

Statement of Basis

**Permit to Construct No. P-2011.0077
Project No. 60807**

**U.S. Department of Energy, Idaho Operations Office (DOE-ID)
Battelle Energy Alliance, LLC (BEA)
Idaho National Laboratory (INL)
Materials and Fuels Complex(MFC)
Fuel Manufacturing Facility (FMF)
Scoville, Idaho
Facility ID No. 011-00022**

Final

**April 5, 2011
Ken Hanna
Permit Writer**



The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01. et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

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ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AFCI	Advanced Fuel Cycle Initiative
AIRS	Aerometric Information Retrieval System
ANSI	American National Standards Institute
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
ASME	American Society of Mechanical Engineers
BEA	Battelle Energy Alliance, LLC
CAM	Compliance Assurance Monitoring
CEMS	continuous emission monitoring systems
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
DOE-ID	U.S. Department of Energy, Idaho Operations Office
EBR-II	Experimental Breeder Reactor No. 2
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
FCRD	Fuel Cycle Research and Development
FFTF	Fast Flux Test Facility
FMF	Fuel Manufacturing Facility
HAP	hazardous air pollutants
HEU	Highly Enriched Uranium
hr/yr	hours per year
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pounds per hour
lb/qtr	pound per quarter
MACT	Maximum Achievable Control Technology
MFC	Materials and Fuels Complex
mrem/yr	millirem per year
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
Np	neptunium
NSPS	New Source Performance Standards
O&M	operation and maintenance
PM	particulate matter
PM ₁₀	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Pu	plutonium
Rules	Rules for the Control of Air Pollution in Idaho
SO ₂	sulfur dioxide
T/yr	tons per consecutive 12-calendar month period
TAP	toxic air pollutants
TRU	transuranic
UH	uranium handling
VOC	volatile organic compounds
WC	Waste Characterization

FACILITY INFORMATION

Description

Current activities conducted in gloveboxes and under hoods as part of the FMF mission include (1) processing surplus nuclear material currently stored at MFC for use or consolidation elsewhere in the DOE complex, (2) R&D on new fabrication methods for high density low enrichment fuel forms, (3) fuel fabrication for the Fuel Cycle Research and Development (FCRD) to investigate options for actinide transmutation fuels and targets, and (4) storage of programmatic uranium and transuranic (TRU) material, including plutonium (Pu) and neptunium (Np).

There are currently four gloveboxes in use at FMF. These include the Advanced Fuel Cycle Initiative (AFCI) glovebox in the north workroom and the Waste Characterization (WC), uranium handling (UH), and Highly Enriched Uranium (HEU) gloveboxes in the south workroom. Processing of Pu bearing and other TRU materials is primarily performed in the AFCI glovebox and the WC glovebox. Processing of uranium bearing materials is performed in all gloveboxes. Additional gloveboxes are planned for future installation in the south workroom. For more detail, refer to the process descriptions provided in the PTC application that is stored with this document in the TRIM database.

Permitting History

This is the initial PTC for the MFC FMF. It is for a modification to an existing facility that did not previously require a permit.

Application Scope

This permit is the initial PTC for the MFC FMF. See the current Tier I permit statement of basis for the permitting history for the INL. This permit application seeks approval to modify the facility by increasing current processing rates for surplus nuclear material and provide increased research capability for the Fuel Cycle Research and Development (FCRD) Project. The installation of new gloveboxes, hoods and stack monitoring system will support these process enhancements and are also included in this application.

Application Chronology

February 3, 2011	DEQ received an application and an application fee.
February 7, 2010	DOE/BEA held an informational public meeting for the proposed project
February 10, 2010	DEQ approved pre-permit construction and determined that the application is complete.
February 17 – March 4, 2011	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
March 8, 2011	DEQ made available the draft permit and statement of basis for peer and regional office review.
March 14, 2011	DEQ made available the draft permit and statement of basis for applicant review.
April 1, 2011	DEQ received the permit processing fee.

