedures:	
(a) Notification	II.2.a; III.2; III.3.b.(2).
(b) Emergency identification/characterization	II.2.c; III.3.c.(3).
(c) Health/environmental assessment	II.2.c; III.3.c.(3).
(d) Reporting	II.2.a; III.2; III.3.c.(3).
(e) Containment	III.3.c.(2); III.3.c.(4).
(f) Monitoring	III.3.b.(3); III.3.c.(3).
(g) Treatment, storage, or disposal of wastes	III.3.d.(4).
(h) Cleanup procedures:.	
(1) Disposal	III.3.d.(4).
(2) Decontamination	III.3.c.(6).
(i) Follow-up procedures	II.4.
(j) Follow-up report	III.4.a.
265.52 Content of contingency plan:	
(a) Emergency response actions.[6]	
(b) Amendments to SPCC plan.	
(c) Coordination with State and local response parties [7]	II.2.b; III.3.a.
(d) Emergency coordinator(s)	II.2.a; III.2.
(e) Detailed description of emergency equipment on-site	II.2.d.(3); II.2.e; II.2.f; III.3.f.(1); III.3.f.(3); III.3.f.(4).
(f) Evacuation plan if applicable	III.3.b.(3).
265.53 Copies of contingency plan.	
265.54 Amendment of contingency plan	III.6.
265.55 Emergency coordinator	II.2.a; III.3.b.(1).
265.56 Emergency procedures:	
(a) Notification	II.2.a; III.2; III.3.b.(2).
(b) Emergency identification/characterization	II.2.c; III.3.c.(3).
(c) Health/environmental assessment	II.2.c; III.3.c.(3).
(d) Reporting	II.2.a; III.2; III.3.c.(3).
(e) Containment	III.3.c.(2); III.3.c.(4).
(f) Monitoring	III.3.b.(3); III.3.c.(3).
(g) Treatment, storage, or disposal of wastes	III.3.d.(4).
(h) Cleanup procedures:	
(1) Disposal	III.3.d.(4).
(2) Decontamination	III.3.c.(6).
(i) Follow-up procedures	II.4.
(j) Follow-up report	III.4.a.
279.52(b)(2) Content of contingency plan:	
(i) Emergency response actions [8]	
(ii) Amendments to SPCC plan.	
(iii) Coordination with State and local response parties [9]	II.2.b; III.3.a.
(iv) Emergency coordinator(s)	II.2.a; III.2.
(v) Detailed description of emergency equipment on-site	II.2.d.(3); II.2.e; II.2.f; III.3.f.(1); III.3.f.(3); III.3.f(4).
(vi) Evacuation plan if applicable	III.3.b.(3).
(3) Copies of contingency plan.	
(4) Amendment of contingency plan	III.6.
(5) Emergency coordinator	II.2.a; III.3.b.(1).
(6) Emergency procedures:	
(i) Notification	II.2.a; III.2; III.3.b.(2).
(ii) Emergency identification/characterization	II.2.c; III.3.c.(3).
(iii) Health/environmental assessment	II.2.c; III.3.c.(3).
(iv) Reporting	II.2.a; III.2; III.3.c.(3).
(v) Containment	III.3.c.(2); III.3.c.(4).
(vi) Monitoring	III.3.b.(3); III.3.c.(3).
(vii) Treatment, storage, or disposal of wastes	III.3.d.(4).
(viii) Cleanup procedures:	
(A) Disposal	III.3.d.(4).
(B) Decontamination	III.3.c.(6).

ATTACHMENT 3: REGULATORY CROSS-COMPARISON MATRICES—Continued

	ICP Citation(s)
(ix) Follow-up report	III.4.a.
EPA's Oil Pollution Prevention Regulation (40 CFR 112)	
112.7(d)(1) Strong spill contingency plan and written commitment of manpower, equipment, and materials.[10,11]	
112.20(g) General response planning requirements	III.3.d.(3); III.6.
112.20(h) Response plan elements	I.2; III.8.
(1) Emergency response action plan (Appendix F1.1):	
(i) Identity and telephone number of qualified individual (F1.2.5)	III.3.b.(1).
(ii) Identity of individuals/organizations to contact if there is a discharge (F1.3.1)	III.2.
(iii) Description of information to pass to response personnel in event of a reportable spill (F1.3).	II.2.a.
(iv) Description of facility's response equipment and its location (F1.3.2)	II.2.d.(3); III.3.e.(3); III.3.e.(6); III.3.f.(1); III.3.f.(3).
(v) Description of response personnel capabilities (F1.3.4)	II.2.b; III.3; III.3.e.(5); III.3.f.(2);
(vi) Plans for evacuation of the facility and a reference to community evacuation plans (F1.3.5).	III.3.b.(3); III.3.e.(5)
(vii) Description of immediate measures to secure the source (F1.7.1)	II.2.d.(2); III.3.c.(2); III.3.c.(4).
(viii) Diagram of the facility (F1.9)	III.1.a–b.
(2) Facility information (F1.2, F2.0)	I.4.b–d; III.1.
(3) Information about emergency responses:	
(i) Identity of private personnel and equipment to remove to the maximum extent practicable a WCD or other discharges (F1.3.2, F1.3.4).	III.3.c.(2); III.3.c.(4)–(5); III.3.e.(5).
(ii) Evidence of contracts or other approved means for ensuring personnel and equipment availability.	III.3.e.(5); III.3.f.(5)
(iii) Identity and telephone of individuals/organizations to be contacted in event of a discharge (F1.3.1).	II.2.a; III.2.b–d; III.3.b.(2).
(iv) Description of information to pass to response personnel in event of a reportable spill (F1.3.1).	II.2.a.
(v) Description of response personnel capabilities (F1.3.4)	II.2.b; III.3; III.3.e.(5); III.3.f.(2).
(vi) Description of a facility's response equipment, location of the equipment, and equipment testing (F1.3.2, F1.3.3).	II.2.d.(3); III.3.e.(3); III.3.e.(6); III.3.f.(1); III.3.f.(3).
(vii) Plans for evacuation of the facility and a reference to community evacuation plans as appropriate (F1.3.5).	III.3.b.(3); III.3.e.(5).
(viii) Diagram of evacuation routes (F1.9).	III.3.b.(3).
(ix) Duties of the qualified individual (F1.3.6)	II.2.c; II.2.d.(1); I.2.e; III.2.b–c; III.3.c.(3); III.3.d.(1); III.3.f.
(4) Hazard evaluation (F1.4)	II.2.c; III.3.d.(1); III.4.b.
(5) Response planning levels (F1.5, F1.5.1, F1.5.2)	II.3.d.(1).
(6) Discharge detection systems (F1.6, F1.6.1, F1.6.2)	II.1.
(7) Plan implementation (F1.7)	II.2.d–f; II.3; II.4.
(i) Response actions to be carried out (F1.7.1.1)	II.2; III.3.d.(2).
(ii) Description of response equipment to be used for each scenario (F1.7.1.1)	III.3.d.(1).
(iii) Plans to dispose of contaminated cleanup materials (F1.7.2)	III.3.c.(5)–(6)
(iv) Measures to provide adequate containment and drainage of spilled oil (F1.7.3)	III.3.c.(2); III.3.c.(4); III.3.d.(2); III.3.d.(4).
(8) Self-inspection, drills/exercises, and response training (F1.8.1–F1.8.3.2)	III.3.e.(6); III.5.
(9) Diagrams (F1.9)	III.1.b.
(10) Security systems (F1.10)	III.3.e.(2).
(11) Response plan cover sheet (F2.0).	
112.21 Facility response training and drills/exercises (F1.8.2, F1.8.3)	III.5.
Appendix F Facility-Specific Response Plan:[12]	I.2.
1.0 Model Facility-Specific Response Plan.	
1.1 Emergency Response Action Plan.	
1.2 Facility Information	I.3; I.4.a; I.4.b–c; I.4.h; II.2.a; III.1.
1.3 Emergency Response Information:	
1.3.1 Notification	II.2.a; III.2.a–c.
1.3.2 Response Equipment List	II.2.d.(3); III.3.e.(3); III.3.f.(1); III.3.f.(3)–(4).
1.3.3 Response Equipment Testing/Deployment	III.3.e.(6).
1.3.4 Personnel	II.2.b; III.3; III.3.f.(2).
1.3.5 Evacuation Plans	III.3.b.(3); III.3.e.(5).
1.3.6 Qualified Individual's Duties	II.2.
1.4 Hazard Evaluation	II.2.c.
1.4.1 Hazard Identification	III.1.c; III.3.d.(1).
1.4.2 Vulnerability Analysis	II.2.c; III.3.d.(1).
1.4.3 Analysis of the Potential for an Oil Spill	III.3.d.(1).
1.4.4 Facility Reportable Oil Spill History	III.4.b.
1.5 Discharge Scenarios:	
1.5.1 Small and Medium Discharges	III.3.d.(1).
1.5.2 Worst Case Discharge	III.3.d.(1).
1.6 Discharge Detection Systems:	
1.6.1 Discharge Detection By Personnel	II.1.

ATTACHMENT 3: REGULATORY CROSS-COMPARISON MATRICES—Continued

	ICP Citation(s)
1.6.2 Automated Discharge Detection	II.1.
1.7 Plan Implementation	II.2.
1.7.1 Response Resources for Small, Medium, and Worst Case Spills	II.2.d.(3); II.2.f; III.3.c.(3); III.3.d.(2); III.3.f.(1); III.3.f.(3)–(4).
1.7.2 Disposal Plans	III.3.c.(5)–(6); III.3.d.(4).
1.7.3 Containment and Drainage Planning	II.2.d; III.3.c.(4); III.3.d.(2).
1.8 Self-Inspection, Drills/Exercises, and Response Training:	
1.8.1 Facility Self-Inspection	III.3.e.(6).
1.8.2 Facility Drills/Exercises	III.5.
1.8.3 Response Training	III.5.
1.9 Diagrams	I.4; III.1.a–c.
1.10 Security	III.3.e.(2).
2.0 Response Plan Cover Sheet	I.4.b; I.4.c; I.4.h; III.1.
USCG FRP (33 CFR part 154)	
154.1026 Qualified individual and alternate qualified individual	II.2.a; III.3.b.(1).
154.1028 Availability of response resources by contract or other approved means	III.3.f or III.8; III.3.f.(5).
154.1029 Worst case discharge	III.3.d.(1).
154.1030 General response plan contents:.	
(a) The plan must be written in English.	
(b) Organization of the plan [13]	I.2.
(c) Required contents.	
(d) Sections submitted to COTP.	
(e) Cross-references	III.8.
(f) Consistency with NCP and ACPs	III.3.d.(3).
154.1035 Significant and substantial harm facilities:	
(a) Introduction and plan content	III.1.
(1) Facility's name, physical and mailing address, county, telephone, and fax	I.4.a; I.4.c–d; I.4.h–i
(2) Description of a facility's location in a manner that could aid in locating the facility	I.4.c.
(3) Name, address, and procedures for contacting the owner/operator on 24-hour basis.	I.4.b; II.2.a
(4) Table of contents	I.2.
(5) Cross index, if appropriate	III.8.
(6) Record of change(s) to record information on plan updates	I.3; III.6.
(b) Emergency Response Action Plan:	
(1) Notification procedures:	
(i) Prioritized list identifying person(s), including name, telephone number, and role in plan, to be notified in event of threat or actual discharge.	II.2.a; III.2.a–c.
(ii) Information to be provided in initial and follow-up notifications to federal, state, and local agencies.	III.3.b; III.2.a–c.
(2) Facility's spill mitigation procedures [14]	II.2.d.(2); III.3.c.(2).
(i) Volume(s) of persistent and non-persistent oil groups.	
(ii) Prioritized procedures/task delegation to mitigate or prevent a potential or actual discharge or emergencies involving certain equipment/scenarios.	II.2.
(iii) List of equipment and responsibilities of facility personnel to mitigate an average most probable discharge.	II.2.e–f; III.3.f.(3); III.3.c.(1)–(5).
(3) Facility response activities [15]	II.2.c; II.2.e–f; II.3; II.4; III.3.c.(3).
(i) Description of facility personnel's responsibilities to initiate/supervise response until arrival of qualified individual.	II.1; II.2.
(ii) Qualified individual's responsibilities/authority	II.2.
(iii) Facility or corporate organizational structure used to manage response actions	II.2.b; II.3; III.3.a; III.3.b.(2)–(4); III.3.c; III.3.d.(1); III.3.e–f.
(iv) Oil spill response organization(s)/spill management team available by contract or other approved means.	II.2.d.(3); III.3.c.(4)–(5); III.3.e.(6); III.3.f.(1)–(2); III.3.f.(5).
(v) For mobile facilities that operate in more than one COTP, the oil spill response organization(s)/spill management team in the applicable geographic-specific appendix.	II.2.d.(3).
(4) Fish and wildlife sensitive environments	III.1.c; III.3.d.(1)–(2).
(i) Areas of economic importance and environmental sensitivity as identified in the ACP that are potentially impacted by a WCD.	II.2.c.
(ii) List areas and provide maps/charts and describe response actions.	
(iii) Equipment and personnel necessary to protect identified areas	II.2.e–f; III.3.f.(3); III.3.c.(1)–(5).
(5) Disposal plan	III.3.d.(4).
(c) Training and exercises	III.5.
(d) Plan review and update procedures	III.6.
(e) Appendices	I.4.c; III.1.b.
(1) Facility specific information	III.1.
(2) List of contacts	II.2.a; III.2.a–c; III.3.b.(1).
(3) Equipment lists and records	III.3.e.(3); III.3.e.(6); III.3.f.(1); III.3.f.(3)–(5).
(4) Communications plan	III.3.b.(2).
(5) Site-specific safety and health plan	III.3.b.(3); III.3.c.(7); III.3.e. (1).