TECHNICAL ANALYSIS

Emissions Units and Control Devices

Table 1 EMISSIONS UNIT AND CONTROL DEVICE INFORMATION

ID No.	Source Description	Control Equipment Description	Emissions Point ID No. and Description
FMF Stack	<u>Emissions Unit Name:</u> Hoods and Gloveboxes in FMF processing areas	<u>Control Device Name:</u> HEPA Filter System PM ₁₀ control efficiency: 99.97%	FMF Stack

Emissions Inventories

An emission inventory was developed by the applicant for this modification of the FMF. It was provided as Table 5.1 in the permit application and a copy is shown below. Because of the nature of the material processed at this facility, and the low volume/tonnage of material processed, and the ultra stringent DOE regulations governing the control and emission of materials managed in the FMF, the air emissions associated with this modification are very low. It is noted that the existing emergency generator at this facility is not changed as a result of this permit modification, therefore there is no change/increase in emissions from the generator as a result of this project. This generator continues to be regulated as specified in the INL Tier I operating permit. Emissions estimates of criteria pollutant PTE were based on process information specific to the facility for this proposed modification.

Table 5.1. List of FMF Chemicals Compared to IDAPA 58.01.01.585 and 586.

Chemical Name	CAS #	TAP	Estimated Annual Usage (lb/yr)	Estimated Hourly Release (lb/hr)	Screening Level (lb/hr)	Exceeds Screening Level
Polyethylene Glycol (PEG = Carbowax) (>99%)	25322-68-3	no	2.2	NA	NA	NA
Acetaldehyde (0.01%)	75-07-01	yes	2.20E-04	2.51E-08	3.00E-03	no
1,4 dioxin (0.0001%)	123-91-1	yes	2.20E-06	2.51E-10	4.80E-03	no
Ethylene oxide (0.0001%)	75-21-8	yes	2.20E-06	2.51E-10	6.70E-05	no
Formaldehyde (0.0001%)	50-00-0	yes	2.20E-06	2.51E-10	5.10E-04	no
Mobilcer	none	no	2.2	NA	NA	NA
Water (50%)	732-78-5	no	1.1	NA	NA	NA
Microcrystalline Wax (50%)	64742-60-5	no	1.1	NA	NA	NA
Polyox™ WSR 301	NA	no	2.2	NA	NA	NA
Ammonia (0.02%)	7664-41-7	yes	4.40E-04	5.02E-08	1.20E+00	no
Ethylene oxide (0.02%)	75-21-8	yes	4.40E-04	5.02E-08	6.70E-05	no
Monoethylamine (0.04%)	75-04-7	yes	8.80E-04	1.00E-07	1.20E+00	no
Windex	none	no	7.5	NA	NA	NA
Water (96%)	7732-18-5	no	7.2	NA	NA	NA
Isopropanol (5%)	67-63-0	yes	0.375	1.88E-04	65.3	
Ethyleneglycol Monohexylether (1%)	112-25-4	no	7.20E-02	NA	NA	NA
Zinc stearate	557-05-1	no	2.2	NA	NA	NA
Sodium	7440-23-5	no	1.10E+02	NA	NA	NA
Ethanol	64-17-5	yes	2.2	1.10E-03	1.25E+02	no
Methanol	67-56-1	yes	2.2	1.10E-03	1.25E+02	no
Uranium Metal	7440-61-1	yes	2.3E+3	2.60E-08	1.30E-03	no

The permittee applied for and complied with the requirements for obtaining Pre-permit construction approval for the FMF modification project. This included compliance with the requirements for providing notice and holding an informational meeting to inform the public of the proposed project. This meeting was held at the Idaho Falls Public Library on February 7, 2011. The application materials were reviewed and found to be complete and include information to describe how compliance will be achieved with applicable requirements for the proposed project. On this basis, pre-permit construction approval was issued by DEQ on February, 10 2011. With this approval the applicant may commence construction, at risk as described in Section 213.02, and commencement of operations as described under the proposed modification to the facility shall not occur until after the PTC is issued.

Tier II Operating Permit (IDAPA 58.01.01.401)

The procedures of IDAPA 58.01.01.400–410 for a Tier II Operating Permit do not apply.

Visible Emissions (IDAPA 58.01.01.625)

The sources of PM₁₀ emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by conditions in the Tier I operating permit that set forth requirements for periodic visual emissions inspections at the facility.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

The INL is classified as a major facility under the Title V program and a Tier I Operating Permit has been issued for this purpose. It is not necessary to modify the Tier I permit as a result of issuance of this PTC since it already contains site-wide requirements to meet the NESHAP regulations under 40 CFR 61 Subpart H and because the remaining conditions in this PTC are “State-only Requirements” that are not required to be included in the Tier I permit.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 Prevention of Significant Deterioration of Air Quality

The INL is classified as an existing major stationary source under the PSD program. It is noted that there is not a reasonable possibility that this project would be a major modification, since the increase in emissions is far below the significant thresholds. Also, no limitations were applied to this project to prevent it from being a major modification. The PSD requirements, including the recordkeeping requirements under 52.21(r)(6) do not apply to this project.