ATTACHMENT 3: REGULATORY CROSS-COMPARISON MATRICES—Continued

	ICP Citation(s)
(6) List of acronyms and definitions.	
(7) A geographic-specific appendix.	
154.1040 Specific requirements for substantial harm facilities.	
154.1041 Specific response information to be maintained on mobile MTR facilities.	
154.1045 Groups I–IV petroleum oils.	
154.1047 Group V petroleum oils.	
154.1050 Training	III.5.
154.1055 Drills	III.5.
154.1057 Inspection and maintenance of response resources	III.3.e.(6).
154.1060 Submission and approval procedures.	
154.1065 Plan revision and amendment procedures	III.6.
154.1070 Deficiencies.	
154.1075 Appeal Process.	
Appendix C—Guidelines for determining and evaluating required response resources for facility response plans.	III.3.f.(3).
Appendix D—Training elements for oil spill response plans	III.5.
DOT/RSPA FRP (49 CFR Part 194)	
194.101 Operators required to submit plans.	
194.103 Significant and substantial harm: operator's statement	III.8.
194.105 Worst case discharge	III.3.d.(1).
194.107 General response plan requirements:	
(a) Resource planning requirements	III.3.d.
(b) Language requirements.	
(c) Consistency with NCP and ACP(s)	III.3.d.(3); III.8.
(d) Each response plan must include:	
(1) Core Plan Contents:	
(i) An information summary as required in 194.113	I.4; III.1.
194.113(a) Core plan information summary:	
(1) Name and address of operator	I.4.b; I.4.d.
(2) Description of each response zone	I.4.c.
(b) Response zone appendix information summary:	
(1) Core plan information summary	I.4; III.1.
(2) Name^O^S^A^A^O Submission and approval procedures	III.6.
194.121 Response plan review and update procedures	III.6.
^Apendix^S^A^Aecommended guidelines for the preparation of response plans	I.2.
Section 1—Information summary	I.4.b–c; II.2.a; II.2.f; III.8.
Section 2—Notification procedures	II.2.a; III.2; III.3.b.(2); III.3.e.(3).
Section 3—Spill detection and on-scene spill mitigation procedures	II.1; II.2.e–f; III.3.c.(2).
Section 4—Response activities	II.2.b; III.3.b.(1).
Section 5—List of contacts	II.2.a.
Section 6—Training procedures	III.5.
Section 7—Drill procedures	III.5.
Section 8—Response plan review and update procedures	III.6.
Section 9—Response zone appendices	II.2.b; II.3; III.1.a–c; III.3.
OSHA Emergency Action Plans (29 CFR 1910.38(a)) and Process Safety (29 CFR 1910.119)	
1910.38(a) Emergency action plan:	
(1) Scope and applicability	III.3.c.(1); III.3.d.
(2) Elements:	
(i) Emergency escape procedures and emergency escape route assignments	II.2; II.2.c; III.3.b.(3); III.3.c.
(ii) Procedures to be followed by employees who remain to operate critical plant operations before they evacuate.	II.2; II.2.c; II.2.e; III.3.c.
(iii) Procedures to account for all employees after emergency evacuation has been completed.	II.2.a; III.3.b.(2); III.3.b.(3); III.3.c; III.4.
(iv) Rescue and medical duties for those employees who are to perform them	III.3.b.(3); III.3.c; III.3.c.(7); III.3.e.(1).
(v) The preferred means of reporting fires and other emergencies	II.2.a; III.3.b.
(vi) Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan.	I.4.f; II.2.a; III.3.b.(2); III.3.b.(4).
(3) Alarm system [16]	II.2.a; III.3.c.(3); III.3.e.(3).
(4) Evacuation	II.2.d; III.3.b.(3); III.3.c.(3); III.3.d; III.3.d.(1).
(5) Training	III.3.e.(5); III.5.
1910.119 Process safety management of highly hazardous chemicals:	
(e)(3)(ii) Investigation of previous incidents	III.4; III.4.b.
(e)(3)(iii) Process hazard analysis requirements	III.3.e.(3).
(g)(1)(i) Employee training in process/operating procedures	III.5.
(j)(4) Inspection/testing of process equipment	III.3.e.(6).
(j)(5) Equipment repair	III.3.e.(6).
(l) Management of change(s)	III.5.
(m) Incident investigation	III.4.a.