NSPS Applicability (40 CFR 60)

NSPS requirements do not apply to this project to modify FMF operations. If 40 CFR 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, applies to the existing unmodified 67 horsepower standby diesel generator, this will be addressed in detail in the forthcoming Tier I renewal permit.

NESHAP Applicability (40 CFR 61)

The FMF is subject to NESHAP regulations under 40 CFR 61 Subpart H, National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities. Under 40 CFR 61.93, this modification project will trigger additional continuous stack monitoring requirements for the FMF. It is noted that EPA has retained authority to administer Subpart H and has not delegated this authority to DEQ, therefore, any

approvals or interpretations of this regulation will be managed by EPA.. The modification associated with this project for the FMF triggers the requirement to apply for an “approval to construct” from the EPA in accordance with 40 CFR 61.96. This application was sent to EPA and approved on March 3, 2011. Refer to the copy attached in Appendix A for details. The Tier I permit already contains site-wide requirements to meet the NESAPS regulations under 40 CFR 61 Subpart H. Similar permit conditions are included in this permit also. The Tier I permit conditions for Subpart H are sufficient to address this modification to the FMF and they do not require modification as a result of issuance of this permit.

MACT Applicability (40 CFR 63)

The modified operations of the FMF are not subject to any MACT standards in 40 CFR Part 63. If 40 CFR 63 Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, applies to the existing unmodified 67 horsepower standby diesel generator, this will be addressed in detail in the forthcoming Tier I renewal permit.

CAM Applicability (40 CFR 64)

The Compliance Assurance Monitoring (CAM) requirements under 40 CFR Part 64 do not apply to the HEPA filter system because the potential pre-control device emissions of PM/PM10 are less than 100 tons per year in accordance with 40 CFR 64.2(a)(3). Also, exemption requirements under 40 CFR 64.2(b)(1)(i) and (vi) would apply.

Permit Conditions Review

This section describes the permit conditions for this initial permit or only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action.

Initial Permit Conditions 1-4

These are standard permit conditions to describe the scope and details about the project.

Initial Permit Conditions 5, 6, 9 and 11

These permit conditions set forth the NESHAP regulations under 40 CFR 61 Subpart H as they apply to the FMF. The NESHAP regulations include the following; emission standard/limit under 40 CFR 61.92 that applies to all sources at the INL, including the FMF; detailed operating monitoring and recordkeeping requirements under 40 CFR 61.93, including requirements for the FMF to install and operate a CEMS to continuously monitor emissions; and recordkeeping and reporting to document radionuclide emissions and effective dose equivalent values in accordance with 40 CFR 61.94 and 61.95.

With regard to permit conditions 6 and 9.1, all radiological and nuclear material that is not being processed in FMF is stored in a closed metal container. The term "Primary Container" is the verbiage used in the Documented Safety Analysis for this closed metal container. For consistency in terminology this term was used in the PTC.

Initial Permit Conditions 7, 8 and 10

A HEPA filter system is integral to this facility to capture radionuclides and prevent their release out of the stack. This system also controls emissions of any other PM and particulate TAPs. Since credit is taken for reduction of TAP emissions by the HEPA filter system, requirements for installation and operation of this system are included in the permit as “state-only requirements”. Specific requirements are included as conditions in the permit to assure that the filter system continues to operate in the manner described in the permit application, and for which compliance with applicable requirements was demonstrated in the permit application. Those specific requirements include the following: minimum filter efficiency; standards for installation and testing; procedures for operation and maintenance; and requirements for monitoring and recordkeeping of pressure drop measurements. The permit conditions specified for the FMF are consistent with similar HEPA system requirements that already exist for other MFC facilities.

With regard to permit condition 10, the term “when facility is accessed for operation” was used to instead of the typical permit language “in operation” to cover instances where the facility may not be manned (i.e. weekends or

periods of curtailment).

Initial Permit Condition 12

The standard permit condition that addresses the applicability of CFR requirements was added to this permit. This is consistent with the permit condition that is used in the facility-wide section of the INL Tier I renewal permit. It is important to note that whenever there is a conflict in the meaning between a PTC permit condition and a CFR requirement, the CFR will take precedence.

Initial Permit Conditions 13 through 24; PTC General Provisions

Standardized “General Provisions” that are included in all Permits to Construct are also included in this permit. Those provisions are described individually below:

The duty to comply general compliance provision requires that the permittee comply with all of the permit terms and conditions pursuant to Idaho Code §39-101.

The maintenance and operation general compliance provision requires that the permittee maintain and operate all treatment and control facilities at the facility in accordance with IDAPA 58.01.01.211.

The obligation to comply general compliance provision specifies that no permit condition is intended to relieve or exempt the permittee from compliance with applicable state and federal requirements, in accordance with IDAPA 58.01.01.212.01.

The inspection and entry provision requires that the permittee allow DEQ inspection and entry pursuant to Idaho Code §39-108.

The construction and operation notification provision requires that the permittee notify DEQ of the dates of construction and operation, in accordance with IDAPA 58.01.01.211.

The performance testing notification of intent provision requires that the permittee notify DEQ at least 15 days prior to any performance test to provide DEQ the option to have an observer present, in accordance with IDAPA 58.01.01.157.03.

The performance test protocol provision requires that any performance testing be conducted in accordance with the procedures of IDAPA 58.01.01.157, and encourages the permittee to submit a protocol to DEQ for approval prior to testing.

The performance test report provision requires that the permittee report any performance test results to DEQ within 30 days of completion, in accordance with IDAPA 58.01.01.157.04-05.

The monitoring and recordkeeping provision requires that the permittee maintain sufficient records to ensure compliance with permit conditions, in accordance with IDAPA 58.01.01.211.

The excess emissions provision requires that the permittee follow the procedures required for excess emissions events, in accordance with IDAPA 58.01.01.130.

The certification provision requires that a responsible official certify all documents submitted to DEQ, in accordance with IDAPA 58.01.01.123.

The false statement provision requires that no person make false statements, representations, or certifications, in accordance with IDAPA 58.01.01.125.

The tampering provision requires that no person render inaccurate any required monitoring device or method, in accordance with IDAPA 58.01.01.126.

The transferability provision specifies that this permit to construct is transferable, in accordance with the procedures of IDAPA 58.01.01.209.06.

The severability provision specifies that permit conditions are severable, in accordance with IDAPA 58.01.01.211.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c. During this time, there were no comments received on the application and there was not a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

APPENDIX A – EPA APPROVAL, 40 CFR 61 SUBPART H NESHAP



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
AIR, WASTE AND TOXICS

March 3, 2011

Mr. Tim J. Safford
Environmental Technical Support Division
Department of Energy
Idaho Operations Office
1955 Fremont Avenue
Idaho Falls, Idaho 83415

Re: Idaho National Laboratory Application to Construct – Fuel Manufacturing Facility

Dear Mr. Safford:

This letter is in response to your February 1, 2011, letter requesting the U.S. Environmental Protection Agency's (EPA) review and approval of the application to install new equipment and to increase processing rates in the Fuel Manufacture Facility (FMF) within the Material and Fuels Complex (MFC), which is located at the Idaho National Laboratory (INL). Based on the discussion below, EPA approves your request on your increase in process rates and new equipment installation.

BACKGROUND

The Fuel Manufacture Facility was constructed in 1986 to house binary fuel and its associated manufacturing equipment to sustain a fuel manufacturing operation for INL's Experimental Breeder Reactor (EBR-II). Currently, there are four gloveboxes in use for the following FMF activities. They are:

1. Processing surplus nuclear material currently stored at MFC for use or consolidation elsewhere;
2. Research and development on new fabrication methods for high-density, low enrichment fuel forms;
3. Fuel fabrication for the Fuel Cycle Research and Development (FCRD) to investigate options for actinide transmutation fuels and targets; and
4. Storage of programmatic uranium and transuranic (TRU) material, including plutonium and neptunium.

Three of the gloveboxes, Waste Characterization (WC), Uranium Handling (UH), and Highly Enriched Uranium (HEU), are located in the South Workroom of FMF, while the Advanced Fuel Cycle Initiative (AFCI) glovebox is located in the North Workroom.