ATTACHMENT 3: REGULATORY CROSS-COMPARISON MATRICES—Continued

	ICP Citation(s)
(n) Emergency planning and response	I.1; II.1; II.2; II.2.d; III.2; III.2.a; III.2.b.
(o)(1) Certification of compliance	III.6.
1910.165 Employee alarm systems:	
(b) General requirements	III.3.e.(3).
(b)(1) Purpose of alarm system	III.2; III.2.a.
(b)(4) Preferred means of reporting emergencies	III.2.
(d) Maintenance and testing	III.3.e.(6).
1910.272 Grain handling facilities:	
(d) Development/implementation of emergency action plan	I.1; III.2.
OSHA HAZWOPER (29 CFR 1910.120)	
1910.120(k) Decontamination	III.3.c.(6).
1910.120(l) Emergency response program	I.1.
(1) Emergency response plan:	
(i) An emergency response plan shall be developed and implemented by all employers within the scope of this section to handle anticipated emergencies prior to the commencement of hazardous waste operations.	
(ii) Employers who will evacuate their employees from the workplace when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency, are exempt from the requirements of this paragraph if they provide an emergency action plan complying with section 1910.38(a) of this part.	
(2) Elements of an emergency response plan:	
(i) Pre-emergency planning and coordination with outside parties	I.4.f; II.2.b; II.2.c; III.2.b; III.2.c; III.3.b.(4); III.3.d.
(ii) Personnel roles, lines of authority, and communication	I.4.f; II.2.b; III.2.a; III.2.c; III.3.b.(4); III.3.e.(4).
(iii) Emergency recognition and prevention	II.1; III.7.
(iv) Safe distances and places of refuge	III.3.b.(3); III.3.d.(2).
(v) Site security and control	III.3.d.(2); III.3.e.(2).
(vi) Evacuation routes and procedures	II.2.d; III.3.b.(3)
(vii) Decontamination procedures	III.3.c.(6).
(viii) Emergency medical treatment and response procedures	II.2.d; III.3.c.(7); III.3.e.(1).
(ix) Emergency alerting and response procedures	II.2; II.2.a; II.2.f; II.4; III.2; III.2.a; III.2.b; III.2.c; III.3.d.
(x) Critique of response and follow-up	II.3; III.4; III.4.a; III.6.
(xi) PPE and emergency equipment	III.3.e.(6); III.3.f.(3); III.3.d.(2); III.3.e.(6); III.3.f.(3).
(3) Procedures for handling emergency incidents:	
(i) Additional elements of emergency response plans:	
(A) Site topography, layout, and prevailing weather conditions	III.1.c.
(B) Procedures for reporting incidents to local, state, and federal government agencies.	II.2.a; III.2.
(ii) The emergency response plan shall be a separate section of the Site Safety and Health Plan.	
(iii) The emergency response plan shall be compatible with the disaster, fire, and/or emergency response plans of local, state, and federal agencies.	III.3.e.
(iv) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.	III.5.
(v) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.	
(vi) An employee alarm system shall be installed in accordance with 29 CFR 1910.165 to notify employees of an emergency situation; to stop work activities if necessary; to lower background noise in order to speed communications; and to begin emergency procedures.	
(vii) Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.	II.2.c; II.2.d.
1910.120(p)(8) Emergency response program:	I.1
(i) Emergency response plan.	
(ii) Elements of an emergency response plan:	
(A) Pre-emergency planning and coordination with outside parties	I.4.f; II.2.b; II.2.b; III.2.b; III.2.c; III.3.b.(4); III.3.d.
(B) Personnel roles, lines of authority, and communication	I.4.f; II.2.b; III.2.c; III.2.c; III.3.b.(4); III.3.e.(4).
(C) Emergency recognition and prevention	II.1; III.7
(D) Safe distances and places of refuge	III.3.b.(3); III.3.d.(2)
(E) Site security and control	III.3.d.(2); III.3.e.(2)
(F) Evacuation routes and procedures	II.2.d; III.3.b.(3).
(G) Decontamination procedures	III.3.c.(6).
(H) Emergency medical treatment and response procedures	II.2.d; III.3.c.(7); III.3.e.(1).
(I) Emergency alerting and response procedures	II.2; II.2.a; II.2.f; II.4; III.2; III.2.a; III.2.b; III.2.c; III.3.d.

ATTACHMENT 3: REGULATORY CROSS-COMPARISON MATRICES—Continued

	ICP Citation(s)
(J) Critique of response and follow-up	II.3; III.4; III.4.a; III.6.
(K) PPE and emergency equipment	III.3.e.(6); III.3.f.(3); III.3.d.(2); III.3.e.(6); III.3.f.(3).
(iii) Training	III.5.
(iv) Procedures for handling emergency incidents:	
(A) Additional elements of emergency response plans:	
(1) Site topography, layout, and prevailing weather conditions	III.1.c; III.3.d.(1).
(2) Procedures for reporting incidents to local, state, and federal government agencies.	II.2.a; III.2.
(B) The emergency response plan shall be compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.	III.3.e.
(C) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.	
(D) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.	
(E) An employee alarm system shall be installed in accordance with 29 CFR 1910.165.	
(F) Based upon the information available at the time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan	II.2.d; II.2.e; III.3.d.(1).
1910.120(q) Emergency response to hazardous substance releases:	
(1) Emergency response plan	III.3.1.
(2) Elements of an emergency response plan:	
(i) Pre-emergency planning and coordination with outside parties	I.4.f; II.2.b; II.2.c; III.2.b; III.2.c; III.3.b.(4); III.3.d.
(ii) Personnel roles, lines of authority, training, and communication	I.4.f; II.2.b; III.2.b; III.2.c; III.3.b.(4); III.3.e.(4).
(iii) Emergency recognition and prevention	II.1; III.7.
(iv) Safe distances and places of refuge	III.3.b.(3); III.3.d.(2).
(v) Site security and control	III.3.d.(2); III.3.e.(2).
(vi) Evacuation routes and procedures	II.2.d; III.3.b.(3).
(vii) Decontamination procedures	III.3.c.(6).
(viii) Emergency medical treatment and response procedures	II.2.d; III.3.c.(7); III.3.e.(1).
(ix) Emergency alerting and response procedures	II.2; II.2.a; II.2.f; II.4; III.2; III.2.a; III.2.b; III.2.c; III.3.d.
(x) Critique of response and follow-up	II.3; III.4; III.4.a; III.6.
(xi) PPE and emergency equipment	III.3.e.(6); III.3.f.(3); III.3.d.(2); III.3.e.(6); III.3.f.(3).
(xii) Emergency response plan coordination and integration	III.3.e; III.8.
(3) Procedures for handling emergency response:	
(i) The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS).	II.2.b; III.3; III.3.a; III.3.b; III.3.b.(1); III.3.b.(2); III.3.e.(3).
(ii) The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.	II.2.c; II.2.d; III.3.c.(3).
(iii) Implementation of appropriate emergency operations and use of PPE	II.2.c; II.2.d; II.2.e; III.3.c; III.3.c.(1); III.3.d.(1); III.3.d.(2).
(iv) Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear positive pressure self-contained breathing apparatus while engaged in emergency response.	II.2.d.
(v) The individual in charge of the ICS shall limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing emergency operations.	III.3.c; III.3.e.(5).
(vi) Backup personnel shall stand by with equipment ready to provide assistance or rescue.	II.2.d; III.3.e.(5).
(vii) The individual in charge of the ICS shall designate a safety official, who is knowledgeable in the operations being implemented at the emergency response site.	II.2.d; III.3.b.(3).
(viii) When activities are judged by the safety official to be an IDLH condition and/or to involve an imminent danger condition, the safety official shall have authority to alter, suspend, or terminate those activities.	III.3.b.(3).
(ix) After emergency operations have terminated, the individual in charge of the ICS shall implement appropriate decontamination procedures.	III.3.c.(6).

ATTACHMENT 3: REGULATORY CROSS-COMPARISON MATRICES—Continued

	ICP Citation(s)
(x) When deemed necessary for meeting the tasks at hand, approved self-contained compressed air breathing apparatus may be used with approved cylinders from other approved self-contained compressed air breathing apparatus provided that such cylinders are of the same capacity and pressure rating.	
(4) Skilled support personnel.	
(5) Specialist employees.	
(6) Training	III.5.
(7) Trainers.	
(8) Refresher training.	
(9) Medical surveillance and consultation.	
(10) Chemical protective clothing.	
(11) Post-emergency response operations.	
EPA's Risk Management Program (40 CFR Part 68)	
68.20–36 Offsite consequence analysis	III.3.d.(1).
68.42 Five-year accident history	III.4.b.
68.50 Hazard review	III.3.d.(1).
68.60 Incident investigation	III.4.a
68.67 Process hazards analysis	III.3.d.(1)
68.81 Incident investigation	III.4.a
68.95(a) Elements of an emergency response program:	
(1) Elements of an emergency response plan:	
(i) Procedures for informing the public and emergency response agencies about accidental releases.	II.2.a; III.2.
(ii) Documentation of proper first-aid and emergency medical treatment necessary to treat accidental human exposures.	III.3.c.(7); III.3.e.(1).
(iii) Procedures and measures for emergency response after an accidental release of a regulated substance.	II.1; II.2; II.3; II.4; III.3.a–c.
(2) Procedures for the use of emergency response equipment and for its inspection, testing, and maintenance.	III.3.e.(6).
(3) Training for all employees in relevant procedures	III.5.
(4) Procedures to review and update the emergency response plan	III.6.
68.95(b) Compliance with other federal contingency plan regulations.	
68.95(c) Coordination with the community emergency response plan.	

Notes to Attachment 3

[1] Facilities should be aware that most states have been authorized by EPA to implement RCRA contingency planning requirements in place of the federal requirements listed. Thus, in many cases state requirements may not track this matrix. Facilities must coordinate with their respective states to ensure an ICP complies with state RCRA requirements.

[2] Facilities should be aware that most states have been authorized by EPA to implement RCRA contingency planning requirements in place of the federal requirements listed. Thus, in many cases state requirements may not track this matrix. Facilities must coordinate with their respective states to ensure an ICP complies with state RCRA requirements.

[3] Facilities should be aware that most states have been authorized by EPA to implement RCRA contingency planning requirements in place of the federal requirements listed. Thus, in many cases state requirements may not track this matrix. Facilities must coordinate with their respective states to ensure an ICP complies with state RCRA requirements.

[4] Section 264.56 is incorporated by reference at § 264.52(a).

[5] Incorporates by reference § 264.37.

[6] Section 265.56 is incorporated by reference at § 265.52(a).

[7] Incorporates by reference § 265.37.

[8] Section 279.52(b)(6) is incorporated by reference at § 279.52(b)(2)(i).

[9] Incorporates by reference § 279.52(a)(6).

[10] Non-response planning parts of this regulation (e.g., prevention provisions) require a specified format.

[11] If a facility is required to develop a strong oil spill contingency plan under this section, the requirement can be met through the ICP.

[12] The appendix further describes the required elements in 120.20(h). It contains regulatory requirements as well as recommendations.

[13] Specific plan requirements for sections listed under 154.1030(b) are contained in 154.1035(a)–(g).

[14] Note: Sections 154.1045 and 154.1047 contain requirements specific to facilities that handle, store, or transport Group I–IV oils and Group V oils, respectively.

[15] Ibid.

[16] Section 1910.38(a)(3) incorporates 29 CFR 1910.165 by reference.

Dated: April 18, 1996.

Elliott P. Laws,

Assistant Administrator, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency.

Dated: April 22, 1996.

Rear Admiral James C. Card,

Chief, Marine Safety and Environmental Protection Directorate, U.S. Coast Guard.

Dated: April 18, 1996.

Richard B. Felder,

Associate Administrator for Pipeline Safety, Research and Special Programs Administration, U.S. Department of Transportation.

Dated: April 18, 1996.

John B. Moran,

Director of Policy, Occupational Safety and Health Administration, Department of Labor.

Dated: April 18, 1996.

Thomas Gernhofer,

Associate Director, Offshore Minerals Management, Minerals Management Service, Department of the Interior.

[FR Doc. 96-13712 Filed 6-4-96; 8:45 am]

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ATTACHMENT 9

NMED Determination of Average
Volatile Organics Concentration by Acceptable Knowledge
For Selected Waste Streams to the ETU

The Table below lists selected waste streams and the best evaluation of their average VO concentrations. The information used to make this determination were the MSDS of the corresponding product, the WIWPS database that NASA submitted, and the generation process described in each WIWPS. The waste streams where hydrazine interscans were used to determine the concentration of the fuels in the waste stream are not included in this table. The use of interscans is not an appropriate or approved method for determining the concentration of hydrazine in a waste. As per Comment 6 of the Technical Comments of NOD Part 1, the hydrazine wastes must be excluded from the waste streams discharged to the ETU. This compiled table is not inclusive. There are multiple waste streams for which MSDS were not submitted or the corresponding MSDSs were outdated. After the review of the MSDSs of the waste streams and the update of the WIWPS database, more waste streams may be identified for initial analysis, and monitoring in order to ensure compliance with 40 CFR 264 subpart CC.