With recent emphasis by the Department of Energy (DOE) on developing new nuclear fuels and reactors designs, additional gloveboxes are planned for future installation to accommodate the increase of activities in the aforementioned processes. All additional gloveboxes will be installed in the South Workroom.

The Potential-to-Emit (PTE) for the future glovebox activities, based on actual unabated dose, is estimated to be 29.8 millirem (mrem) per year, and the abated Effective Dose Equivalent (EDE) to the maximally exposed individual (MEI) off site is expected to be 2.68E-06 mrem per year.

DETERMINATION

Because the PTE for new FMF activities is 29.8 mrem per year, INL does not meet the de minimus exemption pursuant to 40 CFR 61.96(b). According to 40 CFR 61.96(a), in addition to any activity that is defined as construction, this includes fabrication, erection or installation of a new building or structure within a facility, which emits radionuclides is considered new construction as specified of 40 CFR, part 61, Subpart A. The proposed INL activities are subject to approval by EPA.

My staff has reviewed your application and all pertinent information provided. Based on the review, I have determined your request satisfies all requirements under 40 CFR 61.07 and the estimated off-site emission of 2.68E-06 mrem per year is below the emission limit of 10 mrem per year set forth in 40 CFR 61.92. I hereby approve INL's request to install additional gloveboxes in the FMF South Workroom located in MFC.

Please note that INL is required to meet all monitoring, sampling, reporting and record keeping requirements as stated in 40 CFR 61 Subpart H. It is INL's responsibility to ensure that it is compliant with all State and local requirements for calculating radionuclide air emissions doses.

If you have any questions regarding this approval, please contact Davis Zhen of my staff at 206-553-7660 or email at zhen.davis@epa.gov.

Sincerely,



Richard Albright, Director
Office of Air, Waste and Toxics

APPENDIX B – FACILITY DRAFT COMMENTS

The following comments were received from the facility on April 1, 2011:

Facility Comment: Revise table numbers.

DEQ Response: The table numbers were changed.

Facility Comment: Change Permit Condition 6 to read as follows so the implementation of 40 CFR 61.93 is more clear for this particular facility: “In accordance with 40 CFR 61.93, when handling fuel outside its primary container, the permittee shall” A description of the meaning of the term “primary container” was also provided to be placed in the Statement of Basis so it is clear what this means.

DEQ Response: The permit condition and Statement of Basis were changed as requested. When active processing is not occurring, emissions are not expected to occur. Since EPA has retained authority for implementation and enforcement of 40 CFR 61 Subpart H, it will ultimately be EPA’s call on how this regulation is applied to the facility. In the event that there is a conflict between the meaning of the CFR and a permit condition, the CFR takes precedence. To make this more clear, standard permit condition 12 was added to the permit. This requirement is the same as the requirement included in the Tier I operating permit renewal.

Facility Comment: In Permit Conditions 7.2 and 7.4, change ANSI N510 to be ASME N510-1989.

DEQ Response: The conditions were changed as requested to clarify this testing requirement.

Facility Comment: In Permit Condition 9.1, replace the phrase “whenever the facility is operating” with the phrase “when handling fuel outside its primary container”. This clarifies when continuous monitoring and recordkeeping should be performed. Consistent with Permit Condition 6, a description of the meaning of this term was also provided for the Statement of Basis.

DEQ Response: The change was made to both the permit and Statement of Basis. It was not DEQ’s intent to require monitoring and recordkeeping when fuel materials are not being handled outside of their containers as described in the permit application. As noted above, ultimately the CFR and EPA’s interpretation of the regulation will take precedence over the permit condition.

Facility Comment: At the beginning of Permit Condition 10, replace the phrase “when in operation” with the phrase “when facility is accessed for operation”. A description of the meaning of this term was also provided to be placed in the Statement of Basis.

DEQ Response: The change was made to both the permit and Statement of Basis. DEQ does not intend for monitoring to be conducted when active processing operations, as described in the permit application, are not being performed. For example, if materials that are fully contained are being moved within the building for storage purposes, emissions would not occur and monitoring during this type of operation would not be necessary. On the other hand, when material containers are opened and being actively processed/handled within a glovebox, this constitutes operation as described in the permit application, and during periods when this occurs monitoring shall be conducted as specified in the permit condition.