WIWPS#	Organic Constituents	Total Organic Concentration ppm	Volatile Organic Content	Approximate VO Concentration ppm	Method 25D Recommended?
10-20-13	>Citric Acid	100,000	Possible	>500	Yes
20-01-11 80-04-18	>Surfactants >Organic Chelating Agents	12,000	Possible	>500 12,000	Yes
20-01-13	No info available	250,000	Possible	>500	Yes
20-01-18	No info available	60,000	Yes	800	Yes
20-01-36	Multiple	1,000	Yes	1,000	Yes
20-01-37	Multiple	No info given	Yes	<500	Yes
20-01-45	No info avail	1,100	Yes	1,100	Yes
20-01-50 80-04-17	Surfactants	10,000	Possible	5,000 10,000	Yes
20-01-52	Surfactants	10,000	Possible	10,000	Yes
20-01-54	>Dodecylbenzene Sulfonic Acid	10,000	Yes	10,000	Yes
20-02-01	>Acetic Acid	10,000	Yes	10,000	Yes
20-02-07	No info available	60,000	Yes	8,000	Yes

WIWPS#	Organic Constituents	Total Organic Concentration ppm	Volatile Organic Content	Approximate VO Concentration ppm	Method 25D Recommended?
20-02-08	Multiple	1,000,000	Yes	>10,000	Yes
20-02-14	>Sodium Acetate >Amonium Acetate	50,000	Yes	>1,000	Yes
20-02-20	>DMBAC[i] >Ethyl Alcohol >Methyl Alcohol	61,000	Yes	61,000	Yes
20-02-20	>Diethanolamine >Proprietary	>10,000	Possible	>10,000	Yes
20-04-03	>Hydrazines	50,000	Yes	50,000	Yes
20-04-23	>Hydrazines >DMAZ[ii]	>50,000	Yes	>50,000	Yes
20-04-49	>Hydrazines >Citric Acid	1,000-100,000	Yes	>1,000	Yes
20-04-72	>DMAZ[ii]	1,000,000	Yes	1,000,000	Yes
20-04-66	>Organic Solvents >Organic Acids	10,000-500,000	Yes	>10,000	Yes
20-05-01	>Trisodium Nitrilo triacetate	20,000	Possible	20,000	Yes
20-05-06	>2-Thiourea >EDTA Disodium Salt	75,000	Possible	75,000	Yes
20-13-01 20-13-02 20-13-03 20-13-04	No info available	-	Yes	>200	Yes
80-04-01	>Hexamethylene Tetramine	No info available	Possible	No info available	Yes
80-04-15	No info available	11,000	Yes	11,000	Yes

[i] N-Alkyl Dimethyl Benzyl Ammonium Chloride
[ii] Dimethyl-2-Azidoethylamine

Technical Comments
RCRA Permit Renewal Application
NOD Part 1

ATTACHMENT 10

References on Storage Tanks Air Emissions

Estimate Storage Tank Emissions

JIMMY PERESS,
TRITECH CONSULTING ENGINEERS

Use this shortcut to quickly determine emissions from fixed-roof storage tanks.

Fixed-roof storage tanks containing organic liquids are widely used in all industries that produce or consume organic liquids. Emissions from fixed-roof storage tanks consist of working losses and breathing losses (often referred to as standing losses).

Engineers often need to estimate emissions from the storage tanks to prepare air permits or develop emission estimates. The EPA has published a detailed method for calculating losses from storage tanks *(1)*. However, it is quite tedious and time-consuming to the occasional user.

To assist industry, the EPA has developed a software program to calculate storage tank losses. The software program, entitled TANKS 4.09, is available for downloading from the EPA Web site *(2)*. Other commercial software is also available (see the *CEP* Software Directory at www.aiche.org/software).

This article presents an adaptation of the conventional EPA method tgo provide a quick estimate of the emissions from fixed-roof storage tanks.

Simplified procedure — working losses

Working losses occur when the vapor in the vapor space over the liquid is displaced from the tank by the addition of organic liquid during tank filling. Working losses depend on the annual amount of material pumped, the vapor pressure of the material stored, and the ambient temperature.

The working losses can be estimated by:

$$L_w = Q_w\,(1/359)(273.15/T)(VP/760)(MW)(K_N)(K_p) \qquad (1)$$

K_N, the turnover factor, is based on the number of turnovers per year, N, which is defined as $N = Q_w/V_T$. $K_N = (180 + N)/6N$ for $N > 36$ and $K_N = 1$ for $N < 36$. K_p, the working loss product factor, is defined as $K_p = 0.75$ for crude oils and $K_p = 1.0$ for organic liquids.

Simplified procedure — breathing losses

Breathing losses occur because differences in temperature (such as changes between day and night temperatures) affect the vapor space pressure inside storage tanks. Vapors expand with an increase in temperature and contract with a decrease in temperature. In addition, the saturated vapor concentration of a substance in air increases with increasing temperature and decreases with decreasing temperature. As the outside temperature rises during the day, the pressure inside a tank increases and air will be expelled from the tank. As the temperature falls during the night, pressure in the tank decreases and fresh air flows into the tank.

The simplified method for calculating the breathing losses is an adaptation of an EPA method published in Ref. 1.

Consider a tank with a volume of V_T and a liquid level L_T. The vapor space of the tank is:

$$V_v = V_T(100 - L_T)/100 \qquad (2)$$

The vapor expansion factor due to day-night temperature fluctuation is defined as:

$$K_E = T_R/T \qquad (3)$$

where the average ambient temperature is T and the day-night temperature fluctuation is T_R.

The total air displaced per day is calculated by:

$$M_{air} = (V_v)(1/359)(K_E)(273.15/T) \qquad (4)$$

The breathing losses can now be estimated from:

$$L_b = 365M_{air}(VP/760)(MW) \qquad (5)$$

Conventional EPA methodology

The EPA procedure for estimating working losses assumes a constant temperature of 15°C (59°F), but it is otherwise identical to the shortcut method described above.

The method adopted by the EPA to estimate breathing losses is described in full in Ref. 1. The basic equation is:

$$L_s = 365(V_v)(W_v)(K_E)(K_s) \qquad (6)$$

In general terms, the vapor space expansion factor (K_E) represents the combined effect of the day-night temperature fluctuation on the volume of the vapors and on the vapor pressure of the liquid in the tank.

The vented vapor saturation factor (K_s) can be viewed as the approach to saturation of the liquid in the vapor space. It is governed by the vapor pressure of the liquid and the tank outage (height of the vapor space in the tank). The saturation factor approaches 1.0 when the vapor pressure is low or the tank outage is small.

Ref. 1 provides detailed guidelines for evaluating each of

Source
www.arb.ca.gov/
toxics/tac/
factshts/11dmthlh.
pdf

1,1-DIMETHYL HYDRAZINE

1,1-Dimethyl hydrazine is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 57-14-7 $(CH_3)_2NNH_2$

Molecular Formula: $C_2H_8N_2$

1,1-Dimethyl hydrazine is a clear, colorless, flammable, hygroscopic liquid with an ammonia-like, fishy odor. It is miscible with water, ethanol, ether, dimethylformamide, and hydrocarbons. The liquid fumes in air and gradually turns yellow. Its vapor is inflammable in air but ignites spontaneously when in contact with heat, flame, or oxidizers. When heated to decomposition, it emits toxic fumes of nitrogen oxides (NTP, 1991).

Physical Properties of 1,1-Dimethyl Hydrazine

Synonyms:	unsym-dimethylhydrazine; asym-dimethylhydrazine; n,n-dimethylhydrazine; UDMH; Dimazine
Molecular Weight:	60.10
Boiling Point:	63.9 °C
Melting Point:	-58 °C
Flash Point:	-15 °C (5 °F)
Vapor Density:	1.94 (air = 1)
Density/Specific Gravity:	0.791 at 25/4 °C (water = 1)
Vapor Pressure:	157 mm Hg at 25 °C
Conversion Factor:	1 ppm = 2.46 mg/m^3

(HSDB, 1991; Merck, 1989; Sax, 1987; Sax, 1989; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

1,1-Dimethyl hydrazine is used as a component of jet and rocket fuels, in chemical synthesis, as a stabilizer for organic fuel additives, as an absorbent for acid gases, and in photography (HSDB, 1991).

The primary stationary sources that have reported emissions of 1,1-dimethyl hydrazine in

California are manufacturers of guided missiles and space vehicles and parts (ARB, 1997b).

B. Emissions

The total emissions of 1,1-dimethyl hydrazine from stationary sources in California are estimated to be at least 910 pounds per year, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

1,1-Dimethyl hydrazine has not been reported as occurring naturally (HSDB, 1991).

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of 1,1-dimethyl hydrazine.

INDOOR SOURCES AND CONCENTRATIONS

No information regarding the indoor sources and concentrations of 1,1-dimethyl hydrazine was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

In the atmosphere, 1,1-dimethyl hydrazine will react with hydroxyl (OH) radicals and ozone (O_3). The gas phase reaction with the OH radical is expected to have a calculated half-life and lifetime of about 4 hours and 5 hours, respectively. The reaction with O_3 is fast, leading to a calculated half-life and lifetime of 1,1-dimethyl hydrazine due to reaction with O_3 of less than 17 minutes and 25 minutes, respectively, for an average O_3 concentration of 30 ppb. Clearly, the ozone reaction is calculated to dominate, leading to a short half-life and lifetime for 1,1-dimethyl hydrazine in the atmosphere (Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

The Office of Environmental Health Hazard Assessment reviews risk assessments submitted under the Air Toxics "Hot Spots" Program (AB 2588). Of the risk assessments reviewed as of April 1996, 1,1-dimethyl hydrazine contributed to the total cancer risk in 1 of the approximately 550 risk assessments reporting a total cancer risk equal to or greater than 1 in 1 million (OEHHA, 1996a).

HEALTH EFFECTS

The most probable routes of human exposure to 1,1-dimethyl hydrazine are inhalation, ingestion, and dermal contact.

Non-Cancer: 1,1-Dimethyl hydrazine is a central nervous system convulsant, and an irritant of the eyes, skin, and respiratory tract. It is toxic to the liver. Symptoms of acute inhalation overexposure in humans include headache, facial numbness and swelling, increased salivation, nausea, vomiting, seizures, coma, and pulmonary edema. Chronic exposure in test animals has been shown to cause hemolytic anemia, convulsive seizures, and kidney damage (U.S. EPA, 1994a).

The United States Environmental Protection Agency (U.S. EPA) Reference Concentration (RfC) is under review, and no oral Reference Dose (RfD) has been established (U.S. EPA, 1994a).

No information on adverse reproductive effects in humans or animals is available (U.S. EPA, 1994a).

Cancer: No information on the carcinogenic effects of 1,1-dimethyl hydrazine in humans is available. Limited evidence in rats and mice exposed by inhalation indicates increased tumors of the skin, lung, kidney, liver, pancreas, and pituitary, and a high incidence of angiosarcomas in various organs in mice. The U.S. EPA has classified 1,1-dimethyl hydrazine in Group B2: Probable human carcinogen (U.S. EPA, 1994a). The International Agency for Research on Cancer (IARC) has classified 1,1-dimethyl hydrazine in Group 2B: Possible human carcinogen based on sufficient evidence in animals (IARC, 1987a).

The State of California has determined under Proposition 65 that 1,1-dimethyl hydrazine is a carcinogen (CCR, 1996). The preliminary recommended potency value for use in cancer risk assessments is 4.9×10^{-4} (microgram per cubic meter)$^{-1}$. In other words, the potential excess cancer risk for a person exposed over a lifetime to 1 microgram per cubic meter of 1,1-dimethyl hydrazine is estimated to be no greater than 490 in 1 million (CAPCOA, 1993).

<<< For Best Viewing, Use Your Maximum Window Size at a Resolution of 800 by 600 >>>

Air Dispersion Modeling Conversions and Formulas

Click in table below on desired item:

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Converting Atmospheric Pollutant Concentrations: from mg/m^3 to ppmv

The conversion factor depends on the temperature at which you want the conversion (usually about 20 to 25 degrees Centigrade). At an ambient pressure of 1 atmosphere, the general equation is:

[redacted]

where:

ppmv = ppm by volume (i.e., volume of gaseous pollutant per 10^6 volumes of ambient air)
mg/m^3 = milligrams of gaseous pollutant per cubic meter of ambient air
MW = molecular weight of the gaseous pollutant
°C = ambient air temperature in degrees Centigrade

As an example, for gaseous pollutant NOx, convert 20 mg/m^3 to ppmv at 25 °C:

ppmv = (20)(273.15 + 25) / (12.187)(46.01) = 10.6

where: 46.01 = molecular weight of NO_2 (i.e., NOx expressed as nitrogen dioxide)

NOTES:
(1) The pollution laws and regulations in the United States typically reference their pollutant limits to an ambient temperature of 20 to 25 °C as noted above. However, in other nations, the reference ambient temperature for pollutant limits may be 0 °C or other values.
(2) 1 percent by volume = 10,000 ppmv (i.e., parts per million by volume).
(3) For all practical purposes, degrees Centigrade and degrees Celsius are synonymous.

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[redacted]

where:

a = altitude, in 100's of meters
P_a = atmospheric pressure at altitude a, in atmospheres
C = concentration at sea level altitude, in mass per unit volume
C_a = concentration at altitude a, in mass per unit volume

As an example, given a concentration of 260 mg/m^3 at sea level, calculate the equivalent concentration at an altitude of 1,800 meters:

$C_a = (260)(0.9877^{18}) = 208$ mg/m^{3}at 1,800 meters altitude

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Calculation Of Gas Densities:

The following equation for the density of a gas in pounds per cubic foot is derived from the ideal gas law and the applicable universal gas constant:

[redacted]

The following equations for the density of a gas in kilograms per cubic meter are also derived from the ideal gas law and the applicable universal gas constants ... one of the equations uses the absolute pressure expressed in atmospheres and the other uses the absolute pressure expressed in kilopascals:

[redacted]

[redacted]

where:

MW = molecular weight of the gas

psia = absolute pressure in pounds per square inch
atm = absolute pressure in atmospheres
kPa = absolute pressure in kilopascals
1 atm = 14.696 psia = 101.325 kPa
°R = absolute temperature of the gas in degrees Rankine = 459.67 + °F
°K = absolute temperature of the gas in degrees Kelvin = 273.15 + °C

°F = degrees Fahrenheit = (1.8) (°C) + 32
°C = degrees Centigrade = (°F - 32) / 1.8

V_1 and V_2 = gas volumes in the same dimensional units
P_1 and P_2 = absolute pressures in the same dimensional units
T_1 and T_2 = absolute temperatures in the same units (either degrees °R or degrees °K)

°R = absolute temperature in degrees Rankine = 459.67 + °F
°K = absolute temperature in degrees Kelvin = 273.15 + °C
°F = degrees Fahrenheit = (1.8) (°C) + 32
°C = degrees Centigrade = (°F - 32) / 1.8

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Definition Of The Pasquill Stability Classes:

The amount of turbulence in the ambient air has a major effect upon the rise and dispersion of air pollutant plumes. The amount of turbulence can be categorized into defined increments or "stability classes". The most commonly used categories are the Pasquill stability classes A, B, C, D, E, and F. Class A denotes the most unstable or most turbulent conditions and Class F denotes the most stable or least turbulent conditions.

The Pasquill stability classes are presented below as they are defined by the prevailing meteorological conditions of: (a) surface windspeed measured at 10 meters above ground level and (b) day-time incoming solar radiation or the night-time percentage of cloud cover.

[illegible]		[illegible]			[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]						

NOTES:
(1) m/s = meters per second
(2) mi/hr = statute miles per hour

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Pressure Conversions:

Atmospheric pressures may be expressed in a number of different units. The following table provides the conversions between six of the most commonly used units of pressure. Here are some

u_z = wind velocity at height z
u_g = wind velocity at ground station height
h_z = height z
h_g = ground station height (usually 10 meters)
n = a function of the Pasquill stability class and the terrain type (see tables below)

[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

As an example, given a windspeed of 5 m/s measured at 10 meters above the ground and a stability class of B in rural terrain, calculate the windspeed at 500 meters above ground:

$u_z = (5)(500/10)^{0.15} = 9$ m/s

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Converting Mass Flow Rates To Volumetric Flow Rates:

Gaseous emission flow rates (from process vents, combustion flue gases from furnaces or boilers, accidental gaseous releases, etc.) are often expressed in mass flow rates. To convert such mass flow rates to volumetric flow rates, first calculate the gas density (as explained in one of the sections above) using the actual temperature and pressure of the gaseous emission. Then use either of the following equations:

[redacted]

where:

ft^3 / hr = gas volumetric flow rate in cubic feet per hour
lbs / hr = gas mass flow rate in pounds per hour
lbs / ft^3 = gas density in pounds per cubic foot

[redacted]

You can use the following equation to convert the measured NOx content from a "wet" basis to a "dry" basis by using the following equation:

[redacted]

where:

W = fraction of the exhaust gas, by volume, which is water vapor

Thus, the ppmv, dry basis = (40) / (1 - 0.10) = 44.44

Now, you can use the following equation to convert the 44.4 NOx ppmv, dry basis at 5 volume percent oxygen in the exhaust gas to NOx ppmv, dry basis at 3 volume percent oxygen in the exhaust gas:

[redacted]

where:

C_a = ppmv of x in a dry combustion exhaust gas containing volume % oxygen = A

C_b = ppmv of x in a dry combustion exhaust gas containing volume % oxygen = B

Thus, the ppmv, dry basis at 3 volume % oxygen = (44.44) (20.9 - 3) / (20.9 - 5) = 50.03 which is below the regulation limit in our hypothetical example of 55 ppmv, dry basis at 3 volume % oxygen.

Notes:

– Although ppmv has been used in the above equations and examples, you may use other volumetric concentrations such as: ppbv (parts per billion by volume), volume percent, etc.

– 1 percent by volume = 10,000 ppmv (i.e., parts per million by volume).

– Although NOx has been used as the pollutant in the above examples, you may use any other gaseous pollutant such as: SO_2, CO, etc.

– The reference for equation (1) above is "40 CFR, Chapter I, Part 60, Appendix A-3, Test Method 4".

– The reference for equation (2) above is "40 CFR, Chapter I, Part 60, Appendix B, Performance Specification 2".

– Access both references at www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr60a_00.html

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